институт за физику

примље	но:	27. 08. 20	25
Рад.јед.	6pol	Арх.шифра	Прилог
0801	142611		

Наставном већу Института за физику Београд Београд, 26.08.2025. године

предмет:

Молба за покретање поступка за реизбор у звање научни сарадник

Молим Научно веће Института за физику у Београду да, у складу са Правилником о стицању истраживачких и научних звања Министарства науке, технолошког развоја и иновација Републике Србије, покрене поступак за мој реизбор у звање научни сарадник.

У прилогу достављам:

- 1. Мишљење руководиоца лабораторије са предлогом чланова комисије за реизбор у наведено звање
- 2. Попуњен Образац за Материјал уз захтев за реизбор у звање (подаци о кандидату, преглед научне активности, приказ најзначајнијих резултата, показатељи успеха у научноистраживачком раду, библиографија кандидата, квантификација научних резултата кандидата)
- 3. Копију докторске дипломе
- 4. Копију решења о претходном избору у звање научни сарадник
- 6. Додатне прилоге (податке о цитираности, доказ о рецензирању, доказ о позивним предавањима на конференцијама (M31 i M32), доказе о M33 и M34 публикацијама)

С поштовањем,

У Београду 26.08.2025.год.

др Јелена Марјановић научни сарадник

Института за физику у Београду

ИНСТИТУТ ЗА ФИЗИКУ

ПРИМЉЕ	но:	27. 08. 20)25	
Рад.јед.	број	Арх.шифра Прило		
0801	1426/2			

Наставном већу Института за физику Београд Београд, 26.08.2025. године

предмет:

Мишљење руководиоца лабораторије о реизбору др Јелене Марјановић у звање научни сарадник

Др Јелена Марјановић је запослена у Лабораторији за неравнотежне процесе и примену плазме у оквиру Националног центра изузетних вредности за неравнотежне процесе Института за физику у Београду. Др Марјановић је ангажована у области експерименталног истраживања пробоја и карактеристика неравнотежних DC пражњења на ниском притиску у парама течности и фреонима четврте генерације. Додатно је активност проширила на проучавање механизама и особина RF пробоја на ниским притисцима у гасовима. Колегиница Марјановић је аутор и коаутор седам научних радова који су објављени у међународним часописима категорија М21а, М21 и М22. Резултати њених истраживања су презентовани на великом броју међународних конференција. Била је коаутор већег броја предавања по позиву (24) и већег броја радова штампаних у изводу (27) и целини (15).

С обзиром да др Јелена Марјановић испуњава све предвиђене услове прописане Правилником о стицању истраживачких и научних звања и Законом о науци и истраживањима Министарства науке, технолошког развоја и иновација Републике Србије, сагласна сам са покретањем поступка за реизбор др Јелене Марјановић у звање научни сарадник.

Предлажем следећи састав комисије за реизбор др Јелене Марјановић у звање научни сарадник:

- 1) др Драгана Марић, научни саветник Института за физику у Београду
- 2) др Гордана Маловић, научни саветник Института за физику у Београду
- 3) др Весна Ковачевић, доцент Физичког факултета Универзитета у Београду

Руководилац лабораторије

У Београду 26.08.2025.год

др Гордана Маловић

научни саветник

Института за физику у Београду

Материјал уз захтев за реизбор др Јелене Марјановић у звање научни сарадник

институт за физику

број

08.

Арх.шифра

7075

Прилог

примљено:

Рад.јед.

RO

1. ПОДАЦИ О КАНДИДАТКИЊИ

Име и презиме: Јелена Марјановић

Година рођења: 1983. Радни статус: запослена

Назив институције у којој је запослен/а: Институт за физику у Београду

Претходна запослења:

Образовање

Основне академске студије: 2002-2010., Физички факултет, Универзитет у Београду Одбрањен мастер или магистарски рад: 2010., Физички факултет, Универзитет у Београду Одбрањена докторска дисертација: 2020., Физички факултет, Универзитет у Београду

Постојеће научно звање: научни сарадник Научно звање које се тражи: научни сарадник

Датуми избора у стечена научна звања (укључујући и постојеће)

научни сарадник: 16.04.2021. године

Област науке у којој се тражи звање: природно-математичке науке

Грана науке у којој се тражи звање: физика

Научна дисциплина у којој се тражи звање: Физика јонизованих гасова и плазме

Назив матичног научног одбора којем се захтев упућује: МНО за физику

Стручна биографија

Јелена Марјановић (рођена Сивош) је рођена 23.01.1983. године у Крушевцу.

Физички факултет Универзитета у Београду – смер Примењена физика и информатика је завршила 2010. године са просечном оценом 8,34. Дипломирала је 29.12.2010. године са темом "Пробој и струјно-напонске карактеристике пражњења у воденој пари" са оценом 10 под менторством др Драгане Марић. Докторске студије на Физичком факултету Универзитета у Београду – смер Физика јонизованог гаса и плазме уписала је 2011. године. Докторску дисертацију под називом "Пробој и особине неравнотежних DC пражњења на ниском притиску у парама течности" одбранила је 27.11.2020. године на Физичком факултету у Београду.

Јелена Марјановић је у радном односу од 1.01.2011. године у Институту за физику у Београду у Лабораторији за неравнотежне процесе и примену плазме под руководством др Гордане Маловић. Била је истраживач на пројектима ИИИ 41011 и ОИ 171037. Од 2013. до 2017. године је била истраживач у оквиру COST Акције под називом TD1208 Electrical discharges with liquids for future applications, а од 2022. до 2024. године је учествовала на пројекту EGWIn (Exploring ultra low Global Warming potential gases for Insulation in high-voltage technology: Experiments and modelling) у оквиру програма Идеје Фонда за науку Републике Србије. У звање научни сарадник изабрана је 16.04.2021. године.

Као аутор и коаутор објавила је седам научних радова у међународним часописима категорија М21а, М21 и М22, који су на основу база SCOPUS (WoS) цитирани 83 пута, 65 пута без аутоцитата, уз вредност Хиршовог индекса 5 (WoS 26.08.2025.). Резултати њених истраживања су презентовани на великом броју међународних конференција у виду предавања по позиву (24), као и радова штампаних у изводу (27) и целини (15).

2. ПРЕГЛЕД НАУЧНЕ АКТИВНОСТИ

Др Јелена Марјановић се бави истраживањима која спадају у област физике јонизованих гасова и плазми у Лабораторији за неравнотежне процесе и примену плазме под руководством др Гордане Маловић у

Институту за физику у Београду. Фокус је на експерименталном проучавању DC пробоја и неравнотежног пражњења на ниском притиску у парама течности, а тематика је додатно проширена и на проучавање пробоја у радиофреквенцијским (RF) електричним пољима. Истраживање је усмерено на проучавање елементарних процеса, њихове кинетике и феноменологије пробоја и различитих режима пражњења, са циљем да се обезбеде подаци важни за разумевање процеса који одређују пробој и особине пражњења у гасовима који се користе у многобројним применама — у медицини, нанотехнологији, обради и синтези материјала, енергетици и заштити животне средине. Специфичност коришћене експерименталне технике је у могућности нормирања и верификације пресека у области већих вредности редукованог електричног поља E/N (\sim kTd), карактеристичних за практичне примене.

1. DC пробој и карактеристике пражњења на ниском притиску у парама течности

Истраживање је обухватило експериментална мерења у воденој пари и у парама метанола, етанола, изопропанола и бутанола, уз надоградњу постојећег експерименталног уређаја и адаптацију процедура припреме и тестирања система, чиме је обезбеђена поузданост и репродуцибилност мерења. Резултати истраживања су инкорпорирани у базу референтних података за пробој и неравнотежна пражњења "Центра за неравнотежне процесе". Ово истраживање је дало податке за:

- 1) формирање база за моделовање пробоја у парама горе поменутих течности и
- 2) нормирање сетова података за сударне пресеке и за прорачун транспортних коефицијената електрона, позитивних и негативних јона и брзих неутрала у испитиваним парама.

Радови који су публиковани након претходног избора у звање, а односе се на дати истраживачки правац су:

J. Marjanović, D. Marić, G.a Malović, Z. Lj. Petrović,

Voltage-current characteristics of low-pressure discharges in vapors of several alcohols, Journal of Applied Physics 129, 143303 (10pp), 2021 https://doi.org/10.1063/5.0044419

J. Marjanović, D. Marić, G. Malović, Z. Lj. Petrović,

Effective ionization coefficients for low current dc discharges in alcohol vapours at low pressure, The European Physical Journal D 75, 191 (7pp), 2021 https://doi.org/10.1140/epjd/s10053-021-00138-z

2. DC пробој на ниском притиску у фреонима четврте генерације

Други део истраживања кандидаткиње реализован је у оквиру пројекта "EGWIn" финансираног од стране Фонда за науку (2022–2024). Током и након пројекта, фокус истраживања проширен је на пробој на ниским притисцима у еколошки прихватљивим фреонима са ултра ниским потенцијалом за глобално загревање. Обрађени су гасови: 1,1,1,2-Тетрафлуороетан, 2,3,3,3-Тетрафлуоропропен и *транс*-1,3,3,3-Тетрафлуоропропен. Измерене су Пашенове криве, јонизациони коефицијенти, принос секундарних електрона, урађена су спектрално разложена снимања просторне структуре пражњења, што је омогућило нормирање података за сударне пресеке и прорачун транспортних коефицијената честица у овим гасовима. Резултати ових истраживања су објављени у међународним часописима М22 категорије и презентовани на великом броју међународних конференција у виду предавања по позиву (2), као и радова штампаних у изводу (12) и целини (3).

Рад публикован након претходног избора у звање, а односи се на описани истраживачки правац је:

J. Marjanović, D. Marić, Z. Lj. Petrović,

Reduced ionization coefficients in low-current dc discharge in freons of a new generation, European Physical Journal D 78, 14 (8pp), 2024 doi: https://doi.org/10.1140/epjd/s10053-024-00808-8

3. Детекција и мерење RF пробоја на ниском притиску

Трећи део истраживања кандидаткиње је везан за детекцију и мерење пробоја у гасу на ниским притисцима у радиофреквенцијским (RF) електричним пољима. Развијен је нови експериментални уређај базиран на комбинованој техници електричног мерења са капацитивно спрегнутим мостом и

снимању брзом ICCD камером. Циљ је да се експериментално добијени подаци упореде са нумеричким моделом RF пробоја који је развијен у нашој лабораторији. Резултати везани за ово истраживање су презентовани на три међународне конференције.

3. ПРИКАЗ НАЈЗНАЧАЈНИЈИХ РЕЗУЛТАТА

Др Јелена Марјановић има укупно 7 објављених радова који су цитирани 65 пута без аутоцитата уз Хиршов индекс 5 (подаци из базе Web of Science на дан 26.08.2025.). Од тога 1 рад у категорији М21а, 1 рад у категорији М21 и 5 радова у категорији М22. Након одлуке Научног већа о утврђеном предлогу за претходни избор у звање научни сарадник, др Марјановић је била аутор 3 рецензирана научна рада објављена у међународним часописима. Сва три рада су категорије М22. Одржала је више предавања на међународним конференцијама, три предавања по позиву, од којих је два одржала након претходног избора у звање научни сарадник.

- 1. **Jelena Marjanović**, Dragana Marić, Gordana Malović, Zoran Lj. Petrović, Voltage-current characteristics of low-pressure discharges in vapors of several alcohols, Journal of Applied Physics **129**, 143303 (10pp), 2021, https://doi.org/10.1063/5.0044419 M22 (IF= 2.877)
- 2. **Jelena Marjanović**, Dragana Marić, Gordana Malović, Zoran Lj. Petrović, *Effective ionization coefficients for low current dc discharges in alcohol vapours at low pressure*, European Physical Journal D **75**, 191 (7pp), 2021, https://doi.org/10.1140/epjd/s10053-021-00138-z M22 (IF= 1.611)
- 3. **Jelena Marjanović**, Dragana Marić, Zoran Lj. Petrović, Reduced ionization coefficients in low-current dc discharge in freons of a new generation, European Physical Journal D **78**, 14 (8pp), 2024, https://doi.org/10.1140/epjd/s10053-024-00808-8 M22 (IF= 1.5)

Од претходног избора у звање кандидаткиња је први аутор на 3 рада, и за сва три рада dp Марјановић је урадила експериментална мерења и анализу и обраду измерених резултата. Допринос се саастоји и у надоградњи постојећег експерименталног уређаја и адаптацији процедура припреме и тестирања система, чиме је обезбеђена поузданост и репродуцибилност мерења, прикупљању и анализи експерименталних резултата из литературе који су коришћени за поређење са добијеним резултатима у мерењима, припреми и писању радова, комуникацији са уредницима и рецензентима.

Рад под редним бројем 2 је најважнији рад кандидаткиње и у њему су анализирана мерења просторне структуре и одређени ефективни јонизациони коефицијенти (α_{eff}) DC пражњења у парама алкохола метанола, етанола, изопропанола и бутанола. Кандидаткиња је учествовала у планирању и набавци неопходне опреме (алкохола који су коришћени у мерењима, оптичких компоненти, ускопојасних интерференционих оптичких филтера), извршила експериментална мерења, обраду добијених резултата и учествовала у припреми и писању рада као водећи аутор. Приказана је техника одређивања ефективних јонизационих коефицијената на основу снимљених просторних профила пражњења у широком опсегу услова као и поређење добијених резултата са постојећим резултатима из литературе. Наиме, на основу експериментално снимљених профила емисије у лимиту малих струја (без просторног наелектрисања) једносмерног пражњења у Таунзендовом/дифузном режиму (услови пробоја) могуће је одредити ефективне коефицијенте јонизације. Примењена су и спектрално разложена снимања емисије пражњења коришћењем одговарајућих оптичких филтера (На, СН на 431.2 nm) која су пружила додатне информације о процесима ексцитације у овим алкохолима. Профили Нα емисије показали су се вредним јер показују само мали допринос брзих неутрала у процесима побуђивања (ексцитације) у односу на доминантни допринос електронске ексцитације, што је омогућило проширивање опсега мерења ефективних коефицијената јонизације на нешто веће Е/N (редуковано електрично поље). Треба напоменути да је један од важних закључака током анализе резултата за овај рад то да су у свим случајевима добијени исти коефицијенти јонизације без обзира на то да ли су коришћени филтери или не. Ово се показало јако значајним посебно у раду са гасовима где није могуће снимити одговарајуће профиле за одређивање α_{eff} без коришћења оптичких филтера.

Добијени резултати за α_{eff} испитиваних алкохола леже у опсегу E/N од 1 kTd до 8.8 kTd и упоређени су са резултатима из литературе. Поређење је урађено за метанол и за етанол где је показано добро слагање резултата у делу опсега E/N где се подаци добијени у нашем експерименту преклапају са подацима из литературе. Наиме наша мерења су омогућила проширење опсега постојећих резултата за α_{eff} ка вишим вредностима E/N, који се поклапају са условима у пражњењима коришћеним у разним применама. Такође, резултати добијени за ефективне јонизационе коефицијенте за алкохоле вишег реда – изопропанол и бутанол – су по први пут објављени у овом раду.

4. ПОКАЗАТЕЉИ УСПЕХА У НАУЧНОИСТРАЖИВАЧКОМ РАДУ

4.1. Утицајност

Према подацима из базе Web of Science на дан 26.08.2025., радови др Јелене Марјановић су цитирани укупно 83 пута, 65 пута без аутоцитата. Према подацима из исте базе, Хиршов индекс кандидаткиње је 5.

Прилог: подаци преузети из базе Web of Science дана 26.08.2025. године.

4.2. Рецензирање пројеката и научних резултата

Кандидаткиња је била рецензент рада у часопису Contemporary Materials. У прилогу се налази писмо уредништва часописа у коме се захваљује кандидаткињи за обављену рецензију.

5. БИБЛИОГРАФИЈА КАНДИДАТА

У оцењиваном периоду кандидаткиња има укупно три публикације у међународним часописима (M22), два предавања по позиву одржана на међународним конференцијама (M31 и M32), 3 саопштења са међународних скупова штампана у целини (M33) и 12 саопштења са међународних скупова штампаних у изводу (M34).

Списак публикација др Јелене (Сивош) Марјановић – ОЦЕЊИВАНИ ПЕРИОД

Рад у међународном часопису категорије М22

- Jelena Marjanović, Dragana Marić, Gordana Malović, Zoran Lj. Petrović Voltage-current characteristics of low-pressure discharges in vapors of several alcohols Journal of Applied Physics 129, 143303 (10pp), 2021 https://doi.org/10.1063/5.0044419
- 2. **Jelena Marjanović**, Dragana Marić, Gordana Malović, Zoran Lj. Petrović, Effective ionization coefficients for low current dc discharges in alcohol vapours at low pressure European Physical Journal D **75**, 191 (7pp), 2021 https://doi.org/10.1140/epjd/s10053-021-00138-z
- 3. **Jelena Marjanović**, Dragana Marić, Zoran Lj. Petrović, Reduced ionization coefficients in low-current dc discharge in freons of a new generation, European Physical Journal D **78**, 14 (8pp), 2024 https://doi.org/10.1140/epjd/s10053-024-00808-8

Предавање по позиву са међународног скупа штампано у целини категорија М31

Jelena Marjanović, Dragana Marić and Zoran Lj. Petrović
 Breakdown characteristics in low GWP and low ODP freons

 Symposium on Application of Plasma Processes and 14th EU-Japan Joint Symposium on Plasma Processing (SAPP XXV), 31 Jan - 5 Feb, 2025, Štrbské Pleso, Slovakia, page 16-20

 ISBN: 978-80-972179-5-2
 Book of Contributed Papers, 2025

https://neon.dpp.fmph.uniba.sk/sapp/download/SAPP XXV JSPP XIV Book of Contributed Papers.pdf

Предавање по позиву са међународног скупа штампано у изводу категорија М32

1. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

The role of breakdown data in atmospheric studies

V Meeting on Astrophysical Spectroscopy - A&M DATA - Astronomy & Earth Observations, September 12 - 15, 2023, Palić, Serbia, page 29-30

ISBN 978-86-82441-61-8

Book of Abstracts and Contributed Papers, 2023

http://asspectro2023.ipb.ac.rs/AsSpectro2023 book.pdf

Саопштење са међународног скупа штампано у целини категорија М33

Jelena Marjanović, Dragana Marić, Gordana Malović and Zoran Lj. Petrović

Measurements and determination of breakdown voltage in DC discharges at low pressure 48th European Conference on Plasma Physics (EPS), June 27- July 1, 2022, Maastricht, Netherlands (virtual conference), P5b.303 (4pp)

https://indico.fusenet.eu/event/28/contributions/447/

2. Jelena Marjanović, Dragana Marić, Gordana Malović and Zoran Lj. Petrović

Breakdown in saturated water vapor

31st Summer School and International Symposium on the Physics of Ionized Gases (SPIG), September 5-September 9, 2022, Belgrade, Serbia, p. 207-210

ISBN: 978-86-82296-02-7

CONTRIBUTED PAPERS & ABSTRACTS of INVITED LECTURES, TOPICAL INVITED LECTURES and PROGRESS REPORTS, 2022

http://spig2022.ipb.ac.rs/Spig2022-Book-Onine.pdf

3. Jelena Marjanović, Dragana Marić, Marija Puač, Antonije Đorđević and Zoran Lj. Petrović

RF Breakdown in Argon it Low-Pressures: Experiment and Modelling

32nd Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 26 – 30, 2024, Belgrade, Serbia, p. 138-141

ISBN 978-86-82296-08-9

Contributed papers & abstracts of invited lectures, topical invited lectures and progress reports, 2024 https://doi.org/10.69646/aob103p138

Саопштење са међународног скупа штампано у изводу категорија М34

 Jelena Marjanović, Dragana Marić, Gordana Malović, Nikola Škoro, Zoran Lj. Petrović Electrical breakdown in vapors of liquids;

XXII International Symposium on Electron-Molecule Collisions and Swarms (POSMOL), July 29-30, 2021, Virtual Meeting, 20 (1 pp)

Book of Abstracts POSMOL 2021 at-present: XXII International Symposium on Electron-Molecule Collisions and Swarms, 2021

https://drive.google.com/file/d/11UIy4ur6lhtOWROhxpAeU7AzfX-Rfbun/view

2. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

Deriving the Breakdown Voltage from Relaxation Oscillations in Low- Current Discharge
The 14th EU-Japan Joint Symposium on Plasma Processing JSPP-14, April 16-21, 2023, Okinawa Institute of
Science and Technology (OIST) in Okinawa, Japan, P-21 (2pp)

Poster Sessions, 2023

http://www.ppl.eng.osaka-u.ac.jp/ICDDPS4/docs/ICDDPS-4 JSPP-14 PROGRAM.pdf

3. Zoran Lj. Petrović, **Jelena Marjanović**, Gordana Malović, Dragana Marić

Breakdown and Volt-Ampere Characteristics of Low-Current Discharges in Water Vapour

8th International Conference on Advanced Plasma Technologies (ICAPT-8), May 16-18. 2023, Hotel Špik, Gozd Martuljek, Slovenia, 59 (1pp)

ISBN 978-961-94716-2-3

Book of Abstracts, 2023

https://www.plasmadis.com/wp/wp-content/uploads/2023/05/ICAPT-8 Program.pdf

http://www.ltp-app-new.ipb.ac.rs/wp-content/uploads/2023/08/8thICAPT_3rdPlAGriWS_proceedings.pdf

4. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

Breakdown measurements in low GWP gases

49th European Conference on Plasma Physics (EPS), July 3-7, 2023. Bordeaux, France, 152 (1pp)

PosterSessionIII_BookAbstracts 2023

5. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

DC Breakdown Measurements in Low GWP Gases

XXI International Workshop on Low-Energy Positron and Positronium Physics and XXIII International Symposium on Electron-Molecule Collisions and Swarms (POSMOL 2023), August 3-6, 2023, University of Notre Dame, Notre Dame in Indiana, USA, 93 (1pp)

Abstracts of Poster presentation, 2023

https://drive.google.com/file/d/1jt3_sKdhKvGGltHPbz5oXhyZP4ori4pP/view

Zoran Lj. Petrović, Dragana Marić, Saša Dujko, Nenad Selaković, Jelena Marjanović, Jasmina Atić, Danko Bošnjaković, Ilija Simonović

Physics of non-equilibrium collisional plasmas: kinetic phenomena and their effect on real world applications Twenty-Third International Summer School on Vacuum, Electron and Ion Technologies (VEIT), September 18-22, 2023, Sozopol, Bulgaria, p. 27

ISBN 978-954-580-397-0

Program Abstracts, 2023

7. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

Measurements of DC breakdown in hydrofluoroolefine C3H2F4

76th Annual Gaseous Electronics Conference (GEC), October 9–13, 2023; Michigan League, Ann Arbor, Michigan, USA, IW5.00010 (1pp)

Bulletin of the American Physical Society, Abstract, 2023

https://flux.aps.org/meetings/YR23/GEC23/all GEC23.pdf

8. Dragana Marić, Jelena Marjanović, Zoran Lj. Petrović

Breakdown in fluorocarbon gases

4th DEA Club Meeting

19th-21st June 2024, Potsdam, Germany, p. 49

Book of Abstracts, 2024

https://www.uni-potsdam.de/fileadmin/projects/4deaclub/Book of Abstracts 4th DEA Club.pdf

9. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

Emission properties of low-pressure low-current DC discharge in freons of new generation 26th Europhysics Conference on Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July 9-13,

2024, Brno, Czech Republic, p. 329-330

Book of Abstracts, 2024

https://escampig2024.physics.muni.cz/assets/pdf/P2-schedule-v2.pdf

10. Dragana Marić, Jelena Marjanović, Zoran Lj. Petrović

Exploring electrical breakdown in ultra-low global warming potential gases for insulation in medium and high-voltage technology

The Collisions Physics and Chemistry and their Applications (COPCA 2024), 15th- 8th October 2024, Valletta, Malta, (2pp)

Abstract Booklet, 2024

https://llnq.com/242Zq

11. Jelena Marjanović, Dragana Marić, Saša Dujko, Zoran Li. Petrović

Electrical Breakdown in trans-1,3,3,3-Tetrafluoropropene HFO1234ze(E)

International Meeting on Data for Atomic and Molecular Processes in Plasmas: Advances in Standards and Modelling, November 12-15, 2024, Palić, Serbia, p.72-73

BOOK OF ABSTRACTS AND CONTRIBUTED PAPERS, 2024

ISBN 978-86-82441-69-4

doi: https://doi.org/10.69646/aob241119

https://asspectro.ipb.ac.rs/2024/AsSpectro2024_book.pdf

12. Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović

Effective Ionization Coefficients in HFO1234yf and HFO1234ze(E)

XXII International Workshop on Low-Energy Positron and Positronium Physics and XXIV International Symposium on Electron-Molecule Collisions and Swarms (POSMOL 2025), 7th-10th August 2025, Matsue, Japan, p.64

Abstracts of Poster presentations, 2025

https://www-user.yokohama-cu.ac.jp/~tachi/posmol2025/pdf/Book_of_Abstracts_Final.pdf https://www-user.yokohama-cu.ac.jp/~tachi/posmol2025/pdf/POSMOL2025-Schedule_booklet.pdf

Прилог: Позивна писма и програми, копије радова

Списак публикација др Јелене (Сивош) Марјановић – ПРЕ избора у звање научни сарадник

Рад у тематском зборнику међународног значаја категорија М14

 Zoran Lj. Petrović, Nevena Puač, Dragana Marić, Dejan Maletić, Kosta Spasić, Nikola Škoro, Jelena Sivoš, Saša Lazović, Gordana Malović

Development of Biomedical Applications of Nonequilibrium Plasmas and Possibilities for Atmospheric Pressure Nanotechnology Applications

2012 28th International Conference on Microelectronics Proceedings, p. 31-38, 2012 doi: 10.1109/MIEL.2012.6222791

 Zoran Lj. Petrović, Vladimir Stojanović, Nikola Škoro, Željka Nikitović, Gordana Malović, Jelena Sivoš, Dragana Marić

Development of Fast Neutral Etching for Integrated Circuits and Nanotechnologies Fast Neutrals in Gas 2014 29th International Conference on Microelectronics Proceedings, p. 17-24, 2014 doi: 10.1109/MIEL.2014.6842079

 Zoran Lj Petrović, Jelena Sivoš, Marija Savić, Nikola Škoro, Marija Radmilović-Radjenović, Saša Gocić, Dragana Marić

New phenomenology of gas breakdown in DC and RF fields Journal of Physics: Conference Series,. **514**, 012043(9pp), 2014 doi: 10.1088/1742-6596/514/1/012043

Рад у водећем међународном часопису категорија М21а

 Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj Petrović DC discharge in low-pressure ethanol vapour Plasma Sources Sci. Technol., 28, 055011 (8pp), 2019 doi: 10.1088/1361-6595/ab0952

Рад у водећем међународном часопису категорија М21

 Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj Petrović Breakdown and dc discharge in low-pressure water vapour
 Journal of Physics D: Applied Physics, 48(42), 424011 (9pp), 2015 doi: 10.1088/0022-3727/48/42/424011

Рад у међународном часопису категорија М22

Dragana Marić, Marija Savić, Jelena Sivoš, Nikola Škoro, Marija Radmilović-Radjenović, Gordana Malović, and Zoran Lj. Petrović
 Gas breakdown and secondary electron yields
 The European Physical Journal D, 68(6), 155 (7pp), 2014

doi: 10.1140/epjd/e2014-50090-x

2. Jelena Sivoš, Dragana Marić, Gordana Malović, and Zoran Lj. Petrović

Low-pressure DC breakdown in alcohol vapours

The European Physical Journal D, 74(64), 1-10, 2020

doi: 10.1140/epjd/e2020-100540-3

Предавање по позиву са међународног скупа штампано у изводу категорија М32

Jelena Marjanović, Dragana Marić, Gordana Malović and Zoran Lj. Petrović
 Breakdown and Characteristics of Non-Equilibrium Low-Pressure DC Discharges in Vapours of Liquids
 30th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 24-28, 2020,
 Šabac, Serbia, p.148

Publ. Astron. Obs. Belgrade No. 99, 2020

ISBN: 978-86-80019-94-9

ISSN 0373-3742

Саопштење са међународног скупа штампано у целини категорија М33

- Nikola Škoro, Jelena Sivoš, Dragana Marić, Gordana Malović, Zoran Lj. Petrović Volt-Ampere Characteristics of Water Vapour Discharges 30th International Conference on Phenomena in Ionized Gases (ICPIG), August 28th – September 2nd 2011, Belfast, Northern Ireland, UK, C8-153 (4pp)
- Nikola Škoro, Dragana Marić, Jelena Sivoš, Gordana Malović, William Graham, Zoran Lj. Petrović Breakdown and low current discharges in water vapour ECM 112 and 4th ICAPT, September, 9-13, 2011, Strunjan, Slovenia, p. 164-167 ISBN 978-961-92989-3-0
- 3. Zoran Lj. Petrović, **Jelena Sivoš**, Konstantin Karajović, Gordana Malović and Dragana Marić *Electrical breakdown in water vapor and ethanol* 69th Iuvsta Workshop on Oxidation of Organic Materials by Excited Radicals Created in Nonequilibrium Gaseous Plasma, December 9-13, 2011, Crklje na Gorenjeskem, Slovenia, p. 55-58
- Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović Volt-Ampere Characteristics of Low Pressure DC Discharges in Water Vapor 26th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 27-31, 2012, Zrenjanin, Serbia, p. 273-276 ISBN 978-86-7031-242-5
- Vladimir Stojanović, Jelena Sivoš, Dragana Marć, Nikola Škoro and Zoran Lj. Petrović Monte Carlo simulation of electron transport in H₂O vapour 26th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 27-31, 2012, Zrenjanin, Serbia, p. 35-38 ISBN 978-86-7031-242-5
- 6. Dragana Marić, Jelena Sivoš, Nikola Škoro, Gordana Malović, Thomas Kuschel, Ilija Stefanović, Joerg Winter and Zoran Lj. Petrović Breakdown and Discharge Development in Various Gases and Electrode Configurations 19th Symposium on Application of Plasma Processes Workshop on Ion Mobility Spectrometry, January, 26-31, 2013, Vrátna, Slovakia, p. 33-41
- Dragana Marić, Jelena Sivoš, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović
 Low-Pressure Breakdown in Ethanol Vapour
 31st International Conference on Phenomena in Ionized Gases (ICPIG), July, 14-19, 2013, Granada, Spain, p. PS4-048 (4pp)
- 8. Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Breakdown in water vapour and ethanol vapour: heavy particle processes
 3rd National Conference on Electronic, Atomic, Molecular and Photonic Physics, August 25th, 2013, Belgrade, Serbia, p. 21-24

 Dragana Marić, Jelena Sivoš, Nikola Škoro, Vladimir Stojanović, Srđan Marjanović, Ana Banković, Saša Dujko, Gordana Malović and Zoran Petrović

Atomic and Molecular Processes of Interest for Modeling of Discharges in Liquids

6th Conference on Elementary Processes in Atomic Systems (CEPAS), July, 9-12, 2014, Bratislava, Slovakia, p.121-122

ISBN 978-80-8147-021-9

10. Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Abnormal Glow Discharge in Ethanol Vapour 27th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August, 26 – 29, 2014, Belgrade, Serbia, p. 387-390 ISBN 978-86-7762-600-6

Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović
 Electrical Breakdown in Low-Pressure Methanol Vapour Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August, 26 – 29, 2014, Belgrade, Serbia, p. 391-394
 ISBN 978-86-7762-600-6

12. **Jelena Sivoš**, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj Petrović Low-pressure DC discharge in vapour of Methanol and Ethanol 32nd International Conference on Phenomena in Ionized Gases (ICPIG), July, 26-31, 2015, Romania, Iasi, P2.53 (4 pp)

13. **Jelena Sivoš**, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović Analysis of Transit Time of Ions in Low - Current DC Discharge in Water Vapour 28th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 29-September 2, 2016, Belgrade, Serbia, p. 316-319 ISBN: 978-86-84539-14-6

14. Vladimir Stojanović, Nikola Škoro, Jelena Sivoš, Gordana Malović, Dragana Marić, Zoran Lj. Petrović Modeling Emission from Water Vapor DC Discharge at Low Pressure 28th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 29-September 2, 2016, Belgrade, Serbia, p. 328-331 ISBN: 978-86-84539-14-6

15. **Jelena Sivoš**, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović, Volt-ampere characteristics and abnormal glow discharges in methanol and ethanol vapours 29th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 28-September 1, 2018, Belgrade, Serbia, p. 222-225 ISBN: 978-86-7306-146-7

16. Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović, Discharges in alcohol vapours at low pressures 22nd International Conference on Gas Discharges and their Applications (GD), September 2-7, 2018, Novi Sad, Serbia, p. 327-330 ISBN: 978-86-7025-781-8

Саопштење са међународног скупа штампано у изводу категорија М34

 Zoran Lj. Petrović, Dragana Marić, Nikola Škoro, Marija Savić, Jelena Sivoš, Marija Radmilović Rađenović, Milovan Šuvakov and Gordana Malović New phenomenology in description of Townsend discharges and gas breakdown: from standard size to micro discharges
 he 4th International Conference on PLAsma-Nano Technology & Science (IC-PLANTS), March, 10-12, 2011, Gifu, Japan, I-07 Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović
 Axial emission profiles of Townsend discharge in water vapour

 XXI Europhysics Conference on Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July, 10-14, 2012, Viana do Castelo, Portugal, p. 9 (2pp)
 ISBN 2-914771-74-6

3. Zoran Lj. Petrović, **Jelena Sivoš**, Dragana Marić, Nikola Škoro and Vladimir Stojanović Kinetics of Electrons in H₂O at High Values of Reduced Electric Field 65th Annual Gaseous Electronics Conference (GEC), October 22nd–26th, 2012, Austin, Texas, USA, p. PR1.00032

Bulletin of the American Physical Society, vol. 57, no. 8, 2012

ISSN: 0003-0503

4. Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and. Zoran Lj. Petrović Breakdown in ethanol vapour 5th Central, European Symposium on Plasma Chemistry, August, 25-29, 2013, Balatonalmádi, Hungary, P-FUN6, p.113 ISBN 978-615-5270-04-8

Zoran Lj Petrović, Jelena Sivoš, Nikola Škoro, Gordana Malović, Dragana Marić
 DC breakdown in ethanol vapor
 66th Annual Gaseous Electronics Conference, September 30th – October 4th, 2013, Princeton, New Jersey, USA, HW1 35, p.54
 Bulletin of the American Physical Society, vol. 58, no. 8, 2013

 ISSN: 0003-0503

6. Zoran Lj Petrović, Jelena Sivoš, Marija Savić, Nikola Škoro, Marija Radmilović Radenović, Gordana Malović and Dragana Marić New Phenomenology of Gas Breakdown in DC and RF Fields 18th International Summer School on Vacuum, Electron and Ion Technologies (VEIT), October, 7 – 11. 2013. Sozopol, BULGARIA, IL-18, p. 37-38

Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović
 Electrical breakdown in low-pressure ethanol vapour
 16th International Conference on Plasma Physics and Applications, June, 20-25, 2013, Magurele-Bucharest, Romania, p. O18-50
 ISSN 2344-0481

8. Zoran Lj. Petrović, Saša Dujko, Jasmina Mirić, Danko Bošnjaković, Ana Banković, Srđan Marjanović, Dragana Marić, **Jelena Sivoš**, Nikola Škoro, Marija Savić, Olivera Šašić and Gordana Malović Cross Sections for Scattering of Electrons and Positrons in Modeling of Ionized Gases and Non-Equilibrium Plasmas

International Symposium on Non-equilibrium Plasma and Complex-System Sciences (IS-NPCS), February, 26-28, 2014, Icho Kaikan, Osaka University, Osaka, Japan, p. 106

Dragana Marić, Jelena Sivoš, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović
 Breakdown and Discharges in Vapours of Liquids
 COST TD1208 Annual meeting, "Electrical discharges with liquids for future applications" March, 10-13, 2014,
 Lisboa, Portugal

 Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović, Properties of low-pressure DC discharges in H₂O and C₂H₃OH vapours
 XXII Europhysics Conference on Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July, 15-19, 2014, Greifswald, Germany, 9 (2pp)
 ISBN: 2-914771-86-X; EPS ECA (Europhysics Conference Abstracts number): 38 B

11. Zoran Lj. Petrović, **Jelena Sivoš**, Nikola Škoro, Dragana Marić, Gordana Malović, Breakdown in vapors of alcohols: methanol and ethanol 67th Annual Gaseous Electronics Conference, November, 2-7. 2014. Raleigh, North Carolina, USA, GT1.00010 p. 34

Bulletin of the American Physical Society, vol. 59, no. 9, 2014

ISSN: 0003-0503

12. **Jelena Sivoš**, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj Petrović, DC Breakdown in Vapours of Liquids 42nd IEEE International Conference on Plasma Science (ICOPS), May, 24th- 28th, 2015, Belek, Antalya, Turkey, 4E-1 (1 pp)

 Dragana Marić, Jelena Sivoš, Nikola Škoro, Gordana Malović and Zoran Lj Petrović, Secondary electron yield in low-pressure H₂O vapour discharge
 XIX International Symposium on Electron-Molecule Collisions and Swarms (POSMOL), July, 17-21, 2015, Portugal, Lisboa, E 29, 53 (1 pp)
 ISBN: 978-989-20-5845-0

14. Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj Petrović Breakdown in Alcohol Vapours COST TD1208 2nd Annual meeting "Electrical discharges with liquids for future applications" February, 23-26. 2015. Spain, Barcelona, 63 (1 pp) ISBN: 978-84-606-5787-3

15. Nikola Škoro, **Jelena Sivoš**, Dragana Marić, Gordana Malović and Zoran Lj Petrović Breakdown data for vapours of organic liquids
BIOPLASMAS & PLASMAS WITH LIQUIDS - Joint Conference of COST ACTIONS TD1208 "Electrical discharges with liquids for future applications" & MP1101 Biomedical Applications of Atmospheric Pressure Plasma Technology, September, 13-17. 2015. Italy, Bertinoro, P-41 (1 pp)

16. Jelena Sivoš, Nikola Škoro, Dragana Marić, Gordana Malović and Zoran Lj. Petrović Emission Properties of Low-current dc Discharges in Alcohol Vapours COST TD1208 "International Conference on Electrical Discharges with liquids (ICEDL 2016)", March, 14-17. 2016. Turkey, Kocaeli, 50 (1 pp) ISBN: 978-605-9160-20-9

17. Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Emission properties of low pressure low-current DC discharge in n-butanol vapour 23rd Europhysics Conference on the Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July, 12-16, 2016, Bratislava, Slovakia, p. 250-251 ISBN: 979-10-96389-02-5

 Zoran Lj. Petrović, Vladimir Stojanović, Nikola Škoro, Jelena Sivoš, Dragana Marić and Gordana Malović

Effects of Electrons and Heavy Particles on Halpha Emission in Pure H_2O DC Discharge at High E/N (Electric Field, N-Gas Density)

69th Annual Gaseous Electronics Conference (GEC), October, 10-14. 2016, Bochum, Germany, MW6.00047

 Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Analysis of heavy particle processes in low current dc discharge in water vapor
 69th Annual Gaseous Electronics Conference (GEC), October, 10-14. 2016, Bochum, Germany, MW6.00053

 Nikola Škoro, Dragana Marić, Vladimir Stojanović, Jelena Sivoš, Gordana Malović and Zoran Lj. Petrović

Heavy-particle collisions in water vapour discharges at low pressures

23rd Europhysics Conference on the Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July, 12-16, 2016, Bratislava, Slovakia, p. 406-409

ISBN: 979-10-96389-02-5

 Dragana Marić, Jelena Sivoš, Nikola Škoro, Vladimir Stojanović, Srđan Marjanović, Ana Banković, Saša Dujko, Gordana Malović and Zoran Lj. Petrović Atomic and Molecular Processes of Interest for Modelling of Discharges in Liquids
Gordon Research Conference on Plasma Processing Science: Plasmas with Complex Interactions – Exploiting the Non-Equilibrium, July 24-29. 2016, Proctor Academy in Andover NH, United States

22. Nikola Škoro, Dragana Marić, Vladimir Stojanović, **Jelena Sivoš**, Gordana Malović and Zoran Lj. Petrović

Heavy-Particle Processes in Low-Pressure Water Vapour Discharge

28th Summer School and International Symposium on the Physics of Ionized Gases (SPIG), August 29-September 2, 2016, Belgrade, Serbia, p. 456

ISBN: 978-86-84539-14-6

23. Zoran Lj. Petrović, Antonije Đorđević, Jana Petrović, **Jelena Sivoš**, Marija Savić, Gordana Malović and Dragana Marić RF Breakdown as a Swarm Experiment 82nd IUVSTA Workshop, December 4-7. 2017, Bankoku Shinryokan, Okinawa, Japan, p. O-2

24. Dragana Marić, Jelena Sivoš, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Transit time of ions in low-current low-pressure water vapour discharge International Conferece on Plasmas with Liquids (COST Action TD1208), March, 5-9. 2017, Prague, Czech Republic, p.73 ISBN 978-80-87026-07-6

- 25. **Jelena Sivoš**, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović, *Low-pressure DC discharges in vapours of alcohols* 24th Europhysics Conference on Atomic and Molecular Physics of Ionized Gases (ESCAMPIG), July 17-21, 2018, Glasgow, Scotland, UK, p. Topic 9 (2 pp)
- 26. Zoran Lj. Petrović, Antonije Đorđević, Marija Puač, Jana Petrović, **Jelena Sivoš**, Gordana Malović and Dragana Marić *Measurements and simulations of RF breakdown in gases* 7th ICAPT International Conference on Advanced Plasma Technologies, February 24–March 1, 2019, Hue, Vietnam, p.45
- 27. Zoran Lj. Petrović, Saša Dujko, Dragana Marić, Gordana Malović, Nevena Puač, Danko Bošnjaković, Olivera Šašić, Marija Puač, **Jelena Sivoš**, Milovan Šuvakov and Nikola Škoro Non-Equilibrium in Ionized Gases Determined by Charged Particle Collisions with Molecules XX International Workshop on Low-Energy Positron and Positronium Physics, XXI International Symposium on Electron-Molecule Collisions and Swarms, V Workshop on Non-Equilibrium Processes, July 18–21, 2019, Belgrade, Serbia, p. 5
 ISBN: 978-86-7025-819-8
- 28. Jelena Sivoš, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Ionization Coefficients in Low-Pressure DC Discharge in Vapours of Alcohols
 XX International Workshop on Low-Energy Positron and Positronium Physics, XXI International Symposium on Electron-Molecule Collisions and Swarms, V Workshop on Non-Equilibrium Processes, July 18–21, 2019, Belgrade, Serbia, p.115
 ISBN: 978-86-7025-819-8
- 29. Marija Puač, Dragana Marić, Gordana Malović, **Jelena Sivoš** and Zoran Lj. Petrović Comparison of RF Breakdown in Argon and Oxygen Monte Carlo Simulation

 XX International Workshop on Low-Energy Positron and Positronium Physics, XXI International Symposium on Electron-Molecule Collisions and Swarms, V Workshop on Non-Equilibrium Processes, July 18–21, 2019, Belgrade, Serbia, p.133

 ISBN: 978-86-7025-819-8

30. **Jelena Sivoš**, Dragana Marić, Nikola Škoro, Gordana Malović and Zoran Lj. Petrović Breakdown and Discharges in Low-Pressure Alcohol Vapors 10th International conference on plasma nanoscience (iPlasmaNano-X), September 15–20, 2019, Poreč, Croatia, p. T–12

- 31. **Jelena Marjanović**, Dragana Marić, Gordana Malović and Zoran Lj. Petrović Spatial distribution of emission in low pressure DC discharges in water and alcohol vapours 73rd Annual Gaseous Electronics Virtual Conference (GEC), October, 5-9. 2020, San Diego, USA, LT2.00002 Bulletin of the American Physical Society, 2020
- 32. Dragana Marić, Marija Puač, Antonije Đorđević, **Jelena Marjanović**, Gordana Malović, Zoran Lj. Petrović

Breakdown in rf and dc fields

73rd Annual Gaseous Electronics Virtual Conference (GEC), October, 5-9. 2020, San Diego, USA, UR2.00005, Bulletin of the American Physical Society, 2020

Одбрањена докторска дисертација категорија М70

Јелена Марјановић, "Пробој и особине неравнотежних DC пражњења на ниском притиску у парама течности", 2020 др Драгана Марић ДОКТОР НАУКА – ФИЗИЧКЕ НАУКЕ Физички факултет, Универзитет у Београду

6. КВАНТИФИКАЦИЈА НАУЧНИХ РЕЗУЛТАТА КАНДИДАТА

Према Правилнику о стицању истраживачких и научних звања, радови др Јелене Марјановић се признају са пуним бројем поена. Број коаутора на радовима из категорије M22 је 4 и 3, и сва три рада се баве експерименталним мерењима, где се пун број поена признаје за до седам коаутора. Уколико је број аутора већи од седам број поена за научно остварење одређује се по формули M/(1+0,2(н-7)), н>7.

Врста резултата	Вредност резултата (Прилог 2)	Укупан број резултата (укупан број резултата који подлежу нормирању)	Укупан број бодова (укупан број бодова након нормирања)
M22	5	3(0)	15(15)
M31	3,5	1(0)	3,5(3,5)
M32	1,5	1(0)	1,5(1,5)
M33	1	3(0)	3(3)
M34	0,5	12(1)	6(5,92)
	УКУПНО		29(28,92)

Поређење са минималним квантитативним условима за избор у тражено научно звање

Диференцијални услов за оцењивани период за избор у научно звање: научни сарадник	Неопходно	Остварени нормирани број бодова
Укупно	16	28,92
Обавезни: М11+М12+М21+М22+М23+М91+М92+М93	6	15



Рейублика Србија Универзишеш у Беоїраду

УБ

Оснивач: Рейублика Србија Дозволу за рад број 612-00-02666/2010-04 од 12. окшобра 2011. Године је издало Минисшарсшво йросвеше и науке Рейублике Србије

Физички факулией, Београд

Оснивач: Рейублика Србија Дозволу за рад број 612-00-02409/2014-04 од 8. сейшембра 2014. іодине је издало Минисшарсшво йросвеше, науке и шехнолошкої развоја Рейублике Србије





Јелена, Драїан, Марјановић

рођена 23. јануара 1983. године, Крушевац, Реџублика Србија, уйисана школске 2018/2019. године, а дана 27. новембра 2020. године завршила је докшорске академске сшудије, шрећег сшейена, на сшудијском йрограму Физика, обима 180 (сшо осамдесеш) бодова ЕСПБ са йросечном оценом 10,00 (десеш и 0/100).

Наслов докшорске дисершације је: "Пробој и особине неравношежних DC пражњења на ниском пришиску у парама шечносши".

На основу шоїа издаје јој се ова дийлома о сшеченом научном називу докшор наука - физичке науке

> Број: 15150800 У Беоїраду, 26. јуна 2023. їодине

Декан Проф. др Иван Белча

Mar Ge

Рекшор Проф. др Владан Ђокић

00151760



примљено: 31, 05, 2021						
Рад.јед.	6 poj	Арх.шифра	Прилог			
0901	389/1					

Република Србија МИНИСТАРСТВО ПРОСВЕТЕ, НАУКЕ И ТЕХНОЛОШКОГ РАЗВОЈА

Матични научни одбор за физику Број: 660-01-5/2021-14/7 16.04.2021. године Београд

На основу члана 27. став 1 тачка 1) и члана 76. став 5. Закона о науци и истраживањима ("Службени гласник Републике Србије", бр. 49/2019) и Правилника о поступку, начину вредновања и квантитативном исказивању научноистраживачких резултата истраживача ("Службени гласник Републике Србије", број 24/16, 21/17 и 38/17) и захтева који је поднео

Институт за физику у Београду

Матични научни одбор за физику на седници одржаној 16.04.2021. године, донео је

ОДЛУКУ О СТИЦАЊУ НАУЧНОГ ЗВАЊА

Др Јелена Марјановић

ОБРАЗЛОЖЕЊЕ

Институт за физику у Београду

утврдио је предлог број 0801/157/1 од 24.02.2021. године на седници Научног већа Института за физику у Београду и поднео захтев Матичном научном одбору за физику број 0801/159/1 од 25.02.2021. године за доношење одлуке о испуњености услова за стицање научног звања **Научни сарадник.**

Матични научни одбор за физику на седници одржаној 16.04.2021. године разматрао је захтев и утврдио да именована испуњава услове из члана 76. став 5. Закона о науци и истраживањима ("Службени гласник Републике Србије", бр. 49/2019) и Правилника о поступку, начину вредновања и квантитативном исказивању научноистраживачких резултата истраживача ("Службени гласник Републике Србије", број 24/16, 21/17 и 38/17) за стицање научног звања Научни сарадник па је одлучио као у изреци ове одлуке.

Доношењем ове одлуке именована стиче сва права која јој на основу ње по закону припадају.

Одлуку доставити подносиоцу захтева, именованој и архиви Министарства просвете, науке и технолошког развоја у Београду.

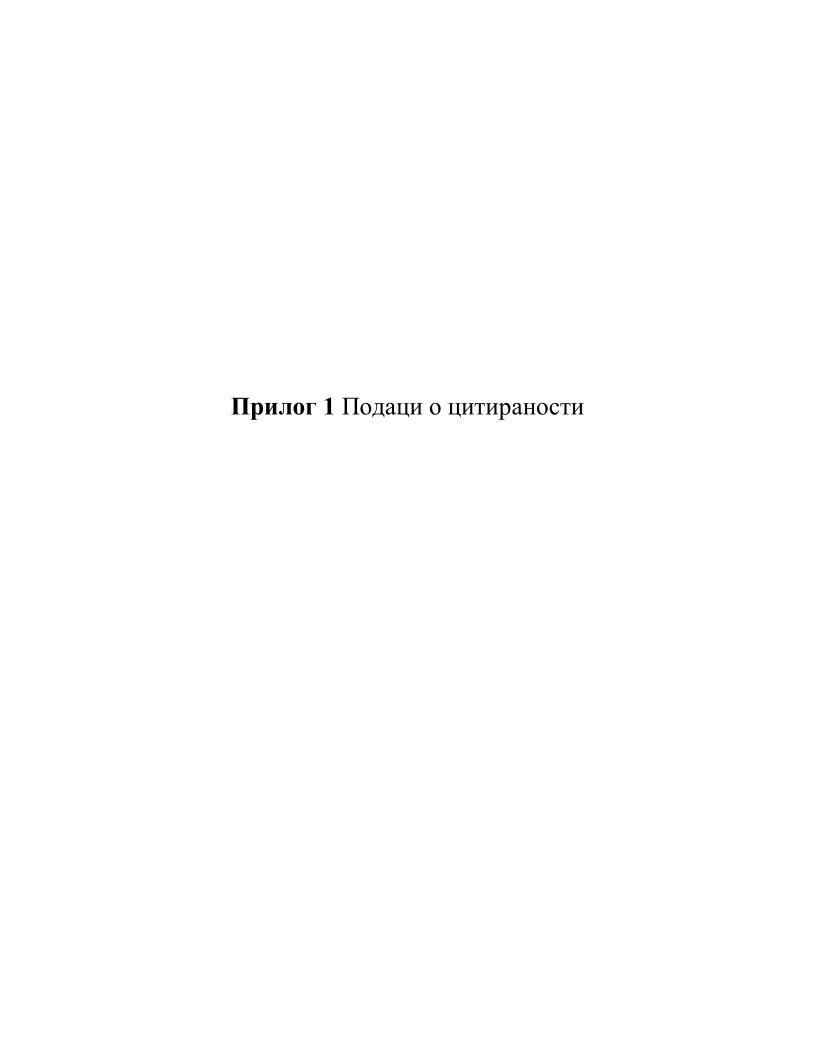
ПРЕДСЕДНИК МАТИЧНОГ НАУЧНОГ ОДБОРА ЗА ФИЗИКУ

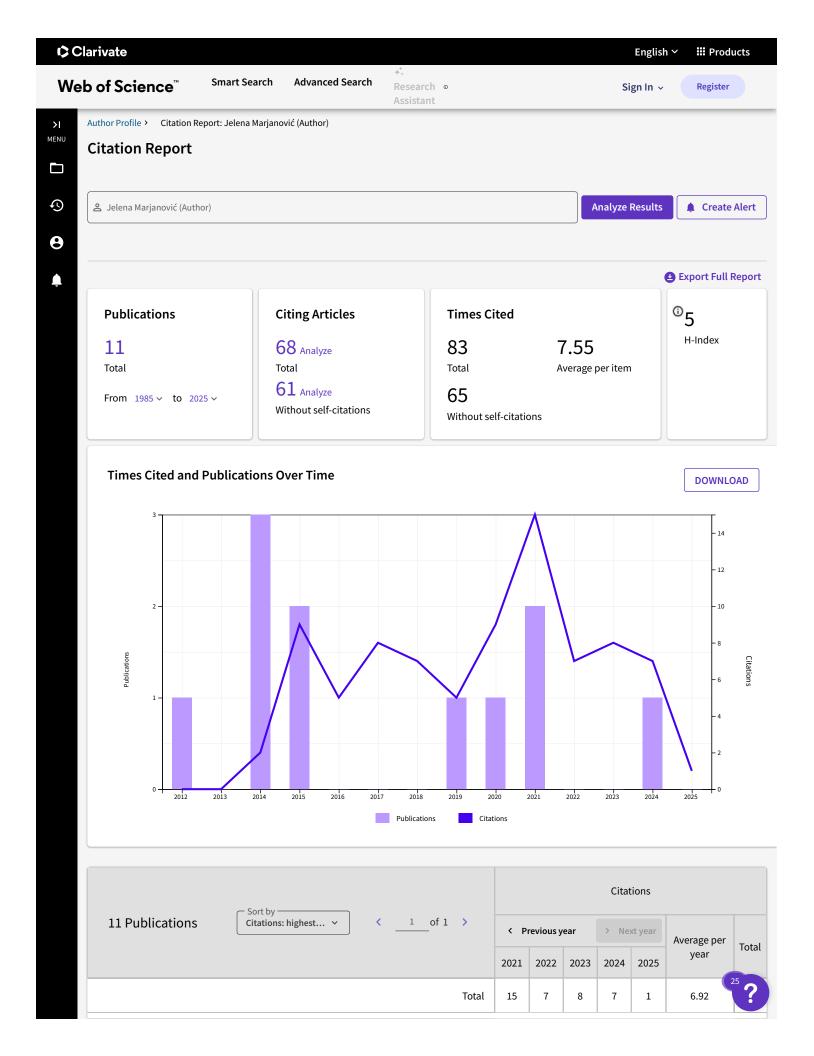
Проф. др Милан Дамњановић

Varying &

ПРВИ ПОТПРЕДСЕДНИК ВЛАДЕ И МИНИСТАР

Бранко Ружић



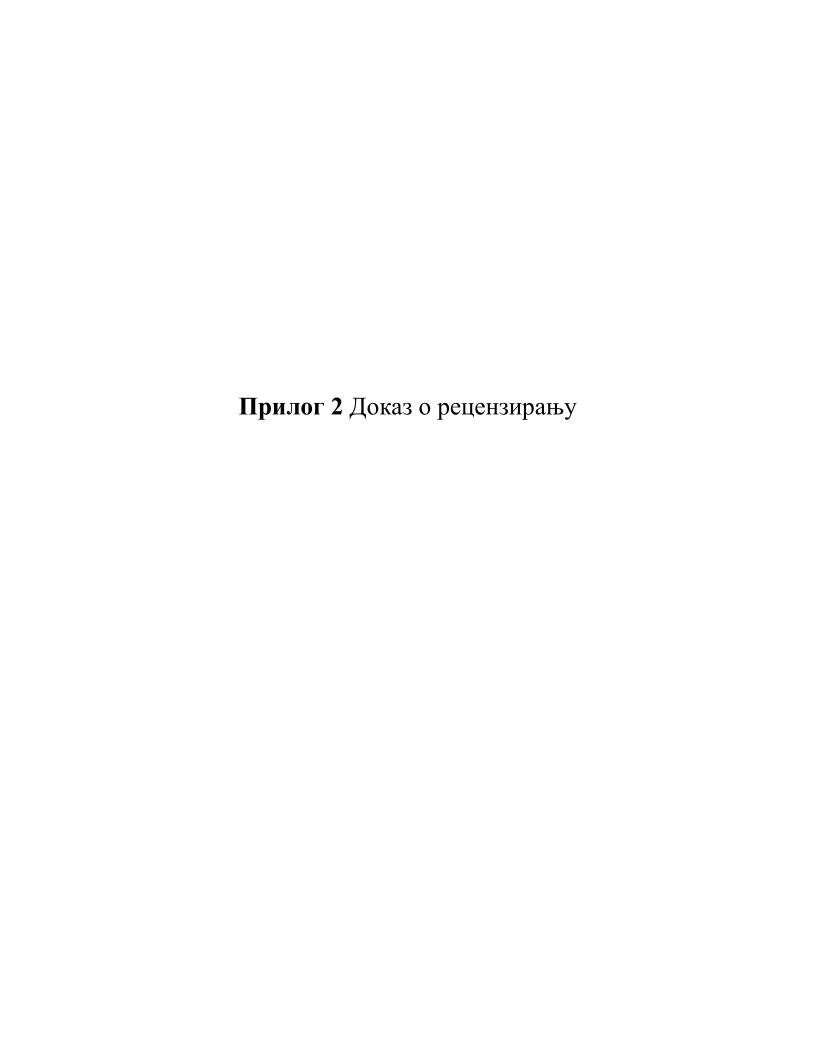


⊝ 1	Gas breakdown and secondary electron yields Maric, D; Savic, M; (); Petrovic, ZL Jun 23 2014 EUROPEAN PHYSICAL JOURNAL D ▼ 68 (6)	8	4	3	3	0	4.25	51
⊝ 2	Breakdown and dc discharge in low-pressure water vapour Sivos, J; Skoro, N; (); Petrovic, ZL Oct 28 2015 JOURNAL OF PHYSICS D-APPLIED PHYSICS ▼ 48 (42)	2	2	0	0	0	0.91	10
	New phenomenology of gas breakdown in DC and RF fields Petrovic, ZL; Sivos, J; (); Maric, D 18th International Summer School on Vacuum, Electron and Ion Technologies (VEIT) 2014 18TH INTERNATIONAL SUMMER SCHOOL ON VACUUM, ELECTRON AND ION TECHNOLOGIES (VEIT2013) 514	1	1	1	0	0	0.58	7
() 4	Low-pressure DC breakdown in alcohol vapours Sivos, J; Maric, D; (); Petrovic, ZL Mar 30 2020 EUROPEAN PHYSICAL JOURNAL D ▼ 74 (4)	2	0	1	1	0	0.83	5
⊝ 5	DC discharge in low-pressure ethanol vapour Sivos, J: Maric, D; (); Petrovic, ZL May 2019 PLASMA SOURCES SCIENCE & TECHNOLOGY ▼ 28 (5)	2	0	1	1	0	0.71	5
⊝ 6	Effective ionization coefficients for low current dc discharges in alcohol vapours at low pressure Marjanovic, J; Maric, D; (); Petrovic, ZL Jun 2021 EUROPEAN PHYSICAL JOURNAL D ▼ 75 (6) □ Lenriched Cited References	0	0	1	2	0	0.6	3
⊝ 7	Voltage-current characteristics of low-pressure discharges in vapors of several alcohols Marjanovic, J; Maric, D; (); Petrovic, ZL Apr 14 2021 JOURNAL OF APPLIED PHYSICS ▼ 129 (14)	0	0	1	0	1	0.4	2

⊝ 8	Reduced ionization coefficients in low-current dc discharge in freons of a new generation Marjanovic, J; Maric, D and Petrovic, ZLJ Feb 2024 EUROPEAN PHYSICAL JOURNAL D ▼ 78 (2) □ ← Enriched Cited References	0	0	0	0	0	0	0
9	DC BREAKDOWN IN VAPOURS OF LIQUIDS Sivos, J; Maric, D; (); Petrovic, ZL IEEE International Conference on Plasma Sciences (ICOPS) 2015 2015 42ND IEEE INTERNATIONAL CONFERENCE ON PLASMA SCIENCES (ICOPS)	0	0	0	0	0	0	0
	Development of Fast Neutral Etching for Integrated Circuits and Nanotechnologies Fast Neutrals in Gas Petrovic, ZL; Stojanovic, Y; (); Maric, D 29th International Conference on Microelectronics (MIEL) 2014 1 2014 29TH INTERNATIONAL CONFERENCE ON MICROELECTRONICS PROCEEDINGS - MIEL 2014 , pp.17-24	0	0	0	0	0	0	0
○ 11	Development of Biomedical Applications of Non-equilibrium Plasmas and Possibilities for Atmospheric Pressure Nanotechnology Applications Petrovic, ZL; Puac, N; (); Malovic, G 28th International Conference on Microelectronics (MIEL) 2012 2012 28TH INTERNATIONAL CONFERENCE ON MICROELECTRONICS (MIEL), pp.31-38	0	0	0	0	0	0	0
	Citation Report Publications Table							

Accessibility Legal Training Cookie Center Portal Policy Help Privacy Product Manage Terms of Statement Support Use Copyright Newsletter preferences Notice Data Correction





Subject Re: Contemporary Materials 2023, recenzija rada

Daniel Grujić <daniel.grujic@anurs.org> To Jelena Marjanovic <sivosj@ipb.ac.rs>

2023-12-15 15:04 Date



Poštovana,

Hvala Vam na izdvojenom vremenu i poslatoj recenziji.

Srdačan pozdrav

Daniel Grujić

пон, 27. нов 2023. y 23:33 Jelena Marjanovic <<u>sivosj@ipb.ac.rs</u>> је написао/ла: Poštovani,

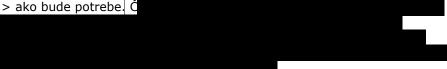
U prilogu mejla se nalaze popunjen Obrazac i dodatne ispravke (kao Additional notes).



Srdačan pozdrav, Jelena Marjanović

On 2023-11-15 08:52, Daniel Grujić wrote:

- > Poštovana,
- > Sve ispravke dopune i td. možete napisati u odvojenom dokumentu. U
- > tom slučaju, pošaljite taj odvojeni dokument, ali popunite i obrazac
- > koji sam Vam poslao.
- > Krajnji rok je 27. novembar, ali možemo ga produžiti nekoliko dana,



- > Srdačan pozdrav
- > пон, 13. нов 2023. y 15:54 Jelena Marjanovic <sivosj@ipb.ac.rs>
- > је написао/ла:
- >> Poštovani,
- >> Potvrđujem da sam dobila Vaš mejl.
- >> Prihvatam da uradum recenziju rada.



- >> Srdačan pozdrav,
- >> Jelena Marjanović
- >>
- >> On 2023-11-09 19:39, Daniel Grujić wrote:
- >>> Poštovana,
- >>>
- >>> U dogovoru sa akademikom Dragoljubom Mirjanićem, glavnim
- >> urednikom
- >>> časopisa "Contemporary Materials", šaljem rad (i obrazac za
- >>> recenziju) u prilogu mejla i molim Vas da napišete recenziju.
- >>>
- >>> Popunjeni obrazac, sa obaveznim potpisom na kraju, dostavite
- >>> elektronskim putem na ovaj e-mail.
- >>> Rok za dostavu recenzije: 27. novembar 2023.
- >>>
- >>> Molim Vas za potvrdu prijema mejla.
- >>>
- >>> Srdačan pozdrav
- >>>
- >>> --
- >>>
- >>> Daniel GrujićViši stručni saradnik za grafičko oblikovanje i
- >>> tehničko uređenje Akademijinih izdanja
- >>>
- >>> Akademija nauka i umjetnosti Republike Srpske
- >>> Bana Lazarevića broj 1
- >>> 78 000 Banja Luka
- >>> Republika Srpska
- >>> Mob. telefon: +387 65 233 692
- >>> E-mail: daniel.grujic@anurs.org
- >>
- >> --
- >> Dr. Jelena Marjanović
- >> Institute of Physics Belgrade
- >> Laboratory for Non-equilibrium
- >> Processes and Plasma Applications
- >>
- >> Pregrevica 118, 11080 Belgrade, Serbia
- >> http://www.ipb.ac.rs/

--

Dr. Jelena Marjanović Institute of Physics Belgrade Laboratory for Non-equilibrium Processes and Plasma Applications

Pregrevica 118, 11080 Belgrade, Serbia http://www.ipb.ac.rs/

Прилог 3 Доказ о позивним предавањима М31 и М32



Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava, Mlynská dolina F2, 842 48 Bratislava, Slovakia

Bratislava, October 25th, 2024

Dear Dr. Jelena Marjanović,

On behalf of the Organizing Committee and International Scientific Committee of the **Symposium on Application of Plasma Processes (SAPP)**, it is my pleasure to invite you to participate at the:

25th Symposium on Application of Plasma Processes - SAPP XXV and 14th EU-Japan Joint Symposium on Plasma Processing

with the following **Invited talk**:

"Breakdown Characteristics in Low GWP and Low ODP Freons".

The conference will take place in Hotel Sorea TRIGAN, Štrbské Pleso, Slovakia between 31st January and 5th February 2025.

We are looking forward to seeing you at the conference.

Yours sincerely,

Assoc. Prof. Peter Papp, PhD. Secretary of SPVAP KEF FMFI UK, Mlynská dolina F2 Bratislava, SLOVAKIA

Phone: +421 2 60295 686 E-mail: spvap@neon.dpp.fmph.uniba.sk



Faculty of Mathematics, Physics and Informatics, Comenius University Bratislava, Mlynská dolina F2, 842 48 Bratislava, Slovakia

Bratislava, February 5th, 2025

Dear Dr. Jelena Marjanović,

On behalf of the Local Organizing Committee and International Scientific Committee of the **Symposium on Application of Plasma Processes (SAPP)**, I would like to express our appreciation for your participation in the

25th Symposium on Application of Plasma Processes - SAPP XXV and 14th EU-Japan Joint Symposium on Plasma Processing

with the following **Invited talk**:

"Breakdown Characteristics in Low GWP and Low ODP Freons".

in Hotel Sorea TRIGAN, Štrbské Pleso, Slovakia between 30th January and 5th February 2025.

Yours sincerely,

Assoc. Prof. Peter Papp, PhD.
Secretary of SPVAP and SAPP 2025
KEF FMFI UK, Mlynská dolina F2
Bratislava, SLOVAKIA



25th Symposium on Application of Plasma Processes and 14th EU-Japan Joint Symposium on Plasma Processing

Book of Contributed Papers

Štrbské Pleso, Slovakia 31 Jan - 5 Feb, 2025

Edited by G. D. Megersa, E. Maťaš, J. Országh, P. Papp, Š. Matejčík

Book of Contributed Papers: 25th Symposium on Application of Plasma Processes and 14th EU-Japan Joint Symposium on Plasma Processing, Štrbské Pleso, Slovakia, 31 January – 5 February 2025.

Symposium organised by Department of Experimental Physics, Faculty of Mathematics, Physics and Informatics, Comenius University in Bratislava and Society for Plasma Research and Applications in hotel SOREA TRIGAN***.

Editors: G. D. Megersa, E. Maťaš, J. Országh, P. Papp, Š. Matejčík

Publisher: Society for Plasma Research and Applications, Bratislava, Slovakia

Issued: January 2025, Bratislava, first issue

ISBN: 978-80-972179-5-2

URL: https://neon.dpp.fmph.uniba.sk/sapp/

Local Organizers

Department of Experimental Physics

Faculty of Mathematics, Physics and Informatics Comenius University in Bratislava Mlynská dolina F2

842 48 Bratislava, Slovakia

URL: http://www.fmph.uniba.sk/

Tel.: +421 2 602 95 686 Fax: +421 2 654 29 980



Society for plasma research and applications

Faculty of Mathematics, Physics and Informatics Comenius University Bratislava Mlynská dolina F2 842 48 Bratislava, Slovakia

E-mail: spvap@neon.dpp.fmph.uniba.sk

Tel.: +421 2 602 95 686



Local Organizing Committee

Peter Papp (chairman)

Štefan Matejčík

František Krčma

Juraj Országh

Ladislav Moravský

Peter Čermák

Matej Klas

Barbora Stachová

Emanuel Maťaš

Filip Pastierovič

Samuel Peter Kovár

Priyanka Kumari

Gadisa Deme Megersa

Enmily Garcia

Angel Pardo

International Scientific Committee

25th Symposium on Application of Plasma Processes

Prof. J. Benedikt Christian-Albrechts-University, Kiel, Germany

Dr. R. Brandenburg INP, Greifswald, Germany

Dr. T. Field Queen's University, Belfast, United Kingdom

Prof. S. Hamaguchi Osaka University, Japan

Dr. P. Hartmann HUN-REN Wigner Research Centre for Physics, Budapest, Hungary

Prof. F. Krčma Brno University of Technology, Brno, Czech Republic

Prof. N. Mason School of Physical Sciences, University of Kent, United Kingdom

Prof. Š. Matejčík

Prof. J. Pawlat

University in Bratislava, Slovakia

University of Technology, Lublin, Poland

Prof. M. Radmilović-Radjenović

Institute of Physics, Belgrade, Serbia

rioi. W. Raumilovic-Raujenovic institute of rhysics, beignade, Serbia

Prof. P. Scheier Leopold-Franzens University, Innsbruck, Austria

14th EU-Japan Joint Symposium on Plasma Processing

Prof. S. Hamaguchi Osaka University, Japan

Prof. N. Mason School of Physical Sciences, University of Kent, United Kingdom

Prof. Z. Petrović Institute of Physics, Belgrade, Serbia

Reading Committee

Prof. Š. Matejčík Comenius University in Bratislava, Slovakia

Prof. F. Krčma Brno University of Technology, Brno, Czech Republic

Prof. N. Mason University of Kent, United Kingdom

Assoc. Prof. P. Papp Comenius University in Bratislava, Slovakia Assoc. Prof. J. Országh Comenius University in Bratislava, Slovakia Assoc. Prof. V. Medvecká Comenius University in Bratislava, Slovakia Assoc. Prof. M. Klas Comenius University in Bratislava, Slovakia Assoc. Prof. P. Čermák Comenius University in Bratislava, Slovakia Dr. Vahideh Ilbeigi Comenius University in Bratislava, Slovakia

Conference Topics

- 1. Electrical discharges and other plasma sources
- 2. Elementary plasma processes and plasma-chemical reactions
- 3. Theory and modelling of plasmas and plasma processes
- 4. Plasma-surface interactions
- 5. Plasma surface treatment for applications
- 6. Plasmas for nanomaterials
- 7. Plasma diagnostics
- 8. Ion mobility and mass spectrometry

Table of Contents

INVITED LECTURES	S	11			
Cristina Canal	PLASMA-TREATED HYDROGELS: A THERAPEUTIC ALTERNATIVE IN PLASMA MEDICINE?	12			
Nicolas Naudé	STUDY TO APPLICATIONS				
Jelena Marjanović	BREAKDOWN CHARACTERISTICS IN LOW GWP AND LOW ODP FREONS	16			
Juraj Fedor	DYNAMICS INDUCED BY ELECTRON COLLISIONS: GASES AND LIQUIDS	21			
Thierry Belmonte	DISSOCIATING PURE AMMONIA WITH MICROWAVE DISCHARGES	22			
Oddur Ingolfsson	LOW ENERGY ELECTRONS IN NANO-SCALE PROCESSING	31			
Inna Orel	SPATIALLY AND TEMPORALLY RESOLVED ELECTRIC FIELD, CURRENT, AND ELECTRON DENSITY IN AN RF ATMOSPHERIC PRESSURE PLASMA JET BY E-FISH	34			
Dušan Kováčik	ADVANCED DCSBD-BASED PLASMA TECHNOLOGIES FOR SURFACE MODIFICATIONS AND BIO-APPLICATIONS	37			
Yuzuru Ikehara	PLASMA-BASED MICROFABRICATION TECHNOLOGY FOR CHARGE CONTROL METHODS IN PATHOLOGICAL SPECIMENS: VISUALIZING PHASE TRANSITION LINKED WITH VIRUS PARTICLE FORMATION USING SEM AND AFM	40			
Toshiaki Makabe	GENERAL RELATIONSHIP BETWEEN DRIFT VELOCITIES IN POSITION AND VELOCITY SPACES OF CHARGED PARTICLES	42			
Máté Vass	HYBRID FLUID/MC SIMULATIONS OF RADIO-FREQUENCY ATMOSPHERIC PRESSURE PLASMA JETS	53			
Paula De Navascués	LOW-PRESSURE PLASMA POLYMERIZATION FOR EMERGING FUNCTIONAL MATERIALS	57			
Jacopo Profili	INVESTIGATING STABLE SURFACE MODIFICATIONS OF FLUOROPOLYMERS BY ATMOSPHERIC PRESSURE NITROGEN DISCHARGE	59			
Zoltán Juhász	RADIATION CHEMISTRY PROCESSES IN THE SURFACE OF ICY MOONS IN THE PLASMA ENVIRONMENT OF GIANT PLANETS	61			
Jarosław Puton	SWARMS OF IONS IN VARIABLE ELECTRIC FIELD - POSSIBLE ANALYTICAL APPLICATION	66			
Masaaki Matsukuma	MULTISCALE SIMULATION OF PLASMA-BASED DEPOSITION PROCESSES	72			
HOT TOPICS		73			
Zdenko Machala	INDOOR AIR CLEANING BY NON-THERMAL PLASMA AND PHOTOCATALYSIS	74			
Karol Hensel	ELECTRICAL DISCHARGES IN CAPILLARY TUBES AND HONEYCOMB MONOLITHS	77			
	Cristina Canal Nicolas Naudé Jelena Marjanović Juraj Fedor Thierry Belmonte Oddur Ingolfsson Inna Orel Dušan Kováčik Yuzuru Ikehara Toshiaki Makabe Máté Vass Paula De Navascués Jacopo Profili Zoltán Juhász Jarosław Puton Masaaki Matsukuma HOT TOPICS Zdenko Machala	ALTERNATIVE IN PLASMA MEDICINE? Nicolas Naudé DIFFUSE DBD AT ATMOSPHERIC PRESSURE: FROM PHYSICS STUDY TO APPLICATIONS BREAKDOWN CHARACTERISTICS IN LOW GWP AND LOW ODP FREONS Juraj Fedor DYNAMICS INDUCED BY ELECTRON COLLISIONS: GASES AND LIQUIDS DISSOCIATING PURE AMMONIA WITH MICROWAVE DISCHARGES Oddur Ingolfsson LOW ENERGY ELECTRONS IN NANO-SCALE PROCESSING SPATIALLY AND TEMPORALLY RESOLVED ELECTRIC FIELD, CURRENT, AND ELECTRON DENSITY IN AN RE ATMOSPHERIC PRESSURE PLASMA JET BY E-FISH ADVANCED DCSBD-BASED PLASMA TECHNOLOGIES FOR SURFACE MODIFICATIONS AND BIO-APPLICATIONS YUZURU Ikehara PLASMA-BASED MICROFABRICATION TECHNOLOGY FOR CHARGE CONTROL METHODS IN PATHOLOGICAL SPECIMENS: VISUALIZING PHASE TRANSITION LINKED WITH VIRUS PARTICLE FORMATION USING SEM AND AFM GENERAL RELATIONSHIP BETWEEN DRIFT VELOCITIES IN POSITION AND VELOCITY SPACES OF CHARGED PARTICLES Mâté Vass Paula DE NAVASCUÉS PAULA DE NAVASCUÉS LOW-PRESSURE PLASMA POLYMERIZATION FOR EMERGING FUNCTIONAL MATERIALS JACOPO Profili JINCOSPHERIC PRESSURE PLASMA POLYMERIZATION FOR EMERGING FUNCTIONAL MATERIALS LOW-PRESSURE PLASMA POLYMERIZATION FOR EMERGING FUNCTIONAL MATERIALS JINCOSPHERIC PRESSURE PLASMA POLYMERIZATION FOR EMERGING FUNCTIONAL MATERIALS JACOPO PROFILI JACOPO PROFILI			

НТ-3	Pavel Veis	TRACE ELEMENTS DETECTION AND CF ELEMENTAL ANALYSIS OF WATER BY LIBS FOR ENVIRONMENTAL CONTROL—COMPARISON OF SURFACE ASSISTED, ACOUSTIC LEVITATION AND NE METHODS	78
HT-4	Zoltán Donkó	THE EFFECT OF NITROGEN ADDITION TO ARGON ON THE Ar $1s_5$ AND $1s_3$ METASTABLE ATOM DENSITIES AND Ar SPECTRAL EMISSION IN A CAPACITIVELY COUPLED PLASMA	79
HT-5	Petra Šrámková	PLASMA TECHNOLOGY AS AN EFFICIENT TOOL TO IMPROVE SEED GERMINATION AND PROVIDE ADHESION OF PROTECTIVE POLYMER COATINGS ON SEEDS	84
НТ-6	Satoshi Hamaguchi	MOLECULAR DYNAMICS SIMULATIONS OF SILICON NITRIDE ATOMIC-LAYER DEPOSITION OVER A NARROW TRENCH STRUCTURE	85
HT-7	Jan Benedikt	STABILITY OF METAL-ORGANIC FRAMEWORKS IN NON- THERMAL ATMOSPHERIC PLASMA	86
НТ-8	Lenka Zajíčková	PLASMA PROCESSING OF POLYMER NANOFIBERS FOR ENHANCED IMMOBILIZATION OF LIGNIN NANO/MICROPARTICLES	87
НТ-9	Ladislav Moravský	ATMOSPHERIC PRESSURE CHEMICAL IONIZATION STUDY OF SULPHUR-CONTAINING COMPOUNDS BY ION MOBILITY SPECTROMETRY AND MASS-SPECTROMETRY	91
HT-10	Jan Žabka	HANKA – CUBESAT SPACE DUST ANALYSER WITH PLASMA ION SOURCE	95
HT-11	Zlata Kelar Tučeková	ATMOSPHERIC PRESSURE PLASMA TREATMENT AND FUNCTIONALIZATION OF GLASS SURFACE FOR RELIABLE ADHESIVE BONDING	97
HT-12	Mário Janda	IN-SITU DIAGNOSTIC OF ELECTROSPRAY BY RAMAN LIGHT SHEET MICROSPECTROSCOPY	99
HT-13	Matej Klas	MEMORY EFFECT IN PULSED MICRODISCHARGES	105
HT-14	Ihor Korolov	STREAMER PROPAGATION DYNAMICS IN A NANOSECOND PULSED SURFACE DIELECTRIC BARRIER DISCHARGE IN HELIUM-NITROGEN MIXTURES	107
HT-15	Oleksandr Galmiz	GENERATION OF REACTIVE SPECIES VIA SURFACE DIELECTRIC BARRIER DISCHARGE IN DIRECT CONTACT WITH WATER	110

YOUNG SCIENTISTS' LECTURES

YS-1	Kristína Trebulová	COLD PLASMA AS AN APPROACH TOWARDS ALTERNATIVE TREATMENT OF OTITIS EXTERNA	115
YS-2	Richard Cimermann	PLASMA-CATALYTIC GAS TREATMENT: THE ROLE OF PELLET-SHAPED MATERIAL IN PACKED-BED DBD REACTORS	118
YS-3	Barbora Stachová	ELECTRON INDUCED FLUORESCENCE OF CARBON MONOXIDE	120
YS-4	Joel Jeevan	EFFECT OF DILUTION OF H ₂ /CH ₄ MICROWAVE MICROPLASMA WITH ARGON FOR IMPROVED GAS PHASE NUCLEATION OF NANODIAMONDS	125
YS-5	Anja Herrmann	MAPPING RADICAL FLUXES WITH THERMOCOUPLE PROBES	131

YS-6	Sandra Ďurčányová	ATMOSPHERIC PRESSURE PLASMA POLYMERIZATION FOR FUNCTIONAL COATING APPLICATIONS	132
YS-7	Ludmila Čechová	PLASMA TREATMENT OF WASTEWATER: A PROMISING APPROACH TO PLANT FERTILIZATION	134
YS-8	Emanuel Maťaš	THERMAL DEGRADATION OF BIODEGRADABLE POLYMERS STUDIED BY IMS TECHNIQUE	136

POSTER PRESENTATIONS

P-01	Tom Field	THE TEMPERATURES OF HELIUM AND AIR-FED ATMOSPHERIC PRESSURE PLASMA JETS	141
P-02	Peter Hartmann	IONIZATION-ATTACHMENT INSTABILITY IN AN O ₂ CCRF PLASMA	142
P-03	Amy Jennings	DEVELOPMENT OF AN ANTIBACTERIAL ATMOSPHERIC PRESSURE PLASMA JET	146
P-04	Jana Kšanová	CYCLIC PLASMA-CATALYTIC SYSTEM OF CATALYST DEACTIVATION AND REGENERATION APPLIED FOR VOC REMOVAL	147
P-05	Kinga Kutasi	COMPARISON OF THE MAGNETRON AND THE SOLID-STATE MICROWAVE GENERATOR POWERED SURFACE-WAVE DISCHARGES	149
P-06	Ranna Masheyeva	ON THE IN-SITU DETERMINATION OF THE EFFECTIVE SECONDARY ELECTRON EMISSION COEFFICIENT IN LOW PRESSURE CAPACITIVELY COUPLED RADIO FREQUENCY DISCHARGES BASED ON THE ELECTRICAL ASYMMETRY EFFECT	155
P-07	Mária Maťašová	STATISTICAL CHARACTERZATION OF VACUUM MICRODISCHARGES GENERATED IN HIGH PULSED ELECTRIC FIELDS	160
P-08	Enmily Garcia	ELECTRON INDUCED DISSOCIATIVE EXCITATION OF FORMAMIDE	163
P-09	Michal Hlína	THERMAL PLASMA GASIFICATION	167
P-10	Mário Janda	ON MECHANISM OF REACTIVE NITROGEN SPECIES FORMATION IN NEGATIVE POLARITY HIGH PRESSURE GLOW DISCHARGE	170
P-11	Gadisa Deme Megersa	LOW ENERGY ELECTRONS INTERACTION WITH ACETONE (CH ₃) ₂ CO IN THE UV-VIS SPECTRAL REGION	179
P-12	Juraj Országh	WATER EMISSION INDUCED BY LOW-ENERGY ELECTRON IMPACT	181
P-13	Samuel Peter Kovár	POTENTIAL ENERGY CURVES OF SPECTROSCOPICALLY RELEVANT EXCITED STATES OF CARBON MONOXIDE: A COMPUTATIONAL STUDY	185
P-14	Vera Mazankova	KINETICS OF OZONE PRODUCTION BY SURFACE PROCESSES	187
P-15	Naomi Northage	EFFECTS OF PLASMA-BASED DISINFECTION METHODS ON THE SURFACE INTEGRITY OF TEFLON	190
P-16	Sandra Ďurčányová	COMPARATIVE STUDY OF PLASMA TREATMENT OF PEA SEEDS WITH DIFFERENT GERMINATION USING TWO PLASMA SOURCES	192

P-17	Mohamed Khalaf Abdelmajeed Fawwaz	EFFECT OF LOW-TEMPERATURE ATMOSPHERIC PRESSURE PLASMA ON GERMINATION, GROWTH PARAMETERS AND DECONTAMINATION OF RADISH SEEDS	196
P-18	Sahila Gahramanli	APPLICATION OF DCSBD AS A LOW-TEMPERATURE PLASMA SOURCE FOR POLYMER PROCESSING	199
P-19	Joel Jeevan	FUTURE TO FACILE SEEDING TECHNOLOGY: FROM NANODIAMOND TO NANOCRYSTALLINE DIAMOND FILM	202
P-20	Bernard Gitura Kimani	NVESTIGATING THE COMBINED ANTIYEAST EFFICACY OF PLASMA-ACTIVATED WATER AND NATURAL PHENOLICS ON PLANKTONIC DEBARYOMYCES HANSENII	205
P-21	Lenka Krejsová	STUDY OF DIRECT AND INDIRECT PLASMA APPLICATION ON ONION SEEDING BULBS	209
P-22	Adriana Mišúthová	EFFECT OF PLASMA-ACTIVATED WATER ON PHYSIOLOGICAL PARAMETERS IN BEAN PLANTS (PHASEOLUS VULGARIS)	215
P-23	Joanna Pawlat	INFLUENCE OF APPJ ON PRIMARY TEETH ENAMEL	220
P-24	Petra Šrámková	APPLICATION OF NON-THERMAL PLASMA GENERATED BY PIEZOELECTRIC DIRECT DISCHARGE ON SEEDS AND STUDY OF ITS EFFECT	222
P-25	Tomáš Vozár	INFLUENCE OF PLASMA ACTIVATED WATER ON THE PLANT GROWTH AND VITALITY	225
P-26	Dawid Zarzeczny	QUALITY STUDY OF FRESH PRESSED CARROT JUICE AFTER COLD ATMOSPHERIC PLASMA TREATMENT	229
P-27	Jozef Brcka	MULTISCALE TIME EVOLUTION OF C ₂ H ₂ +Ar MIXTURE DECOMPOSITION IN LOW-PRESSURE INDUCTIVELY COUPLED PLASMA	231
P-28	Oddur Ingolfsson	DISSOCIATIVE IONISATION OF PENTAFLUOROPHENYL TRIFLATE, A POTENDIAL PHOTO ACID GENERATOR FOR CHEMICALLY AMPLIFIED EXTREME ULTRAVIOLET LITHOGRAPHY RESISTS	233
P-29	Oddur Ingolfsson	DISSOCIATIVE ELECTRON ATTACHMENT TO PENTAFLUOROPHENYL TRIFLATE, A POTENDIAL PHOTO ACID GENERATOR FOR CHEMICALLY AMPLIFIED EXTREME ULTRAVIOLET LITHOGRAPHY RESISTS	235
P-30	Peter Čermák	ACCURATE REFERENCE DATA FOR MONITORING OF AMMONIA	237
P-31	Martin Kuťka	MEASUREMENT OF ION CURRENT FROM MULTI-HOLLOW SURFACE DIELECTRIC BARRIER DISCHARGE	239
P-32	Filip Pastierovič	DUAL-CHANNEL ABSORPTION SPECTROSCOPY	244
P-33	Peter Tóth	EMISSION SPECTRA OF TRANSIENT SPARK WITH ELECTROSPRAY	246
P-34	Neda Babucić	MASS SPECTROMETRY OF DIELECTRIC BARIER DISCHARGE WITH WATER ELECTRODE	251
P-35	Vahideh Ilbeigi	RAPID DETECTION OF VOLATILE ORGANIC COMPOUNDS EMITTED FROM PLANTS BY MULTICAPILLARY COLUMN-ION MOBILITY SPECTROMETRY	257
P-36	Priyanka Kumari	STUDY OF PLASMA-ASSISTED REACTION OF PENTANE AND AMMONIA BY ATMOSPHERIC PRESSURE CHEMICAL IONIZATION ION MOBILITY-MASS SPECTROMETRY (IMS-MS)	261

P-37	Catalina McLaughlin	PERFORMANCE OF TWO-FIELD LINEAR TIME-OF-FLIGHT MASS SPECTROMETER	265
P-38	Ladislav Moravský	DESIGN AND CONSTRUCTION OF AN ION MOBILITY SPECTROMETER BASED ON ELECTROSPRAY	266
P-39	Angel Pardo	APPLICATION OF ATMOSPHERIC COLD PLASMA TO PESTICIDE DEGRADATION	270

BREAKDOWN CHARACTERISTICS IN LOW GWP AND LOW ODP FREONS

Jelena Marjanović¹, Dragana Marić¹, Zoran Lj. Petrović^{2,3}

¹Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia
²Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia
³School of Engineering, Ulster University, Jordanstown, County Antrim BT37 OQB, United Kingdom
E-mail: sivosj@ipb.ac.rs

We present the results of breakdown measurements for three freons: 1,1,1,2-tetrafluoroethane (R134a, $C_2H_2F_4$), 2,3,3,3-tetrafluoropropene (HFO1234yf, $C_3H_2F_4$), and trans-1,3,3,3-tetrafluoropropene (HFO1234ze(E), $C_3H_2F_4$) in a centimeter-sized plan-parallel electrode system, under swarm conditions at low currents (~1 A) and low pressures. Paschen curves and corresponding distributions of emission intensities at low current were recorded in the *pd* (pressure x electrode gap) range from 0.05 to 3 Torr cm, covering the region of Paschen minimum. We obtained an effective ionization coefficient of studied freons from the emission profiles for the *E/N* range 2.5 kTd to 23 kTd.

1. Introduction

The widespread use of fluorocarbons and sulphur hexafluoride (SF₆) has raised concerns regarding their emissions due to their detrimental environmental impact. These greenhouse gases have an extremely long atmospheric lifetime, high global warming potentials (GWP) and high ozone depletion potentials (ODP). The electrical industry, a major consumer of SF₆, is actively working to replace it with environmentally friendly insulation gases. Among the most promising alternatives are hydrofluoroolefins (HFOs), perfluoro-ketones (PFKs), and perfluoronitriles (PFNs). These synthetic compounds not only have significantly shorter atmospheric lifetimes compared to SF₆ [1, 2] but are also added in small concentrations to atmospheric gases, providing similar electrical strength as SF₆ [3-5]. However, the ideal SF₆ replacement in electrical gas insulation equipment must fulfil some relevant technical parameters such as maximum operating voltage, limited by the breakdown voltage, minimum operating temperature, boiling point, vapour pressure, toxicity, flammability, low GWP and ODP etc.

In recent years, many studies (dielectric breakdown experiments, swarm experiments) have been made to obtain the necessary data needed for a better understanding of the electrical and physical properties of new synthetic compounds and their mixtures [6-9]. Nonetheless, there is still a lack of essential data necessary for the development of environmentally friendly power equipment. The main objective of this work is to gather the elementary breakdown data (breakdown voltages at various reduced electric fields, effective ionization coefficients, secondary electron yields) that will contribute to the development of comprehensive sets of cross-sections and other discharge parameters in the energy range that are relevant to a wide array of applications.

2. Experimental setup

Breakdown measurements are done in a centimeter-sized plan-parallel electrode system, under swarm conditions at low currents ($^{\sim}$ 1 mA) and low pressures ($^{\sim}$ 0.05 – 3 Torr). The copper cathode and aluminium anode have a diameter of 5.4 cm, and the distance between them is set at 1.1 cm. The electrode system is placed in a narrow cylinder made of quartz glass, which allows the recording of side - on images of the discharge emission in a wide spectral range. We used a sensitive ICCD camera (Andor IStar DH720-18U-03) to capture light emission from discharges, and for spectrally resolved recordings, we employed optical band-pass filters. A more detailed description of the experimental procedure is given in [10, 11]. Measurements were done for three freons: 1,1,1,2-tetrafluoroethane (R134a, $C_2H_2F_4$), 2,3,3,3-tetrafluoropropene (HFO1234yf, $C_3H_2F_4$), and trans-1,3,3,3-

tetrafluoropropene (HFO1234ze(E), $C_3H_2F_4$). Figure 1 depicts a simplified schematic of the experimental set-up.

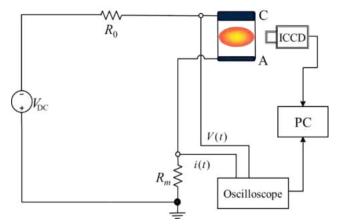


Fig. 1. Schematics of the experimental setup and the electrical circuit used in measurements. The discharge current is determined by measuring voltage drop on the resistor R_m , while R_0 limit the current.

3. Results

In Figure 2, we present the breakdown voltage dependence on the product of pressure (p) and interelectrode distance (d), commonly known as Paschen curves for 1,1,1,2-tetrafluoroethane (R134a, $C_2H_2F_4$), 2,3,3,3-tetrafluoropropene (HFO1234yf, $C_3H_2F_4$), and trans-1,3,3,3-tetrafluoropropene (HFO1234ze(E), $C_3H_2F_4$) in comparison with sulfur hexafluoride (SF₆) [12, 13]. The Paschen curves for all presented gases have a minimum at \sim 0.25 Torr cm. R134a exhibits the lowest breakdown voltages compared to HFOs and SF₆ under identical conditions.

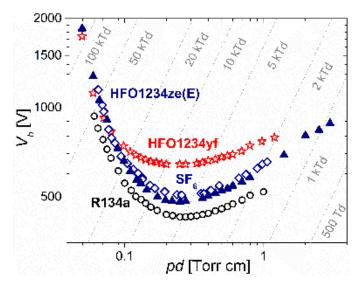


Fig. 2. Comparison of Paschen curves for 1,1,1,2-Tetrafluoroethane (R134a) (open circles), 2,3,3,3-Tetrafluoropropene (HFO1234yf) (open stars), trans-1,3,3,3-Tetrafluoropropene (HFO1234ze(E)) (solid triangles), and sulfur hexafluoride (SF_6) (open rhombs) [12, 13]. Curves have been obtained for an electrode distance of 1.1 cm.

While the breakdown voltage values for HFO1234ze(E) around the Paschen minimum are significantly lower than those for HFO1234yf, a shift towards higher pressures reveals a steeper increase in voltage for HFO1234ze(E) compared to HFO1234yf. At lower pressures, the voltage increase in the left-hand

branch of the Paschen curve, is comparable for both HFOs and aligns with the left-hand branch of SF₆. Observing the Paschen curves of SF₆ and HFO1234ze(E), it is evident that these gases align closely in breakdown voltages at both lower pressures (left-hand branch) and higher pressures (right-hand branch). One should keep in mind that surface processes dominantly influence the left-hand branch of the Paschen curve, while the right-hand branch is mainly shaped by the processes in gas [14].

Along with the breakdown measurements, we recorded the spatial distribution of discharge emission. We obtained the axial emission profiles (Fig. 3) for the range of reduced electric fields covered by the Paschen curve. The recordings of discharge spatial distribution are crucial because they can provide insights into the overall particle kinetics under various conditions [15-19]. In Steady State Townsend (SST) discharges, there are two distinguished regions, one an electron-dominated region observed near the anode, and another with significant emissions near the cathode that are generally due to the heavy particles excitation, such as fast neutrals, fast ions and metastables [16, 20, 21]. The recordings for all three studied freons reveal that the significant contribution to total emission originates from the heavy - particle excitation for all covered reduced electric fields (E/N) (examples shown in Fig. 3, integrated visual profiles). However, the H α emission profile significantly changes its shape with the decrease of reduced electrical field (E/N). Around the Paschen minimum, for all showed freons, contribution to overall emission by electron excitation becomes significant, which is depicted with the maximum intensity in front of the anode (Fig. 3, H α profiles at 0.3 and 0.25 Torr cm).

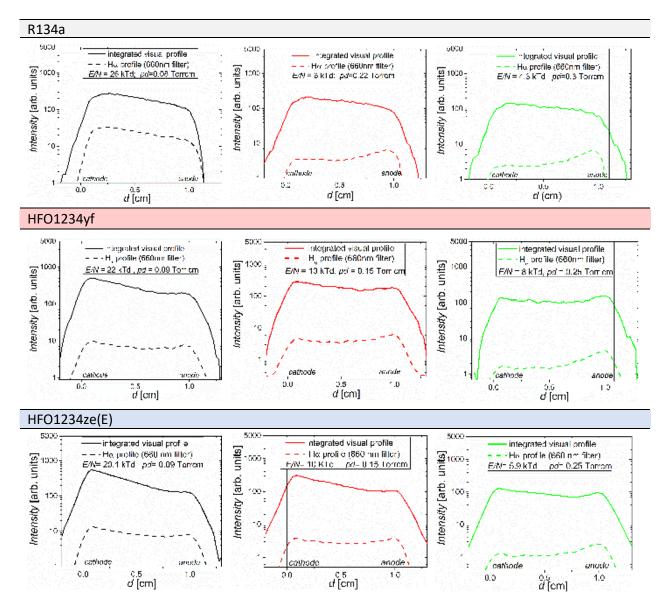


Fig. 3. Examples of the total (integrated visual) axial emission profiles and H α axial emission profiles of R134a, HFO1234yf, and HFO1234ze(E) discharges, recorded for various reduced electric fields (E/N).

The effective ionization coefficients for the studied gases are determined from the axial emission profiles obtained in the spectrally resolved measurements by using band-pass optical filters [see ref. [10]]. Profiles are recorded for the low-current limit (no space charge) of the DC discharges in the Townsend/diffuse regime (breakdown conditions). In the case of HFO1234ze, we determined α/N coefficient from H α axial emission profiles as they show only a small contribution of fast neutrals to excitation (an example shown in Fig. 4). The slope of exponential intensity growth (plotted in a semi - logarithmic scale) corresponds to the effective ionization coefficient α_{eff}/N [12, 22].

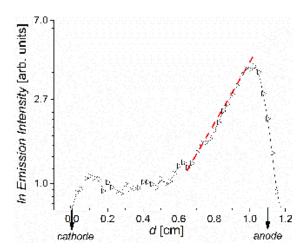


Fig. 4. H α axial emission profile of low-current Townsend discharge recorded in HFO1234ze(E) for pd = 0.4 Torr cm, $V_b = 504$ V and E/N = 3.8 kTd at electrode distance of d = 1.1 cm. The plot of the emission profile in the semi-log scale reflects electron multiplication between the electrodes, and the profile slope (red dotted line) corresponds to the effective ionization coefficient.

In Figure 5, we present results for the reduced effective ionization coefficient for HFO1234ze(E) discharge and compare it with the results for R134a, HFO1234yf [10]. Results are obtained in the E/N range from 2.5 kTd to 23 kTd. For comparison, we also show effective ionization coefficients for SF₆ from the literature [23, 24]. The α_{eff}/N values for SF₆ in the E/N range of 2.5 kTd to 4 kTd are approximately twice as large as those for HFO1234ze(E) within the same range.

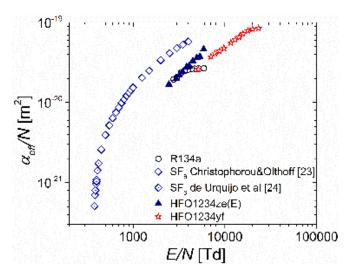


Fig. 5. The dependence of reduced effective ionization coefficient (α_{eff}/N) on the reduced electric field (E/N). Results obtained from our experiment for R134a (open circles), HFO1234yf (open stars), and

HFO1234ze(E) (solid triangles) are compared with data for SF₆ from Christophorou and Olthoff (open rhombs)[23] and de Urquijo et al (open rhombs with dots)[24].

HFO1234ze(E) and HFO1234yf gases show the high potential for insulation applications because of their high breakdown voltages and low effective ionization coefficients.. They cannot fully replace SF_6 in medium and high-voltage technologies. Still, they represent building blocks for understanding a new complex class of gases that is currently the most promising alternative to SF_6 .

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

4. References

- [1] Lin [1] L, Chen Q, Wang X, Zhang H, and Li H 2022 High Voltage, 7(6) 1069
- [2] Christophorou L G, J. Olthoff K, and Green D S 1997 Technical Note (NIST TN) 1425 1-44
- [3] Seeger M, Smeets R, Ito H, Claessens M, Dullni E, Falkingham L, Franck C M, Gentils F, Hartmann W, Kieffel Y, Jia S, Jones G, Mantilla J, Pawar S, Rabie M, Robin-Jouan P, Schellekens H, Spencer J, Uchii T, Li X, Yan J, and Yanabu S 2017 *Electra* **291** 26–29
- [4] Koch M and Franck C M 2015 *IEEE Transactions on Dielectrics and Electrical Insulation* **22**(6) 3260-3268
- [5] Zhang B, Chen L, Li X, Guo Z, Pu Y, and Tang N 2020 *IEEE Transactions on Dielectrics and Electrical Insulation* **27**(4) 1187-1194
- [6] Chachereau A et al. 2016 Plasma Sources Sci. Technol. 25 045005
- [7] Egüz E A et al. 2022 *J. Phys. D: Appl. Phys.* **55** 315203
- [8] Egüz E A et al. 2023 J. Phys. D: Appl. Phys. **56** 395203
- [9] Garland N A et al. 2024 J. Phys. D: Appl. Phys. 57 245202
- [10] Marjanović J, Marić D, and Petrović Z Lj 2024 European Physical Journal D 78, 14
- [11] Sivoš J, Marić D, Malović G, and Petrović Z Lj 2020 European Physical Journal D 74(64) 1-10
- [12] Marić D, Savić M, Sivoš J, Škoro N, Radmilović-Radjenović M, Malović G, Petrović Z Lj 2014 *Eur. Phys. J. D* **68** 155
- [13] Steanović I 1998 Osobine difuznih električnih pražnjenja u gasovima na niskom pritisku u režimu niskih struja (Doctoral dissertation, School of Electrical Engineering, University of Belgrade)
- [14] Phelps A V and Petrović Z Lj 1999 Plasma Sources Sci. Technol. 8 R21
- [15] Ingold J. H. 1978 *Anatomy of the discharge in Gaseous Electronics: Electrical Discharges vol* 1, edited by Hirsh M and Oskam H J (Academic Press, New York, ISBN 0-12-349701-9)
- [16] Petrović Z Lj and Phelps A V 2009 Phys. Rev. E 80 016408
- [17] Marić D, Kutasi K, Malović G, Donkó Z, and Petrović Z Lj 2002 Eur. Phys. J. D 21 73
- [18] Petrović Z Lj, Donkó Z, Marić D, Malović G, and Živanov S 2002 IEEE Trans. Plasma Sci. 30 136
- [19] Marić D, Hartmann P, Malović G, Donkó Z, and Petrović Z Lj 2003 J. Phys. D: Appl. Phys. 36 2639
- [20] Petrović Z Lj, Jelenković B M, and Phelps A V 1992 Phys. Rev. Lett. 68 325
- [21] Petrović Z Lj and Stojanović V 1998 J. Vac Sci. Technol. A 16 329
- [22] Malović G, Strinić A, Živanov S, Marić D, and Petrović Z Lj 2003 Plasma Sources Sci. Technol. 12 1
- [23] Christophorou L G and Olthoff J K 2000 J. Phys. Chem. Ref. Data 29(3) 267-330
- [24] Urquijo J et al. 2001 J. Phys. D: Appl. Phys. **34** 2151



25th Symposium on Application of Plasma Processes 14th EU-Japan Joint Symposium on Plasma Processing

31st January - 5th February 2025, Hotel Sorea TRIGAN, Štrbské Pleso, Slovakia

THE STATE OF THE S

Home General Info Travel Info Registration Speakers Programme Abstracts Posters PlasTHER Links

Book of Contributed Papers

 The Book of Contributed Papers of the 25th SAPP and 14th EU-Japan JSPP is available, click to open or download.

Programme of the Conference

	Friday (Jan 31)	Saturday (Feb 1)	Sunday (Feb 2)	Monday (Feb 3)	Tuesday (Feb 4)	Wednesday (Feb 5)	
08:20			1000				08:20
		Naudé	Ingolfsson	Makabe		-	08:40
					1		
09:05					Juhász	Matsukuma	
		Marjanović	Orel	Vass	4		
		manjanovic			Benedikt	Korolov	09:25
09:50							09:50
		Hensel	Donko	Hamaguchi	Zajíčková	Galmiz	
10:15		Coffee	Coffee	Coffee	Coffee	CLOSING	10:15
		Break	Break	Break	Break		
10:45							10:45
		Time f	or free discussions, to	uristics, ski, wellness an	d lunch		l.
15:30		Coffee	Coffee	Coffee	Coffee		15:30
		Break	Break	Break	Break		
16:00							16:00
		Fedor	Kováčik	Navascués	Puton		h.
		202000		10.5 10.5 10.5 10.5 10.5 10.5 10.5 10.5	MARKA.		И.,
16:45							16:4
		Belmonte	Ikehara	Profili	Moravský		
17:15	OPENING	beillionte	Incilara	FIGHT	Žabka		17:10
17:30	OPENING				Zabka		
		Veis	Šrámková				17:35
17:55	Canal						17:50
				ISC Meeting	Dinner		
18:15	Machala		1.00 m.m.				
18:40		Dinner	Dinner				Н.
	Trebulová				M = = = = = = = = = = = = = = = = = = =		
19:00					Kelar Tučeková		19:00
19:15		Cimerman	Maťaš				19:25
19:35	Dinner	Dinner Stachová Ďurčányová	Ďurčánuouá		Janda		
10.55			Durcanyova				19:50
19:55		Herrmann	Čechová		Klas		
20:15				Conference Dinner			20:15
	Poster Poster Sessions Sessions		Poster	THE STATE OF THE S			
		Sessions	Sessions				

Friday, 31st January 2025

14:00		വരാ	FD AT	
14.00	Γ	เวเอา	I TAI	IC JIV

17:15 OPENING OF SAPP XXV & 14th EU-JAPAN JSPP

Plasma surface treatment for applications

Chairman: Jacopo Profili

17:30 Cristina Canal (Technical University of Catalonia, Spain)

Plasma-Treated Hydrogels: a Therapeutic Alternative in Plasma Medicine?

18:15 Zdenko Machala (Comenius University in Bratislava, Slovakia)

Indoor Air Cleaning by Non-Thermal Plasma and Photocatalysis

18:40 Kristína Trebulová (Brno University of Technology, Czech Republic)

Cold Plasma as an Approach Towards Alternative Treatment of Otitis Externa

19:00 **DINNER**

20:15 POSTER SESSION 1

Saturday, 1st February 2025

Electrical discharges and other plasma sources

Chairman: Yuzuru Ikehara

08:20 Nicolas Naudé (CNRS - Toulouse INP, France)

Diffuse DBD at Atmospheric Pressure: From Physics Study to Applications

09:05 Jelena Marjanović (Institute of Physics Belgrade, Serbia)

Breakdown Characteristics in Low GWP and Low ODP Freons

09:50 Karol Hensel (Comenius University in Bratislava, Slovakia)

Electrical Discharges in Capillary Tubes and Honeycomb Monoliths

10:15 COFFEE BREAKS & FREE TIME

Electrical discharges and other plasma sources Elementary plasma processes and plasma-chemical reactions

Chairman: Satoshi Hamaguchi

16:00 **Juraj Fedor** (J. Heyrovsky Institute of Physical Chemistry, Czech Republic)

Dynamics Induced by Electron Collisions: Gases and Liquids

16:45 Thierry Belmonte (Centre National de la Recherche Scientifique, France)

Dissociating Pure Ammonia with Microwave Discharges

17:30 Pavel Veis (Comenius University in Bratislava, Slovakia)

Trace Elements Detection and CF Elemental Analysis of Water by LIBS for Environmental Control—Comparison of Surface Assisted, Acoustic Levitation and NE Methods

17:55 **DINNER**

Electrical discharges and other plasma sources Elementary plasma processes and plasma-chemical reactions

Chairman: Juraj Fedor

19:15 Richard Cimermann (Comenius University in Bratislava, Slovakia)

Plasma-Catalytic Gas Treatment: The Role of Pellet-Shaped Material in Packed-Bed DBD Reactors

19:35 Barbora Stachová (Comenius University in Bratislava, Slovakia)

Electron Induced Fluorescence of Carbon Monoxide

19:55 Anja Herrmann (Queen's University Belfast, UK)

Mapping Radical Fluxes with Thermocouple Probes

20:15 POSTER SESSION 2

Sunday, 2nd February 2025

Plasmas for nanomaterials Plasma diagnostics

Chairman: Nigel Mason

08:20 Oddur Ingolfsson (University of Iceland, Iceland)

Low Energy Electrons in Nano-Scale Processing

09:05 Inna Orel (RDPCI, Ruhr University Bochum, Germany)

Spatially and Temporally Resolved Electric Field, Current, and Electron Density in an RF Atmospheric Pressure Plasma Jet by E-FISH

09:50 Zoltan Donko (Wigner Research Centre For Physics, Hungary)

The Effect of Nitrogen Addition to Argon on the Ar 1s5 and 1s3 Metastable Atom Densities and Ar Spectral Emission in a Capacitively Coupled Plasma

10:15 COFFEE BREAKS & FREE TIME

Plasma surface treatment for applications

Chairman: Paula De Navascués

16:00 **Dušan Kováčik** (Masaryk University, Brno, Czech Republic and Comenius University, Bratislava, Slovakia) Advanced DCSBD-based Plasma Technologies for Surface Modifications and Bio-Applications

16:45 Yuzuru Ikehara (Chiba University, Japan)

Plasma-Based Microfabrication Technology for Charge Control Methods in Pathological Specimens: Visualizing Phase Transition Linked with Virus Particle Formation Using SEM and AFM.

17:30 Petra Šrámková (Comenius University in Bratislava, Slovakia)

Plasma Technology as an Efficient Tool to Improve Seed Germination and Provide Adhesion of Protective Polymer Coatings on Seeds

17:55 DINNER

Plasma surface treatment for applications Plasma diagnostics

Chairman: Matej Klas

19:15 Emanuel Mat'aš (Comenius University in Bratislava, Slovakia)

Thermal Degradation of Biodegradable Polymers Studied by IMS Technique

19:35 Sandra Ďurčányová (Comenius University in Bratislava, Slovakia)

Atmospheric Pressure Plasma Polymerization for Functional Coating Applications

19:55 **Ludmila Čechová** (Brno University of Technology, Czech Republic)

Plasma Treatment of Wastewater: A Promising Approach to Plant Fertilization

20:15 POSTER SESSION 3

Monday, 3rd February 2025

Theory and modelling of plasmas and plasma processes

Chairman: Zoltán Donkó

08:20 Toshiaki Makabe (Keio University)

General Relationship Between Drift Velocities in Position and Velocity Spaces of Charged Particles

09:05 Máté Vass (AEPT, Ruhr University Bochum, Germany)

Hybrid Fluid/MC Simulations of Radio-Frequency Atmospheric Pressure Plasma Jets

09:50 Satoshi Hamaguchi (Osaka University, Japan)

Molecular Dynamics Simulations of Silicon Nitride Atomic-Layer Deposition over a Narrow Trench Structure

10:15 COFFEE BREAKS & FREE TIME

Plasma surface treatment for applications lon mobility and mass spectrometry

Chairman: Masaaki Matsukuma

16:00 Paula De Navascués (EMPA, Switzerland)

Low-pressure Plasma Polymerization for Emerging Functional Materials

16:45 Jacopo Profili (Laval University in Quebec, Canada)

Investigating Stable Surface Modifications of Fluoropolymers by Atmospheric Pressure Nitrogen Discharge

- 17:30 International Scientific Committee Meeting
- 19:00 CONFERENCE DINNER

Tuesday, 4th February 2025

Theory and modelling of plasmas and plasma processes Plasma-surface interactions

Chairman: Zdenko Machala

09:25 Jan Bendikt (Kiel University, Germany)

Stability of Metal-Organic Frameworks in Non-Thermal Atmospheric Plasma

09:50 Lenka Zajíčková (CEITEC BUT & Masaryk University, Czech Republic)

Plasma Processing of Polymer Nanofibers for Enhanced Immobilization of Lignin Nano/Microparticles

10:15 COFFEE BREAKS & FREE TIME

Ion mobility and mass spectrometry

Chairman: Toshiaki Makabe

16:00 Jarosław Puton (Military University of Technology, Poland)

Swarms of Ions in Variable Electric Field - Possible Analytical Application

16:45 Ladislav Moravský (Comenius University in Bratislava, Slovakia)

Atmospheric Pressure Chemical Ionization Study of Sulphur-Containing Compounds by Ion Mobility Spectrometry and Mass-Spectrometry

17:10 Jan Žabka (J. Heyrovský Institute of Physical Chemistry of the CAS, Czech Republic)

HANKA - Cubesat Space Dust Analyser with Plasma Ion Source

17:35 **DINNER**

Electrical discharges and other plasma sources Plasma surface treatment for applications Plasma diagnostics

Chairman: Kinga Kutasi

19:00 Zlata Kelar Tučeková (Masaryk University, Czech Republic)

Atmospheric Pressure Plasma Treatment and Functionalization of Glass Surface for Reliable Adhesive Bonding

19:25 Mário Janda (Comenius University in Bratislava, Slovakia)

In-situ Diagnostic of Electrospray by Raman Light Sheet Microspectroscopy

19:50 Matej Klas (Comenius University in Bratislava, Slovakia)

Memory Effect in Pulsed Microdischarges

Wednesday, 5th February 2025

Electrical discharges and other plasma sources Elementary plasma processes and plasma-chemical reactions Theory and modelling of plasmas and plasma processes

Chairman: Štefan Matejčík

08:40 Masaaki Matsukuma (Tokyo Electron Technology Solutions Limited, Japan)

Multiscale Simulation of Plasma-Based Deposition Processes

09:25 **Ihor Korolov** (Ruhr University Bochum (AEPT), Germany)

Streamer Propagation Dynamics in a Nanosecond Pulsed Surface Dielectric Barrier Discharge in Helium-Nitrogen Mixtures

09:50 Oleksandr Galmiz (Comenius University in Bratislava, Slovakia)

10:15 CLOSING OF SAPP XXV & 14^{th} EU-JAPAN JSPP





V Meeting on Astrophysical Spectroscopy: A&M DATA - Astronomy & Earth Observations

To Professor Jelena Marjanović

Belgrade, Serbia, July 24th, 2023

Dear Professor Marjanović,

On behalf of the Scientific and Organizing Committees, we have a pleasure to invite you to attend the *V Meeting on Astrophysical Spectroscopy: A&M DATA – Astronomy & Earth Observations* and present an **Invited lecture**: "The role of breakdown data in atmospheric studies".

The fifth Meeting on Astrophysical Spectroscopy will be held from September 12 to 15, 2023 in Palić, Serbia. The details of the conference are available at official website: http://asspectro2023.ipb.ac.rs/

We look forward to seeing you at V A&M Meeting.

Yours sincerely,

Vladimir Srećković (Co-Chair of the Scientific Committee)

Cully

Dimitrijević Milan (Co-Chair of the Scientific Committee)

June Inamyjelet

Conference Organizer:

University of Belgrade, Institute of Physics Belgrade





V Meeting on Astrophysical Spectroscopy: A&M DATA -Astronomy & Earth Observations

CERTIFICATE

With this certificate we declare and confirm that:

Dr Jelena Marjanović,

Presented an **Invited lecture** at the *V Meeting on Astrophysical Spectroscopy: A&M DATA – Astronomy & Earth Observations, September 12 to 15, 2023 in Palić, Serbia* on the topic:

The role of breakdown data in atmospheric studies

Co-Chairmen of the Scientific Committee:

Vladimir Srećković

Cully

(Co-Chair of the Scientific Committee)

Dimitrijević Milan

(Co-Chair of the Scientific Committee)

Muson Inumpelet

Conference Organizer:

University of Belgrade, Institute of Physics Belgrade

V Meeting on Astrophysical Spectroscopy - A&M DATA - Astronomy & Earth Observations

September 12 - 15, 2023, Palić, Serbia

BOOK OF ABSTRACTS AND CONTRIBUTED PAPERS

Edited by Vladimir A. Srećković, Milan S. Dimitrijević, Aleksandra Kolarski, Zoran R. Mijić and Nikola B. Veselinović





V Meeting on Astrophysical Spectroscopy - A&M DATA – Astronomy & Earth Observations BOOK OF ABSTRACTS AND CONTRIBUTED PAPERS Eds. V. A. Srećković, M. S. Dimitrijević, A. Kolarski, Z. R. Mijić and N. B. Veselinović

Scientific Committee

Vladimir A. Srećković, Co-Chairman, Serbia Milan S. Dimitrijević, Co-Chairman, Serbia

Nikolay Bezuglov, Russia Nebil Ben Nessib, Saudi Arabia Vesna Borka Jovanović, Serbia Nikola Cvetanović, Serbia Saša Dujko, Serbia Stevica Đurović, Serbia Zoran Grujić, Serbia Rafik Hamdi, Tunisia Magdalena D. Christova, Bulgaria Dragana Ilić, Serbia Milivoje Ivković, Serbia Darko Jevremović, Serbia Ognyan Kounchev, Bulgaria Bratislav P. Marinković, Serbia Zoran R. Mijić, Serbia Aleksandar Milosavljević, France Aleksandra Nina, Serbia Bratislav M. Obradović, Serbia Nicolina Pop, Romania Luka Č. Popović, Serbia Branko Predojević, Republic of Srpska, BiH Sylvie Sahal-Bréchot, France Igor Savić, Serbia Sanja Tošić, Serbia Nikola B. Veselinović, Serbia

Local Organizing Committee

Aleksandra Kolarski (Co-Chair), Institute of Physics Belgrade
Vladimir A. Srećković (Co-Chair), Institute of Physics Belgrade
Nikola B. Veselinović (Secretary), Institute of Physics Belgrade
Zoran R. Mijić, Institute of Physics Belgrade
Nenad M. Sakan, Institute of Physics Belgrade
Veljko Vujčić, Astronomical Observatory, Belgrade
Nikola Cvetanović, University of Belgrade, Faculty of Transport and Traffic Engineering

V Meeting on Astrophysical Spectroscopy - A&M DATA – Astronomy & Earth Observations BOOK OF ABSTRACTS AND CONTRIBUTED PAPERS Eds. V. A. Srećković, M. S. Dimitrijević, A. Kolarski, Z. R. Mijić and N. B. Veselinović

Organizers:

Institute of Physics Belgrade, Serbia,

Text arrangement by computer: Tanja Milovanov

ISBN 978-86-82441-61-8

Published and copyright © by Institute of Physics Belgrade, Pregrevica 118, 11080 Belgrade Serbia

Financially supported by the Ministry of Science, Technological Developement and Innovation of Serbia

Production: Skripta Internacional, Mike Alasa 54, Beograd in 50 copies

The role of breakdown data in atmospheric studies

Jelena Marjanović¹, Dragana Marić¹ and Zoran Li. Petrović^{2,3}

¹Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

E-mail: sivosj@ipb.ac.rs

²Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia

³School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom

Non-equilibrium low-temperature plasmas are a common phenomenon both on Earth and in space. There are remarkable similarities in many fundamental properties between low-temperature plasmas in various fields, including gas discharges, space science, the near-Earth environment, discharges/electricity, and semiconductor physics. An example of this is the creation of different groups of electrons (with varying energies), which is a common occurrence in DC, RF, capacitive, and inductive discharges, as well as space plasma (solar wind) (Kolobov et al. 2020, Kolobov and Godyak 2019). The study of runaway electrons, in particular, can help us understand the initiation of lightning and thunderstorm activity in the troposphere, as well as the formation of electric discharges such as elves, sprites, and jets in the stratosphere and mesosphere. This is especially interesting because runaway electrons tend to occur in front of fast ionization waves, streamers, and leader tips during natural lightning. However, progress in studying and understanding atmospheric discharges on Earth and other planets demands a multidisciplinary approach and collaboration between researchers from different fields.

Studying the breakdown and electrical characteristics of discharges can provide insights into the fundamental properties and processes at play, and help identify phenomena through experimental observations. By conducting our experimental measurements of breakdown conditions, we are able to gain valuable knowledge of the elementary processes that occur during discharges, including ionization, secondary electron emission, and surface interactions. We will discuss the results of our experimental measurements of breakdown in water vapor and low ODP (Ozone Depletion Potential) and low GWP (Global Warming Potential) specifically 1,1,1,2-tetrafluoroethane (R-134a) 2,3,3,3gases, and tetrafluoropropene (HFO-1234vf). These measurements yielded breakdown voltages (Paschen curves), critical electrical fields, spatially and spectrally resolved distribution of discharge emission, and effective ionization coefficients. Using the available cross-section data, we analysed the collisional processes in these gasses. Furthermore, obtained effective ionization coefficients (in the region of reduced electric field *E/N* from 680 Td to 6.5 kTd for water vapor, from 2.7 kTd to 6 kTd for R-134a, and from 5 kTd to 23 kTd for HFO-1234yf), as one of the key transport coefficients, can be utilized to normalize existing ionization cross-sections for electron scattering on gases (Petrović et al. 2022, Marić et al. 2014). The implications of these results extend to both atmospheric research and practical applications.

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

Kolobov, V., et al, 2020, J. Phys.: Conf. Ser., 1623, 012006
Kolobov, V., and Godyak, V., 2019, Phys. Plasmas, 26, 060601
Marić, D., Savić, M., Sivoš, J., Škoro, N., Radmilović-Radjenović, M., Malović, G., Petrović, Z., Lj., 2014, Eur. Phys. J. D, 68, 155
Petrović, Z., Lj., et al., 2022, Eur. Phys. J. D, 76, 25

CIP - Каталогизација у публикацији Народна библиотека Србије, Београд

52-355.3(048)

533.92:537.228.5(048)

539.184.27(048)

550.38(048)

MEETING on Astrophysical Spectroscopy - A&M DATA - Astronomy & Earth Observations (5; 2023; Palić)

Book of abstracts and contributed papers / V Meeting on Astrophysical Spectroscopy - A&M DATA - Astronomy & Earth Observations, September 12 - 15, 2023, Palić, Serbia; edited by Vladimir A. Srećković ... [et al.]; [organizers Institute of Physics Belgrade, Serbia]. - Belgrade: Institute of Physics, 2023 (Beograd: Skripta Internacional). - 91 str.: ilustr.; 24 cm

Tiraž 50. - Bibliografija uz većinu apstrakata. - Registar.

ISBN 978-86-82441-61-8

- а) Астрофизика Апстракти б) Плазма Спектрална анализа Апстракти
- в) Штарков ефекат Апстракти г) Магнетизам земље Апстракти

COBISS.SR-ID 123774729



The fifth Meeting on Astrophysical Spectroscopy - A&M DATA - Astronomy & Earth Observations

Palić, Serbia, September 12 – 15, 2023

PROGRAMME

FIRST DAY. SEPTEMBER 12, 2023 (Tuesday)		
16:00-18:00	Arrival and Registration	
18:00-18:15	Opening ceremony (Vladimir Srećković, Milan Dimitrijević)	
18:15-18:30	Milan S. Dimitrijević, A brief history of the A&M DATA meetings	
18:30-19:00	Magdalena D. Christova, Milan S. Dimitrijević, Sylvie Sahal-Bréchot , On the Stark broadening parameters of N VI spectral lines (Invited lecture)	
19:00-20:00	Welcome Cocktail	
	SECOND DAY. SEPTEMBER 13, 2023 (Wednesday)	
	Chairman - Vladimir Srećković	

	SECOND DAY. SEPTEMBER 13, 2023 (Wednesday)
	Chairman - Vladimir Srećković
10:00-10:30	Nicolina Pop, E. Djuissi, J. Bofelli, J. Zs Mezei, F. Iacob, I. F. Schneider, Dissociative Recombination and ro-vibrational excitation of molecular cations by electrons: new datasets (cross sections and rate coefficients) -impact in astrophysics (Invited lecture)
10:30-11:00	Ilija B. Simonović, Danko V. Bošnjaković, Saša Dujko, Simulations of positive and negative streamers in the AMReX environment (Invited lecture)
11:00-11:15	Nikola Cvetanović, Saša S Ivković, Bratislav M. Obradović, Spectroscopic method for nitrogen impurity estimation in helium atmospheric discharge
11:15-11:30	Coffee Break
	Chairman - Nicolina Pop
11:30-12:00	Vesna Borka Jovanović, Duško Borka, Predrag Jovanović , Study of radio spectral index of radio galaxy DA 240 (Invited lecture)
12:00-12:30	Duško Borka, Vesna Borka Jovanović, Salvatore Capozziello, Predrag Jovanović, Constraining theories of gravity by velocity distribution of elliptical galaxies (Invited lecture)
12:30-12:45	Milan S. Dimitrijević, Magdalena D. Christova , On the Stark broadening parameters of Al IV spectral lines for stellar spectra analysis and synthesis (Invited lecture)
12:45-13:00	Nenad M. Sakan, Z Simić, M Dechev, Vladimir A. Srećković, The close vicinity ions as modifiers of the mean form of cut-off potential, simple approach
13:00-15:00	Lunch Break

A&M DATA

	Poster session 1 (Chairman - Nikola Cvetanović and Aleksandra Kolarski)
	Jovica Jovović, Gordana Lj. Majstorović, The broadening of carbon spectral
	lines emitted from a pulsed atmospheric pressure gas discharge source with
	graphite cathode
	Željka D. Nikitović, Zoran M. Raspopović, Transport properties of H ₂ ⁺ ions in
	H ₂ gas
	Jelena Barović, Vladimir A. Srećković, Aleksandra Kolarski, Examination of
	the ionospheric response to intense solar activity from September 6 to 10, 2017
15:00-16:00	Vladimir A. Srećković, Ljubinko M. Ignjatović, Sanja Tošić, Veljko Vujčić,
	Collisional and radiative processes involving some small molecules: cross sections
	and rate coefficients
	Veljko Vujčić, Darko Jevremović, Vladimir A. Srećković, ACol – Database for
	collisional processes
	Nikola V. Ivanović, Nikodin V. Nedić, Ivan R. Videnović, Djordje Spasojević,
	Nikola Konjević, Stark polarization spectroscopy in the cathode sheath of a
	Grimm-type glow discharge in neon
	Vladimir A. Srećković, Ljubinko M. Ignjatović, Milan Dimitrijević, Nikolai
16.00 10.00	Bezuglov, Collisional processes involving Rydberg atoms: Rate coefficients Work in Sections (Mini-Projects) 1-6
16:00 – 18:00	-
20:00	Conference Dinner
	THIRD DAY. SEPTEMBER 14, 2023 (Thursday)
	Chairman - Magdalena Christova
	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P.
10:00-10:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic
10:00-10:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture)
10:00-10:30 10:30-11:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown
	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture)
	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion
10:30-11:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session:
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L.
10:30-11:00 11:00-11:15	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David,
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture)
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture)
10:30-11:00 11:00-11:15 11:15-11:30	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture) Aleksandra Kolarski, Lower ionosphere influenced by high-class Solar flare
10:30-11:00 11:00-11:15 11:15-11:30 11:30-12:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture) Aleksandra Kolarski, Lower ionosphere influenced by high-class Solar flare events as observed through VLF measurements (Invited lecture)
10:30-11:00 11:00-11:15 11:15-11:30 11:30-12:00 12:00-12:30 12:30-13:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture) Aleksandra Kolarski, Lower ionosphere influenced by high-class Solar flare events as observed through VLF measurements (Invited lecture) Maja Kuzmanoski, Zorica Podraščanin, Ana Čirišan, Zoran Mijić, Aerosol
10:30-11:00 11:00-11:15 11:15-11:30 11:30-12:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture) Aleksandra Kolarski, Lower ionosphere influenced by high-class Solar flare events as observed through VLF measurements (Invited lecture) Maja Kuzmanoski, Zorica Podraščanin, Ana Ćirišan, Zoran Mijić, Aerosol vertical profiles in Belgrade, Serbia, associated with different surface PM10
10:30-11:00 11:00-11:15 11:15-11:30 11:30-12:00 12:00-12:30 12:30-13:00	Chairman – Magdalena Christova Jelena B. Maljković, Jelena Vukalović, F. Blanco, G. García, Bratislav P. Marinković, Experimental and theoretical differential cross sections for elastic electron scattering from isoflurane molecule at 100eV (Invited lecture) Jelena Marjanović, Dragana Marić, Zoran Lj. Petrović, The role of breakdown data in atmospheric studies (Invited lecture) Filip Arnaut, Aleksandra Kolarski, Alternative Evaluation Metrics for Machine Learning Model Selection in Ionospheric VLF Amplitude Data Exclusion Coffee Break Chairman – Milan Dimitrijević Special Session: Astronomy and Earth Observations: multi-instrumental approach and theory Maletić M. Dimitrije, Veselinović B. Nikola, Savić R. Mihailo, Dragić L. Aleksandar, Banjanac M. Radomir, Joković R. Dejan, Knezević David, Travar Miloš, Udovičić I. Vladimir, Study on 2021 November 4 Forbush decrease with Belgrade muon station (Invited lecture) Darije Maričić, Filip Šterc, Anatoly Belov, Dragan Roša, Damir Hržina, Ivan Romštajn, Galactic Cosmic Ray Variation Caused by Different Structural Elements of Isolated Earth-Impacting Coronal Mass Ejection (Invited lecture) Aleksandra Kolarski, Lower ionosphere influenced by high-class Solar flare events as observed through VLF measurements (Invited lecture) Maja Kuzmanoski, Zorica Podraščanin, Ana Čirišan, Zoran Mijić, Aerosol

A&M DATA

	Poster session 2 (Chairman - Nikola Veselinović and Zoran Mijić)
	Vladimir A. Srećković, Aleksandra Kolarski, Impact of strong solar flares on
	the lower ionosphere: radio waves, satellite observations and modeling
	Zoran R. Mijić, Maja Kuzmanoski, Luka Ilić, Data quality assurance and
	characterization of Belgrade Raman lidar station
	Filip Arnaut, Aleksandra Kolarski, Multilayer Perception Hyperparameter Fine-
	Tuning for Ionospheric VLF Amplitude Data Exclusion
	Mihailo R. Savić, Nikola B. Veselinović, Aleksandar L. Dragić, Dimitrije M.
18:00-19:00	Maletić, Radomir M. Banjanac, Dejan R. Joković, David Knežević, Miloš
	Travar, Vladimir I. Udovičić, Classification of Forbush decrease events utilizing
	machine learning
	Shahrokh Pourbeyranvand , Observation of Earth's magnetic field in search for
	earthquake precursors
	Aleksandra Kolarski, Vladimir Srećković, Zoran Mijić, VLF propagation
	parameters modeling related to low intensity solar X-ray flares
	Zlatko Majlinger, Ivan Traparić, New perspectives in the analysis of Stark
	width regularities and systematic trends

FOURTH DAY. SEPTEMBER 15, 2023 (Friday)			
	Chairman – Felix Iacob		
10:00-10:15	Nikola Veselinović, Aleksandra Kolarski, Vladimir A. Srećković, Zoran R. Mijić, Mihailo Savić, Aleksandar Dragić, Multi-instrumental investigation of extreme space weather events in September 2017: Data and modeling		
10:15-10:30	Bratislav P. Marinković, Zoran Mijić , COST programme role within the Serbian multilateral collaboration in science and innovation framework		
10:30-10:45	Zoran R. Mijić, Bratislav P. Marinković , Interdisciplinary research in the European Cooperation in Science and Technology – advantage or disadvantage?		
10:45-11:15	Scientific Committee Meeting		
11:15	Closing Ceremony and Best poster Award		

Sections (Mini-projects)

M1 Modeling the Atmosphere: data&models,

M2 Big data in Astronomy and Earth Observations,

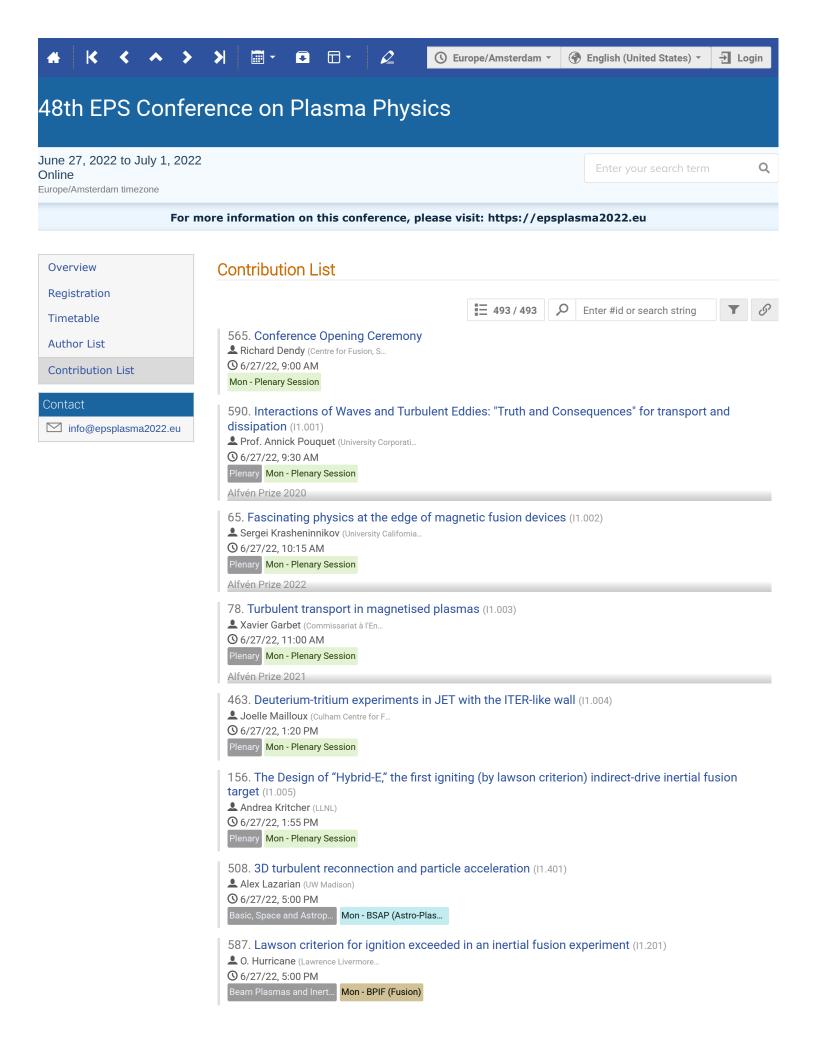
M3 A&M DATA and HPC,

M4 A&M DATA and standards,

M5 Radiative & Collisional Processes: databases,

M6 Spectra: stellar and laboratory plasmas.

Прилог 4 Докази о М33 и М34 публикацијама



```
561. Renewable energy driven non-thermal chemistry: Plasma chemistry as the special case (11.301)
Richard van de Sanden (DIFFER, The Netherl...
O 6/27/22, 5:00 PM
Low Temperature and D... Mon - LTDP (Plasma-Ga...
54. Tritium experiments in JET-ILW in support of JET and ITER D-T plasmas (I1.101)
♣ Dr Costanza Maggi (CCFE)
O 6/27/22, 5:00 PM
Magnetic Confinement F... Mon - MCF (D-T plasmas)
13. Laser-Driven Proton-Boron Fusion and Applications (11.202)
▲ Daniele Margarone (Queen's University B...
O 6/27/22, 5:30 PM
Beam Plasmas and Inert... Mon - BPIF (Fusion)
291. Particle energization in radiative relativistic plasma turbulence (11.402)

▲ Vladimir Zhdankin (Flatiron Institute)
O 6/27/22, 5:30 PM
Basic, Space and Astrop... Mon - BSAP (Astro-Plas...
27. Plasma technology for electrification of chemical reactions (I1.302)
Annemie Bogaerts (University of Antwer...
O 6/27/22, 5:30 PM
Low Temperature and D... Mon - LTDP (Plasma-Ga...
195. The power threshold of H-mode access in tritium and deuterium-tritium plasmas at JET with
ITER-like wall (11.102)
Gregor Birkenmeier (Max Planck Institut...
O 6/27/22, 5:30 PM
Magnetic Confinement F... Mon - MCF (D-T plasmas)
146. A new model for the turbulent stress tensors from simulations of the magnetorotational
instability. (01.401)
▲ Miquel Miravet-Tenés (Universitat de Valèn...
O 6/27/22, 6:00 PM
Basic, Space and Astrop... Mon - BSAP (Astro-Plas...
287. Development of hybrid (high beta) plasmas for D-T operation in JET (01.101)
Live Challis (UKAEA, Culham Sci...
O 6/27/22, 6:00 PM
Magnetic Confinement F... Mon - MCF (D-T plasmas)
266. High energy attosecond pulse interaction with matter and application to proton-Boron fusion
(01.201)
♣ Dr Xavier Ribeyre (University of Bordea...
O 6/27/22, 6:00 PM
Beam Plasmas and Inert... Mon - BPIF (Fusion)
511. Model analysis and experimental determination of noble gas metastable for plasma-assisted
catalysis of ammonia (01.301)
Shota Abe
O 6/27/22, 6:00 PM
Low Temperature and D... Mon - LTDP (Plasma-Ga...
560. Efficiency and conversion optimisation of tubular vortex flow stabilised microwave plasma
reactors (01.302)
♣ Felix Smits (Dutch Institute for F...
O 6/27/22, 6:15 PM
Low Temperature and D... Mon - LTDP (Plasma-Ga...
417. Fluid and gyrokinetic simulations of plasmoid formation in collisionless plasmas (01.402)
Camille Granier
```

O 6/27/22, 6:15 PM

Basic, Space and Astrop... Mon - BSAP (Astro-Plas... 559. High-frequency reversed-shear Alfvén eigenmodes in fast-ion experiments on JET (01.102) Mykola Dreval (National Science Ce... **O** 6/27/22, 6:15 PM Magnetic Confinement F... Mon - MCF (D-T plasmas) 338. Thermal and ponderomotive filamentations of a high-power laser beam propagating through a long gas-filled target (01.202) ♣ Dr Pascal Loiseau (Commissariat à l'En... O 6/27/22, 6:15 PM Beam Plasmas and Inert... Mon - BPIF (Fusion) 235. Experimental Investigations of the H-mode Access in Mixed Hydrogen- Deuterium Plasmas at ASDEX Upgrade (01.103) LUlrike Plank (Max Planck Institut... () 6/27/22, 6:30 PM Magnetic Confinement F... Mon - MCF (D-T plasmas) 352. Microwave Plasma at atmospheric pressure: Improving characteristic parameters of Biogas decomposition in an Argon Plasma (01.303) Antonio Cobos-Luque (Universidad de Córd... O 6/27/22, 6:30 PM Low Temperature and D... Mon - LTDP (Plasma-Ga... 339. Scaling of hot electron generation from two plasmon decay instability (01.203) ▲ Mr edoardo rovere (Commissariat à l'En... O 6/27/22, 6:30 PM Beam Plasmas and Inert... Mon - BPIF (Fusion) 31. Spectral features and energy cascade of plasma turbulence at sub-ion scales (01.403) Giuseppe Arrò (KU Leuven, Universi... **O** 6/27/22, 6:30 PM Basic, Space and Astrop... Mon - BSAP (Astro-Plas... 439. Developing understanding of spherical tokamaks with MAST Upgrade (01.104) L Dr Rory Scannell (United Kingdom Ato... O 6/27/22, 6:45 PM Magnetic Confinement F... Mon - MCF (D-T plasmas) 308. Intermittent turbulence and complexity within reconnection exhausts in the solar wind (01.404) Rodrigo Miranda O 6/27/22, 6:45 PM Basic, Space and Astrop... Mon - BSAP (Astro-Plas... 51. On activation of the non-equilibrium vibrational CO2 dissociation in plasma chemistry (01.304) ■ Vladislav Kotov (Forschungszentrum... O 6/27/22, 6:45 PM Low Temperature and D... Mon - LTDP (Plasma-Ga... 170. Optimisation of Polar Direct Drive Illumination for Mega-Joule Laser Facilities (01.204) ♣ Dr Duncan Barlow (Université de Borde... O 6/27/22, 6:45 PM Beam Plasmas and Inert... Mon - BPIF (Fusion) 404. Non-equilibrium as the cornerstone of collisional low-temperature plasmas: cross sections, kinetic phenomena and real world applications (12.001) Zoran Petrović (Serbian Academy of... **O** 6/28/22, 9:00 AM Plenary Tue - Plenary Session

173. Improved understanding of energetic ions impact on plasma confinement from theory and experiments. (I2.002)

♣ Jeronimo Garcia (Commissariat à l'En...

```
O 6/28/22, 9:35 AM
Plenary Tue - Plenary Session
11. Experimental advances to unveil the fundamental mechanisms of the interaction between
charged particles and nuclear fusion relevant materials (12.J301)
Marco Minissale (Aix Marseille Univer...
O 6/28/22, 10:40 AM
Low Temperature and D... Tue - JS 1 - LTDP/MCF (...
557. Fast radio bursts: the ultrastrong electromagnetic waves (12.401)
Prof. A.M. Beloborodov (Columbia University)
O 6/28/22, 10:40 AM
Basic, Space and Astrop... Tue - BSAP (Massive Obj...
268. Turbulent impurity transport simulations in stellarators (12.101)
♣ Jose Manuel Garcia Regana (CIEMAT, Spain)
O 6/28/22, 10:40 AM
Magnetic Confinement F... Tue - MCF (Stellarator)
55. Vacuum laser acceleration of super-ponderomotive electrons using relativistic transparency
injection (12.201)
L Dr Prashant Singh (Research Fellow, Na...
O 6/28/22, 10:40 AM
Beam Plasmas and Inert... Tue - BPIF (Particle Acc...
377. Kinetic model of Neutron Stars charge starved vacuum gaps (02.401)
♣ Dr Thomas Grismayer (Instituto Superior Té...
O 6/28/22, 11:10 AM
Basic, Space and Astrop... Tue - BSAP (Massive Obj...
528. Overview of SPIDER NBI source for ITER (12.J302)
Gianluigi Serianni (Università di Padov...
O 6/28/22, 11:10 AM
Magnetic Confinement F... Tue - JS 1 - LTDP/MCF (...
198. Radial electric fields, turbulence and transport studies in W7-X and TJ-II (12.102)
♣ Teresa Estrada (CIEMAT, Spain)
O 6/28/22, 11:10 AM
Magnetic Confinement F... Tue - MCF (Stellarator)
15. Ultra-bright laser-driven sources of MeV particles and radiation using low density foam (12.202)
Olga Rosmej (Helmholtzzentrum ...
O 6/28/22, 11:10 AM
Beam Plasmas and Inert... Tue - BPIF (Particle Acc...
269. Generating inverted Landau level populations through radiation reaction cooling (02.402)
Amr Pablo Jaime Bilbao (GoLP/Instituto de Pl...
O 6/28/22, 11:25 AM
Basic, Space and Astrop... Tue - BSAP (Massive Obj...
532. General relativistic particle-in-cell simulations of compact neutron star magnetospheres (02.403)
Rui Torres (University of Lisbon ..
O 6/28/22, 11:40 AM
Basic, Space and Astrop... Tue - BSAP (Massive Obj...
144. Hosing of a long proton bunch induced by an electron bunch (02.201)
▲ Tatiana Nechaeva (Max-Planck-Institut...
O 6/28/22, 11:40 AM
Beam Plasmas and Inert... Tue - BPIF (Particle Acc...
319. Isotope effects on transport and turbulence in LHD (02.101)
▲ Toshiki Kinoshita (kyushu university)
O 6/28/22, 11:40 AM
```

Magnetic Confinement F... Tue - MCF (Stellarator) 107. Spectroscopic observations and analysis of the Fulcher Bands of hydrogen an its isotopologues in divertor region of the ITER-like wall JET tokamak (02.J501) Lewa Pawelec (University of Opole, ... O 6/28/22, 11:40 AM Low Temperature and D... Tue - JS 1 - LTDP/MCF (... 331. Experimental and numerical studies on laser-generated spin-polarised particle beams (02.202) ♣ Paul Gibbon (Forschungszentrum... O 6/28/22, 11:55 AM Beam Plasmas and Inert... Tue - BPIF (Particle Acc... 583. Impurity flow measurements with Coherence Imaging Spectroscopy at Wendelstein 7-X (02.102) ▲ Valeria Perseo (Max Planck Institut...) O 6/28/22. 11:55 AM Magnetic Confinement F... Tue - MCF (Stellarator) 255. Prompt Emission Of High-Energy Nonthermal Photons From A Radiation-Dominated Relativistic Magnetic Reconnection (02.404) Prof. Bin Qiao (Peking University) O 6/28/22, 11:55 AM Basic, Space and Astrop... Tue - BSAP (Massive Obj... 488. Ultra-Fast Langmuir Probe in Magnetised Plasma (02.J502) Mr Christopher J. Hickling (University of Liverp... **O** 6/28/22, 11:55 AM Low Temperature and D... Tue - JS 1 - LTDP/MCF (... 214. Enhanced confinement after multi-pellet injection into neutral beam injection heated plasmas in the stellarator TJ-II (02.103) Lieran McCarthy (CIEMAT, Spain), Alexander Melnikov (Kurchatov Institute), Isabel García-Cortes (Ciemat) **O** 6/28/22, 12:10 PM Magnetic Confinement F... Tue - MCF (Stellarator) 513. Hybrid plasma accelerators: towards high brightness beams (02.203) Amax Gilljohann (LOA, Ecole Polytech... **O** 6/28/22, 12:10 PM Beam Plasmas and Inert... Tue - BPIF (Particle Acc... 89. Radio frequency wall conditioning discharges at low magnetic fields in Uragan-2M stellarator (02.J503) L Dr Yurii Kovtun (National Science Ce.. **O** 6/28/22, 12:10 PM Magnetic Confinement F... Tue - JS 1 - LTDP/MCF (... 7. Reconnection in black hole magnetospheres (12.402) Bart Ripperda (princeton university) O 6/28/22, 12:10 PM Basic, Space and Astrop... Tue - BSAP (Massive Obj... 361. Plasma wedge diffraction and vacuum particle acceleration by high intensity laser pulses (02.204)Samuel Marini O 6/28/22, 12:25 PM Beam Plasmas and Inert... Tue - BPIF (Particle Acc... 373. Sensitivity of scrape-off layer codes to modelling approaches (02.J504) ▲ Mike Kryjak (University of York, U... O 6/28/22, 12:25 PM Magnetic Confinement F... Tue - JS 1 - LTDP/MCF (...

117. Transition from no-ELM response to pellet ELM triggering during pedestal build-up — insights from extended MHD simulations (02.104)

```
Dr Shimpei Futatani (Technical University...
O 6/28/22, 12:25 PM
Magnetic Confinement F... Tue - MCF (Stellarator)
17. Monoenergetic High-energy Ion Source via Femtosecond Laser Interacting with a Microtape
(12.203)
Xiaofei Shen
O 6/28/22, 5:00 PM
Beam Plasmas and Inert... Tue - BPIF (Lasers / Targ...
60. Particle balance and exhaust in Wendelstein 7-X (12.103)
L Dr Thierry Kremeyer (Max Planck Institut...
O 6/28/22, 5:00 PM
Magnetic Confinement F... Tue - MCF (Exhaust)
401. The pursuit of net energy, MHD stability, and disruption resilience in the SPARC Tokamak (I2.105)
Ryan Sweeney (Plasma Science an...
O 6/28/22, 5:00 PM
Magnetic Confinement F... Tue - MCF (Advanced C...
45. Wave propagation in rotating plasmas (I2.J501)
Renaud Gueroult (CNRS)
O 6/28/22, 5:00 PM
Basic, Space and Astrop... Tue - JS 2 - BSAP/MCF (...
95. Efficient Laser Wake Field electron acceleration with chirped intense laser pulses (12.204)
Prof. Nektarios Papadogiannis (Institute of Plasma ...
O 6/28/22, 5:30 PM
Beam Plasmas and Inert... Tue - BPIF (Lasers / Targ...
551. Experimental study of the fast-ion confinement in W7-X based on FIDA spectroscopy (I2.106)
Peter Zsolt Poloskei (Max Planck Institut...
O 6/28/22, 5:30 PM
Magnetic Confinement F... Tue - MCF (Advanced C...
52. First high-power results from the DIII-D helicon system (I2.J502)
▲ Bart Van Compernolle (General Atomics)
O 6/28/22, 5:30 PM
Magnetic Confinement F... Tue - JS 2 - BSAP/MCF (...
531. Quantitative Balmer line analysis of multispectral imaging data to infer 2D maps of edge plasma
parameters in TCV (I2.104)
Artur Perek (Dutch Institute for F...
O 6/28/22, 5:30 PM
Magnetic Confinement F... Tue - MCF (Exhaust)
466. A self-consistent cross-field transport model for edge plasma simulations: SOLEDGE modelling
and comparison with WEST experiments (02.105)
Guido Ciraolo
O 6/28/22, 6:00 PM
Magnetic Confinement F... Tue - MCF (Exhaust)
461. Deuterons and Neutrons from Cryogenic Deuterium Ribbons at Vulcan PetaWatt (02.205)
L Chloe Ho (Centre for Plasma P...
O 6/28/22, 6:00 PM
Beam Plasmas and Inert... Tue - BPIF (Lasers / Targ...
97. Investigation of suprathermal electron transport induced by Electron-Cyclotron waves in tokamak
plasmas (02.J601)
▲ Jean Cazabonne (École Polytechnique...
O 6/28/22, 6:00 PM
Magnetic Confinement F... Tue - JS 2 - BSAP/MCF (...
```

422. The Physics of the Preferred Plasma Scenario for STEP (02.107)

```
Lendrik Meyer (Culham Centre for F...
O 6/28/22, 6:00 PM
Magnetic Confinement F... Tue - MCF (Advanced C...
593. Advanced time-of-flight diagnostics for real-time characterization of ions accelerated by high
energy lasers (02.206)
▲ Martina Salvadori
O 6/28/22, 6:15 PM
Beam Plasmas and Inert... Tue - BPIF (Lasers / Targ...
464. Injecting positrons into an electron cloud - the next step towards a confined pair plasma
(02.1602)
▲ Markus Singer (Max Planck Institut...
O 6/28/22, 6:15 PM
Basic, Space and Astrop... Tue - JS 2 - BSAP/MCF (...
162. Physics Exploitation of the new Divertor Thomson Scattering at ASDEX Upgrade (02.106)
Marco Cavedon (Università degli Stu...
O 6/28/22, 6:15 PM
Magnetic Confinement F... Tue - MCF (Exhaust)
148. Predict-first scenario modelling in support of the design of the Divertor Tokamak Test facility
▲ Ms Irene Casiraghi (Università degli Stu...
O 6/28/22, 6:15 PM
Magnetic Confinement F... Tue - MCF (Advanced C...
564. The journey to demonstrate the first iodine electric propulsion system in space (13.001)
♣ Dr Dmytro Rafalskyi (ThrustMe), Dr Ane Aanesland (ThrustMe)
O 6/29/22, 9:00 AM
Plenary Wed - Plenary Session
293. NON-LINEAR COSMIC RAY INDUCED PLASMA PHENOMENA IN ACCELERATORS, AROUND
SOURCES AND AROUND GALAXIES (13.002)
Pasquale Blasi (Gran Sasso Science...
O 6/29/22, 9:35 AM
Plenary Wed - Plenary Session
505. Cold atmospheric pressure plasma in interaction with multiphase and reduced gravity
environments (13.301)
▲ Augusto Stancampiano (CNRS)
O 6/29/22, 10:40 AM
Low Temperature and D... Wed - LTDP (Plasma Wa...
186. Experiments and 3D simulations of hot VDEs and halo currents in ASDEX Upgrade (13.101)
■ Nina Schwarz (Max Planck Institut...
O 6/29/22, 10:40 AM
Magnetic Confinement F... Wed - MCF (Events)
42. Inter-machine comparison of SOL particle dynamics in ASDEX Upgrade and Wendelstein 7-X
(13.104)
Dorothea Gradic (Max Planck Institut...
O 6/29/22, 10:40 AM
Magnetic Confinement F... Wed - MCF (Operation)
16. MITIGATION OF MAGNETO-RAYLEIGH-TAYLOR INSTABILITY USING DENSITY PROFILING AND
EXTERNAL MAGNETIC FIELD IN GAS PUFF Z-PINCH PLASMAS (13.201)
▲ Farhat Beg (University of Califor...
() 6/29/22, 10:40 AM
Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ...
```

289. 3D Simulations Capture the Persistent Low-Mode Asymmetries Evident in Laser-Direct-Drive Implosions on OMEGA (13.202)

L Dr Arnaud Colaïtis (CNRS)

O 6/29/22, 11:10 AM Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ... 38. Boundaries of high density operation due to plasma edge turbulence in ASDEX Upgrade (13.105) ▲ Thomas Eich (Max Planck Institut... **(**) 6/29/22, 11:10 AM Magnetic Confinement F... Wed - MCF (Operation) 495. Controlled avoidance of disruptions in tokamaks: experience and developments in TCV (I3.102) ♣ Dr Alessandro Pau (École Polytechnique... O 6/29/22, 11:10 AM Magnetic Confinement F... Wed - MCF (Events) 279. Plasma jets stabilize water to splash less (13.302) Prof. Wonho Choe (Korea Advanced Ins... **(**) 6/29/22, 11:10 AM Low Temperature and D... Wed - LTDP (Plasma Wa... 271. First full-size turbulence simulations of diverted TCV plasmas and comparison with experiments (I3.106) La Davide Galassi (École Polytechnique... O 6/29/22, 11:40 AM Magnetic Confinement F... Wed - MCF (Operation) 562. High-order moment models for partially-ionized plasmas (13.303) Alejandro Alvarez Laguna (CNRS, Laboratoire d... O 6/29/22, 11:40 AM Low Temperature and D... Wed - LTDP (Plasma Wa... 50. Impact of externally applied 3D magnetic perturbations on fast-ion confinement in the ASDEX Upgrade tokamak (13.103) Joaquin Galdon Quiroga (University of Seville,... **O** 6/29/22, 11:40 AM Magnetic Confinement F... Wed - MCF (Events) 410. Spectroscopic and x-ray diagnostics for warm dense matter and applications (13.203) ▲ Marta Fajardo (University of Lisbon ... **(**) 6/29/22, 11:40 AM Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ... 316. Lithostatic Pressure Effects on the Plasma-Pulse Geo-Drilling (PPGD) (03.301) ▲ Mr Mohamed Ezzat (Geothermal Energy ... O 6/29/22, 12:10 PM Low Temperature and D... Wed - LTDP (Plasma Wa... 76. Modelling of high field side high density region with the nonlinear MHD code JOREK with kinetic **neutrals** (03.105) Legisland Sven Korving (Eindhoven Universit... O 6/29/22, 12:10 PM Magnetic Confinement F... Wed - MCF (Operation) 506. Strong Laser-Driven Magnetostatic Fields for Investigations of Magnetized High Energy-Density Plasmas (03.201) ▲ Joao Jorge Santos (Commissariat à l'En... O 6/29/22, 12:10 PM Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ... 194. Validation of 3D MHD simulations of mixed Ne-D₂ shattered pellet injection against H-mode experiments in JET (03.101) ▲ Daniele Bonfiglio (Istituto per la Scien... O 6/29/22, 12:10 PM Magnetic Confinement F... Wed - MCF (Events)

```
578. Hydrodynamic Instability of High-Energy-Density Plasmas under Laser-Produced Strong
Magnetic Field (03.202)
Dr Shinsuke Fujioka (Institute of Laser En...
O 6/29/22, 12:25 PM
Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ...
120. Interpretative 3D MHD modelling of deuterium shattered pellet injection into a JET H-mode
plasma (03.102)
♣ Dr Mengdi Kong (Culham Centre for F...
O 6/29/22, 12:25 PM
Magnetic Confinement F... Wed - MCF (Events)
433. Measurements and kinetic simulations of the Alternative Low Power Hybrid ion Engine (alphie)
■ Jorge Gonzalez (Dutch Institute for F...
O 6/29/22, 12:25 PM
Low Temperature and D... Wed - LTDP (Plasma Wa...
407. SOLPS-ITER simulations of the initiation of an X-point radiator in the ASDEX Upgrade tokamak
(03.106)
Ou Pan (Max Planck Institut...
O 6/29/22, 12:25 PM
Magnetic Confinement F... Wed - MCF (Operation)
311. First MAST-U detachment results indicate enhanced role of molecules (03.107)
Levin Verhaegh (Culham Centre for F...
O 6/29/22, 12:40 PM
Magnetic Confinement F... Wed - MCF (Operation)
133. Quantum dot photoluminescence as charge probes for plasma exposed surfaces (03.303)
▲ Mr Mohammad Hasani (Eindhoven Universit...
O 6/29/22, 12:40 PM
Low Temperature and D... Wed - LTDP (Plasma Wa...
128. Runaway dynamics in disruptions with current relaxation events (03.103)
Dr Istvan Pusztai (Chalmers University...
O 6/29/22, 12:40 PM
Magnetic Confinement F... Wed - MCF (Events)
517. Spectroscopic characterization of core conditions in magnetized cylindrical implosion
experiments (03.203)
Ricardo Florido (University of Las Pa...
O 6/29/22, 12:40 PM
Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ...
164. Interpretative modelling of the target ion flux rollover in Conventional and Super-X divertor
configurations on MAST Upgrade (03.108)
▲ David Moulton (Culham Centre for F...
O 6/29/22, 12:55 PM
Magnetic Confinement F... Wed - MCF (Operation)
384. Relaxation of non-thermal electrons in solid density plasmas heated by the European X-ray free
electron laser (03.204)
▲ Gareth Williams (University of Lisbon ...
O 6/29/22, 12:55 PM
Beam Plasmas and Inert... Wed - BPIF (HEDP / ICF ...
597. Theory of vertical displacements resonant at magnetic divertor X-points (03.104)
♣ Francesco Porcelli (Politecnico di Torin...
O 6/29/22, 12:55 PM
Magnetic Confinement F... Wed - MCF (Events)
487. Towards the anticorrosion protection of aluminum surfaces by using an atmospheric pressure
```

microwave plasma (03.204)

```
Mr Andrés M. Raya Bejarano (Universidad de Córd...
O 6/29/22, 12:55 PM
Low Temperature and D... Wed - LTDP (Plasma Wa...
247. The dual role of the plasma boundary in tokamaks (13.003)
Lisabeth Wolfrum (Max Planck Institut...
O 6/29/22, 2:30 PM
Plenary Wed - Plenary Session
142. Modelling of electron runaway in cooling fusion plasmas (13.004)
♣ Prof. Tünde Fülöp (Chalmers University...
O 6/29/22, 3:05 PM
Plenary Wed - Plenary Session
371. Role of Energetic Ions in the ITER Research Plan (13.005)
▲ Simon Pinches (ITER Organization, F...
O 6/29/22, 3:40 PM
Plenary Wed - Plenary Session
90. Connecting the Dots: Understanding the Nature of Plasma and Liquid Interactions (13.006)
Land David Go (University of Notre ...
O 6/29/22, 4:45 PM
Plenary Wed - Plenary Session
203. Probing the plasma near supermassive black holes with the Event Horizon Telescope (13.007)
George Wong (Institute for Advanc...
O 6/29/22, 5:20 PM
Plenary Wed - Plenary Session
563. Probing extreme physics with plasma accelerators (14.001)
Lower Stuart Mangles (Imperial College Lo...
() 6/30/22, 9:00 AM
Plenary Thu - Plenary Session
224. Strongly coupled complex plasmas under microgravity conditions on the International Space
Station (14.002)
▲ Hubertus Thomas (DLR)
O 6/30/22, 9:35 AM
Plenary Thu - Plenary Session
556. Magnetic Control of the TCV tokamak through Deep Reinforcement Learning (14.101)
♣ Federico Felici (EPFL-SPC)
O 6/30/22, 10:40 AM
Magnetic Confinement F... Thu - MCF (Advanced M...
229. On the coupling of vibrational and electronic excited state kinetics with the electron energy
distribution function in CO2 cold plasmas (14.301)
Lucia Daniela Pietanza (Consiglio Nazionale...
O 6/30/22, 10:40 AM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
310. Pedestal particle balance studies in JET-ILW H-mode plasmas (I4.103)
Laszlo Horvath (Culham Centre for F...
O 6/30/22, 10:40 AM
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
206. Solar and stellar flares - recent advances and open questions (14.J801)
Lucia Kleint (University of Geneva)
O 6/30/22, 10:40 AM
Basic, Space and Astrop... Thu - JS 3 - BSAP/ESPD ...
216. A quasi-continuous exhaust scenario for a fusion reactor: the renaissance of small edge
localized modes (14.104)
```

L Georg Harrer (Fusion@ÖAW, Austr...

```
O 6/30/22, 11:10 AM
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
304. Insight into into contraction dynamics in CO2 microwave discharges through comparisons
between simulations and experiments (14.302)
♣ Paola Diomede
O 6/30/22, 11:10 AM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
237. Integrated modeling of H-mode tokamak plasma confinement (14.102)
♣ Teobaldo Luda di Cortemiglia (Max Planck Institut...
() 6/30/22, 11:10 AM
Magnetic Confinement F... Thu - MCF (Advanced M...
201. Revealing the Lagrangian Skeleton of Solar Atmospheric Dynamics (14.J802)
La Suzana de Souza e Almeida Silva (The University of Sh...
O 6/30/22, 11:10 AM
Basic, Space and Astrop... Thu - JS 3 - BSAP/ESPD ...
326. Examining Transport and Integrated Modeling Predictive Capabilities for Negative-Triangularity
Scenarios (04.101)

▲ Joseph McClenaghan (General Atomics)

O 6/30/22, 11:40 AM
Magnetic Confinement F... Thu - MCF (Advanced M...
22. Extended gyrokinetic theory for the tokamak H-mode pedestal (04.105)
Alexandra Dudkovskaia (University of York, U...
O 6/30/22, 11:40 AM
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
541. Particle charging by EUV and EUV-induced plasma (04.301)
▲ Mark van de Kerkhof (ASML)
O 6/30/22, 11:40 AM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
227. Turbulence induced by magnetic reconnection in the Earth's magnetosphere: numerical
simulations and comparison with observations (14.J803)
♣ Francesco Pucci (Istituto per la Scien...
O 6/30/22, 11:40 AM
Basic, Space and Astrop... Thu - JS 3 - BSAP/ESPD ...
342. Drift-Diffusion modelling of a DBD volumetric reactor (04.302)
Giacomo Pierotti (University of Bologn...
O 6/30/22, 11:55 AM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
368. Reduced transport models for a Tokamak flight simulator (04.102)
▲ Marco Muraca (Max Planck Institut...
O 6/30/22, 11:55 AM
Magnetic Confinement F... Thu - MCF (Advanced M...
126. Small-ELM-regime access facilitated by a new tungsten divertor on EAST (04.106)
quosheng xu (Institute of Plasma ...
O 6/30/22, 11:55 AM
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
383. Dust charge distribution in a plasma afterglow (04.303)
Prof. Igor Denysenko (School of Physics a...
O 6/30/22, 12:10 PM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
426. Impact of pellets on SOL and on SOL-pedestal coupling in JET-ILW (04.107)
L Christian Perez von Thun (Institute of Plasma ...
```

O 6/30/22, 12:10 PM

```
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
367. Increased core ion temperatures in high-beta advanced scenarios in AUG: Disentangling ExB-
shear and fast ion effects using gyrokinetic simulations (04.103)
▲ Mr Maximilian Reisner (Max Planck Institut...
O 6/30/22, 12:10 PM
Magnetic Confinement F... Thu - MCF (Advanced M...
44. MHD avalanches in magnetized solar plasma: proliferation and heating in coronal arcades
(04.J801)
L Dr Jack Reid (University of St And...
O 6/30/22, 12:10 PM
Basic, Space and Astrop... Thu - JS 3 - BSAP/ESPD ...
260. Current ramp-up modelling for STEP (04.104)
♣ Dr Frida Eriksson (UKAEA)
O 6/30/22, 12:25 PM
Magnetic Confinement F... Thu - MCF (Advanced M...
397. Fast camera imaging of visible light: when the electron temperature matters (04.304)
♣ Dr Simon Vincent (Lab Phys, ENS de Ly...
O 6/30/22, 12:25 PM
Low Temperature and D... Thu - LTDP (Plasma-Gas...
272. On the formation of multi-threaded prominences (04.J802)
Legartment Of Mat...
O 6/30/22, 12:25 PM
Basic, Space and Astrop... Thu - JS 3 - BSAP/ESPD ...
100. Pedestal structure and stability at peeling boundary in TCV (04.108)
Lorenzo Frassinetti (Royal Institute of Te...
O 6/30/22, 12:25 PM
Magnetic Confinement F... Thu - MCF (Pedestal/Ed...
154. Creating observable QED collective plasma effects (14.201)
▲ Kenan Qu (Princeton University)
O 6/30/22, 5:00 PM
Beam Plasmas and Inert... Thu - BPIF (QED & Accel...
12. Electron acceleration at supernova remnants (14.401)
Artem Bohdan (Deutsches Elektron...
O 6/30/22, 5:00 PM
Basic, Space and Astrop... Thu - BSAP (Shocks)
264. Gyrokinetic simulation of internal kink and fishbone instabilities: verification and validation
using DIII-D experiments, and prediction for ITER plasmas (14.105)
♣ Guillaume Brochard
O 6/30/22, 5:00 PM
Magnetic Confinement F... Thu - MCF (Alfvén)
103. The increase in L-H power threshold due to externally applied non-axisymmetric magnetic
perturbations in ASDEX Upgrade (14.107)
▲ Matthias Willensdorfer (Max Planck Institut...
O 6/30/22, 5:00 PM
Magnetic Confinement F... Thu - MCF (Improved Pe...
220. High performance Ne-seeded baseline scenario in JET-ILW in support of ITER (14.108)
Larine Giroud (Culham Centre for F...
O 6/30/22, 5:30 PM
Magnetic Confinement F... Thu - MCF (Improved Pe...
36. Laser-plasma acceleration beyond the diffraction and dephasing limits (14.202)
```

. Laser-plasma acceleration beyond the dimaction and dephasing

♣ Cedric Thaury (CNRS)

O 6/30/22, 5:30 PM

Beam Plasmas and Inert... Thu - BPIF (QED & Accel... 312. Measurement and Simulation of Fast Ion Phase-space Flow Driven by Alfvén Instabilities (14.106) Xiaodi Du O 6/30/22, 5:30 PM Magnetic Confinement F... Thu - MCF (Alfvén) 83. Studying plasma heating and particle acceleration in collisionless shocks through astrophysical observations (14.402) ♣ Dr Marco Miceli (University of Palerm... O 6/30/22, 5:30 PM Basic, Space and Astrop... Thu - BSAP (Shocks) 49. Carrier-envelope phase controlled electron dynamics in a laser-wakefield accelerator (04.201) Lucas Rovige (Institut Polytechniq... **O** 6/30/22, 6:00 PM Beam Plasmas and Inert... Thu - BPIF (QED & Accel... 62. Core radiative collapse in WEST LHCD plasmas: characterisation and integrated modelling (04.113)▲ Valeria Ostuni (Cea Cadarache) **O** 6/30/22, 6:00 PM Magnetic Confinement F... Thu - MCF (Improved Pe... 295. Experimental observations of fast-ion losses correlated with Global and Compressional Alfvén Eigenmodes in MAST-U (04.109) ■ Juan F Rivero-Rodriguez (Culham Centre for F... O 6/30/22, 6:00 PM Magnetic Confinement F... Thu - MCF (Alfvén) 459. Radiatively cooled shocks in jets at the MAGPIE pulsed-power facility (04.401) ▲ Danny Russell (Imperial College Lo... **O** 6/30/22, 6:00 PM Basic, Space and Astrop... Thu - BSAP (Shocks) 59. Acceleration of positrons in plasmas with high energy efficiency (04.202) ▲ Dr Celine HUE (Weizmann Institute ... O 6/30/22, 6:15 PM Beam Plasmas and Inert... Thu - BPIF (QED & Accel... 393. Energetic particle modes in TCV with two neutral beam injectors (04.110) A Matteo Vallar (Università di Padov... **O** 6/30/22, 6:15 PM Magnetic Confinement F... Thu - MCF (Alfvén) 400. Experimental and numerical investigations of ion acceleration by ultraintense laser pulses in near-critical transparent gas jets (04.402) OSPINA-BOHORQUEZ Valeria (CEA-DAM/ CELIA, U... O 6/30/22, 6:15 PM Basic, Space and Astrop... Thu - BSAP (Shocks) 129. Understanding tungsten accumulation during ICRH operation on WEST (04.114) Patrick Maget (Commissariat à l'En... O 6/30/22, 6:15 PM Magnetic Confinement F... Thu - MCF (Improved Pe... 187. Global electromagnetic gyrokinetic simulations of Energetic Particle driven instabilities in ITER and ASDEX Upgrade (04.111) Lanck Institut... **O** 6/30/22, 6:30 PM Magnetic Confinement F... Thu - MCF (Alfvén)

93. Real time monitoring of pellet delivery to facilitate burn control in EU-DEMO (04.115)

Peter Lang (Max Planck Institut...

O 6/30/22, 6:30 PM Magnetic Confinement F... Thu - MCF (Improved Pe... 364. Superradiant x-ray emission in ion channels (04.203) Miguel Pardal (University of Lisbon ... O 6/30/22, 6:30 PM Beam Plasmas and Inert... Thu - BPIF (QED & Accel... 592. The non-resonant streaming instability: from theory to experiments (04.403) ▲ Alexis Marret (SLAC) O 6/30/22, 6:30 PM Basic, Space and Astrop... Thu - BSAP (Shocks) 330. Fast-ion dynamics at ITER-relevant densities in ASDEX Upgrade measured with collective Thomson scattering (04.112) ▲ Jesper Rasmussen (Technical University... O 6/30/22, 6:45 PM Magnetic Confinement F... Thu - MCF (Alfvén) 450. First experimental results of beam driven plasma wakefield acceleration at FACET-II: beam matching and gamma-ray radiation (04.204) ♣ Pablo San Miguel (Ecole Polytechnique) O 6/30/22, 6:45 PM Beam Plasmas and Inert... Thu - BPIF (QED & Accel... 520. Isotope Effects on Intrinsic Toroidal Rotation and Rotation Reversals (04.116) Maria Filomena Nave (University of Lisbon ... O 6/30/22, 6:45 PM Magnetic Confinement F... Thu - MCF (Improved Pe... 456. Two stage acceleration of protons in the interaction of high-energy lepton flows with background plasma (04.404) Gaowei Zhang O 6/30/22, 6:45 PM Basic, Space and Astrop... Thu - BSAP (Shocks) 242. Measuring the H-He properties under Jupiter interior conditions: challenge, approach, data and implications (15.001) ♣ Dr Stephanie Brygoo (CEA) **○** 7/1/22, 9:00 AM Plenary Fri - Plenary Session 21. Learning Exchange-Correlation Functionals from Nature (15.002) Lagrangian Sam Vinko (University of Oxford,... **O** 7/1/22, 9:35 AM Plenary Fri - Plenary Session 554. Automated Laser Plasma Accelerators (15.201) Matthew Streeter () 7/1/22, 10:40 AM Beam Plasmas and Inert... Fri - BPIF (Machine Lear... 320. Characterization of Turbulence, Zonal Flow, and Turbulent Transport Against Hydrogen Isotope Ratio in a Torus Plasma Experiment (15.101) ♣ Dr Shinsuke OHSHIMA (Institute of Advance... O 7/1/22, 10:40 AM Magnetic Confinement F... Fri - MCF (Stellarator Tur... 41. COMPACT - A new Complex Plasma Facility for the ISS (15.301) L Dr Christina Knapek (University Greifswal... O 7/1/22, 10:40 AM Low Temperature and D... Fri - LTDP (Complex Plas...

48. Laboratory evidence for proton energization by collisionless shock surfing (15.401)

Weipeng YAO O 7/1/22, 10:40 AM Basic, Space and Astrop... Fri - BSAP (Lab Plasma-... 43. Automated control and optimisation of high-intensity laser-solid interactions (15.202) Charlotte Palmer (Queen's University B... **○** 7/1/22, 11:10 AM Beam Plasmas and Inert... Fri - BPIF (Machine Lear... 25. Characterization of quasi-Keplerian, differentially rotating, free-boundary laboratory plasmas ▲ Vicente Valenzuela-Villaseca (Imperial College Lo... **○** 7/1/22, 11:10 AM Basic, Space and Astrop... Fri - BSAP (Lab Plasma-... 188. Influence of discharge parameters on the mode-coupling instability in two-dimensional complex plasma crystals (15.302) Lenaic Couedel (University of Saskat... **○** 7/1/22, 11:10 AM Low Temperature and D... Fri - LTDP (Complex Plas... 66. Recognizing the hallmarks of the turbulent transport reduction by fast ions (15.102) ▲ Samuele Mazzi (École Polytechnique... **○** 7/1/22, 11:10 AM Magnetic Confinement F... Fri - MCF (Stellarator Tur... 387. Characterization of low-density rear-driven collisional plasma jets from thin foils (05.401) ♣ Pablo Perez-Martin (HZDR) **○** 7/1/22, 11:40 AM Basic, Space and Astrop... Fri - BSAP (Lab Plasma-... 595. Deep Learning for the modeling of electron nonlocal transport in plasmas (05.201) Lamy (Université de Borde... **○** 7/1/22, 11:40 AM Beam Plasmas and Inert... Fri - BPIF (Machine Lear... 99. From L-mode to the L-H transition, experiments on ASDEX Upgrade, gyrokinetic simulations and full-radius transport modeling (05.101) ▲ Nicola Bonanomi (Max Planck Institut... © 7/1/22, 11:40 AM Magnetic Confinement F... Fri - MCF (Stellarator Tur... 39. Two-dimensional complex (dusty) plasma with active Janus particles (05.301) L Volodymyr Nosenko (DLR) O 7/1/22, 11:40 AM Low Temperature and D... Fri - LTDP (Complex Plas... 110. Experimental formation of fine-grained rims around chondrules in dusty protoplanetary environments (05.302) La Truell Hyde (CASPER, Baylor Uni... © 7/1/22, 11:55 AM Low Temperature and D... Fri - LTDP (Complex Plas... 179. Influence of safety factor on the radial electric field at the edge of tokamak plasmas (05.102) Laure vermare (CNRS, LPP, Ecole Po... **○** 7/1/22, 11:55 AM Magnetic Confinement F... Fri - MCF (Stellarator Tur... 596. Local characteristics of self-compressed plasma streams in external magnetic field (05.402) L Yuliia Volkova (V. N. Karazin Kharki... O 7/1/22, 11:55 AM Basic, Space and Astrop... Fri - BSAP (Lab Plasma-...

```
Alexander Knetsch (École Polytechnique)
O 7/1/22, 11:55 AM
Beam Plasmas and Inert... Fri - BPIF (Machine Lear...
399. On the nature of electromagnetic pulse emission generated by short-pulse lasers and the
possible mitigation methods (05.203)
Dr Piotr Raczka (Institute of Plasma ...
① 7/1/22, 12:10 PM
Beam Plasmas and Inert... Fri - BPIF (Machine Lear...
476. Particle-in-cell simulations of laser-driven, ion-scale magnetospheres in laboratory plasmas
(05.403)
Filipe Cruz (University of Lisbon ...
○ 7/1/22, 12:10 PM
Basic, Space and Astrop... Fri - BSAP (Lab Plasma-...
190. Plasma processing of nano and microparticles in Gliding Arc Tornado device (05.303)
Prof. Ruggero Barni (Università degli Stu...
O 7/1/22, 12:10 PM
Low Temperature and D... Fri - LTDP (Complex Plas...
158. Saturation Physics in Negative- and Positive-Triangularity Plasmas (05.103)
▲ M.J. Pueschel (DIFFER)
O 7/1/22, 12:10 PM
Magnetic Confinement F... Fri - MCF (Stellarator Tur...
469. Artificial voids in nanodusty plasmas (05.304)
Franko Greiner (Kiel University)
○ 7/1/22, 12:25 PM
Low Temperature and D... Fri - LTDP (Complex Plas...
408. Collisional effects on ultrarelativistic beam-plasma instabilities (05.404)
La Jérémy Faure (Commissariat à l'En...
⊙ 7/1/22, 12:25 PM
Basic, Space and Astrop... Fri - BSAP (Lab Plasma-...
106. Looking into solid-density plasmas using attosecond XUV dispersion (05.204)
Andréas Sundström (Chalmers University...
① 7/1/22, 12:25 PM
Beam Plasmas and Inert... Fri - BPIF (Machine Lear...
618. Zonally dominated dynamics and the transition to strong turbulence in ion-scale plasma
turbulence (05.104)
♣ Dr Plamen Ivanov (Rudolf Peierls Centr...
O 7/1/22, 12:25 PM
Magnetic Confinement F... Fri - MCF (Stellarator Tur...
14. Linear plasma devices as tools to study plasma surface interactions and divertor physics (I5.003)
Thomas Morgan (Dutch Institute for F...
O 7/1/22, 5:00 PM
Plenary Fri - Plenary Session
588. Progress in Direct Drive Inertial Confinement Fusion: Conventional and Shock Ignition (15.004)
R. Betti (Laboratory for Lase...
O 7/1/22, 5:35 PM
Plenary Fri - Plenary Session
Landau-Spitzer Prize 2020 - R. Betti, A. Casner, X. Ribeyre, W. Theobald
184. 2D X-ray spectrometer on WEST: diffracting crystals study and first temperatures profiles
(P1b.110)
Adrien Da Ros (Commissariat à l'En...
Magnetic Confinement F... Mon - Poster Session 2
```

```
Dr Francisco Javier Artola Such (ITER Organization, F...
Magnetic Confinement F... Fri - Poster Session 1
24. A flexible linear gyro-fluid eigensolver with Onsager symmetry (P5b.101)
♣ Gary Staebler (General Atomics)
Magnetic Confinement F... Fri - Poster Session 2
192. A free-boundary MHD code for axisymmetric equilibrium configurations with flow. (P5a.108)
La Gonzalo Fernández-Torija Daza (University Carlos III ...
Magnetic Confinement F... Fri - Poster Session 1
389. A hybrid (ablation-expansion) model for low-density foams (P1b.204)
Lubomír Hudec (Czech Technical Uni...
Beam Plasmas and Inert... Mon - Poster Session 2
94. A new equilibrium solver for the Fenix flight simulator (P1a.102)
Lemiliano Fable (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 1
270. A new turbulent transition in a toroidal plasma (P5b.112)
Mr Wesley Agoua (Laboratoire de Méc..
Magnetic Confinement F... Fri - Poster Session 2
322. A special case of long-pulse high performance operation in W7-X (P1b.118)
Glen Wurden (Los Alamos Nation.
Magnetic Confinement F... Mon - Poster Session 2
127. A statistical analysis approach of plasma dynamics in gyrokinetic simulations of stellarator
turbulence} (P1b.106)

▲ Johan Anderson (Chalmers University...)

Magnetic Confinement F... Mon - Poster Session 2
81. A Two-photon Absorption Laser Induced Fluorescence diagnostic for atomic H in a helicon
plasma device (P5b.401)
Mr Lyes Kadi (Ecole Polytechnique...
Basic, Space and Astrop... Fri - Poster Session 2
182. Acceleration of spin-polarized proton beams from a dual-laser pulse scheme (P2a.203)
▲ Mr Lars Reichwein (Heinrich-Heine-Univ..
Beam Plasmas and Inert... Tue - Poster Session 1
233. Adiabatic Focusing of a Long Proton Bunch in Plasma (P2a.204)
Livio Verra (Max Planck Institut
Beam Plasmas and Inert... Tue - Poster Session 1
606. Alfvénic Transport in the Storm-time Magnetosphere (P4b.406)
Lab... Christopher Chaston (Space Sciences Lab...
Basic, Space and Astrop... Thu - Poster Session 2
306. Alpha Particle Confinement and Losses in JET's Tritium Campaign (P4a.113)
Phillip Bonofiglo (Princeton Plasma P...
Magnetic Confinement F... Thu - Poster Session 1
374. An active learning pipeline for surrogate models of gyrokinetic turbulence. (P5b.119)
♣ Dr Lorenzo Zanisi (Culham Centre for F...
Magnetic Confinement F... Fri - Poster Session 2
467. An efficient zero-order analysis of resonant effects on fast ion losses. (P1a.121)
Dr Panagiotis Zestanakis (National Technical ...
Magnetic Confinement F... Mon - Poster Session 1
```

516. An extended-MHD model for peeling-ballooning stability thresholds in spherical tokamaks (P2a.123)

```
Dr Andreas Kleiner (Princeton Plasma P...
Magnetic Confinement F... Tue - Poster Session 1
109. An interpretable, transferable and real-time disruption predictor in HL-2A based on deep learning
(P4a.101)
Lang Yu Yang (China | Southwester...
Magnetic Confinement F... Thu - Poster Session 1
239. Analysis of 3D filament structures in various magnetic configurations of the W7-X stellarator
(P1b.114)
Attila Buzás (Budapest University...
Magnetic Confinement F... Mon - Poster Session 2
160. Analysis of divertor fluxes with proper orthogonal decomposition method in Wendelstein 7-X
(P1b.108)
▲ Marcin Sleczka (Institute of Physics, ...
Magnetic Confinement F... Mon - Poster Session 2
525. Analysis of electron bunch energy spectra after meter scale over-dense plasma (P2a.210)
Mr Kook-Jin Moon (Ulsan National Instit...
Beam Plasmas and Inert... Tue - Poster Session 1
523. Analysis of Ion Temperature in High Intense Gas Puffing Experiment on Heliotron J (P5a.120)
Lobernyu Wang (Kyoto University), Shinji Kobayashi (Institute of Advance...
Magnetic Confinement F... Fri - Poster Session 1
522. Analysis of ITER performance with different heating schemes using predictive integrated
plasma modelling (P5a.119)
⚠ Mr Tomás Bensadón (BSC)
Magnetic Confinement F... Fri - Poster Session 1
457. Analysis of pellet ELM triggering potential in different ASDEX Upgrade plasma scenarios
(P1a.120)
♣ Dr G. Kocsis (Centre for Energy R..
Magnetic Confinement F... Mon - Poster Session 1
337. Analysis techniques for the simultaneous measurement of impurity ion temperatures and
velocities in MAST-U using Coherence Imaging Spectroscopy (P2a.109)
Rhys Doyle
Magnetic Confinement F... Tue - Poster Session 1
70. Analyzing the solar activity using the horizontal visibility graph method (P4b.403)
⚠ Mr Tomás Zurita-Valencia (University of Chile)
Basic, Space and Astrop... Thu - Poster Session 2
351. Application of FIDA as a charge exchange loss measurement for NB-produced fast ions in small
or medium-size devices (P5a.122)
Shin Nishimura (National Institute fo...
Magnetic Confinement F... Fri - Poster Session 1
579. Atomic calculations in moderately charged lanthanide ions (from La to Pm) relevant for plasma
opacity studies in the context of kilonovae (P2a.404)
Legistra Helena Carvajal (UMons)
Basic, Space and Astrop... Tue - Poster Session 1
180. Available energy and its relation to turbulent transport (P5a.107)
Ralf Mackenbach (Eindhoven Universit...
Magnetic Confinement F... Fri - Poster Session 1
244. Avalance effect: The necessary condition for auto-sustained fusion process in Hydrogen-Boron
fuel (P1a.202)
Chrysovalanti Daponta (Technical University)
Beam Plasmas and Inert... Mon - Poster Session 1
```

```
82. Ballooning stability in negative and positive triangularity spherical tokamak plasmas (P5b.103)
Robert Davies (University of York, U...
Magnetic Confinement F... Fri - Poster Session 2
323. Basic Commissioning of the Laser-Plasma Ion accelerator at the ELIMAIA user beamline
(P5b.202)
Lorenzo Giuffrida (ELI-Beamlines Cen...
Beam Plasmas and Inert... Fri - Poster Session 2
436. Benchmarking DIV1D on SOLPS-ITER simulations of TCV plasmas (P4b.120)
Gijs Derks (Eindhoven Universit.
Magnetic Confinement F... Thu - Poster Session 2
208. Bifurcated magnetic flux consumption during current ramp-up (P4a.109)
Qi Zhang
Magnetic Confinement F... Thu - Poster Session 1
391. Calculation on the stopping power of the warm dense matter at the Bragg peak (P1b.205)
♣ Francisco Chacón Rubio (UNIVERSIDAD DE C...
Beam Plasmas and Inert... Mon - Poster Session 2
329. Calorimetry probe measurements of runaway electron impact energy on plasma facing
components at COMPASS tokamak (P2b.118)
Jakub Čaloud (Czech Technical Uni...
Magnetic Confinement F... Tue - Poster Session 2
199. Can a monotonic electrostatic potential exist in the Debye sheath at very shallow magnetic field
angles? (P5b.109)
Alessandro Geraldini (École Polytechnique...
Magnetic Confinement F... Fri - Poster Session 2
465. Can we study turbulence in fluid complex plasmas? (P4a.302)
Prapti Bajaj (Institut für Material.
Low Temperature and D... Thu - Poster Session 1
478. Causality analysis of turbulent structures in the stellarator TJ-K. (P5b.124)
▲ Mr Nicolas Dumérat (University of Stuttg...
Magnetic Confinement F... Fri - Poster Session 2
75. Characteristics of electron temperature profile stiffness in electron heating dominant plasmas on
EAST (P4a.103)

▲ Jianwen Liu (Forschungszentrum...)

Magnetic Confinement F... Thu - Poster Session 1
211. Characterization of Pedestal Burst Instabilities during I-mode to H-mode Transition in the EAST
Tokamak (P4a.111)
XiaoMing Zhong
Magnetic Confinement F... Thu - Poster Session 1
284. Collisional-radiative model for transport simulations of neutrals in detached conditions (P2a.105)
Francesco Cianfrani (Forschungszentrum...
Magnetic Confinement F... Tue - Poster Session 1
57. Community structure of Earth's magnetic field measurements. (P1b.401)
La Sebastián de la Maza (Universidad de Chile)
Basic, Space and Astrop... Mon - Poster Session 2
278. Compatibility of high-Z impurity accumulation with high plasma performance in ECR-heated W7-
X plasmas (P1b.117)
Daihong Zhang (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 2
```

```
183. Computation of neoclassical toroidal viscosity with the account of non-standard orbits in a
tokamak (P1a.109)
Rico Buchholz (Fusion@ÖAW, Austr...
Magnetic Confinement F... Mon - Poster Session 1
485. Concepts for studying strong-field QED using laser-electron colliders (P4a.205)
Christoffer Olofsson (Göteborgs universit...
Beam Plasmas and Inert... Thu - Poster Session 1
441. Conditions for QED cascade development in counter-propagating Laguerre-Gauss beams
(P4a.203)
Anthony Mercuri-Baron (LULI, Sorbonne Univ...
Beam Plasmas and Inert... Thu - Poster Session 1
250. Confinement and transport studies of high-Z impurities injected by Laser Blow-Off technique in
electron and ion-root TJ-II stellarator plasmas (P2b.112)
♣ Dr Belén López Miranda (CIEMAT, Spain)
Magnetic Confinement F... Tue - Poster Session 2
421. Confinement dependence on beta/power in the JET ILW hybrid scenario (P2a.113)
■ Jörg Hobirk (Max Planck Institut...
Magnetic Confinement F... Tue - Poster Session 1
521. Confinement of fast ions and FLR effects in presence of magnetic islands (P5b.125)
■ Julio Martinell (Universidad Nacion...
Magnetic Confinement F... Fri - Poster Session 2
435. Control of the self-modulation and long-bunch hosing instabilities through plasma frequency
detuning (P2a.209)
▲ Mariana Moreira (University of Lisbon ...
Beam Plasmas and Inert... Tue - Poster Session 1
274. Coronal Magnetic Field Extrapolation Using a Specific Family of Analytical 3D
Magnetohydrostatic Equilibria — Practical Aspects (P4a.405)
Lilli Nadol (University of St And...
Basic, Space and Astrop... Thu - Poster Session 1
200. Correlation microwave diagnostics on the Wendelstein 7-X stellarator for Operational Phase 2
(P1b.111)
Gavin Weir (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 2
87. Crescent-shaped spot modeling of runaway electron synchrotron radiation (P4b.101)
Mr Volodymyr Bochko (V. N. Karazin Kharki...
Magnetic Confinement F... Thu - Poster Session 2
163. Data-driven model discovery from fusion plasma turbulence simulations (P2b.107)
Livana Abramovic (Eindhoven Universit...
Magnetic Confinement F... Tue - Poster Session 2
480. Decoupling of dust cloud and embedding plasma for high electron depletion in nanodusty
plasmas (P4b.302)
Andreas Petersen (University of Kiel)
Low Temperature and D... Thu - Poster Session 2
219. Design and optimization of a radio frequency plasma jet for biomedical applications (P1b.303)
Leonardo Zampieri (Università degli Stu...
Low Temperature and D... Mon - Poster Session 2
598. Design of reflectivity measurement device of First Mirrors in ITER VUV spectrometers (P5a.123)
Yookwan Kim (Korea Institute of Fu...
Magnetic Confinement F... Fri - Poster Session 1
```

	607. Design of the calibration setup for VUV spectrometers using calibrated photo-diode detector in the wide range of VUV wavelength (P4b.128) Lengrae Seon (Korea Institute of Fu
	Magnetic Confinement F Thu - Poster Session 2
	74. Detachment control with feedback impurity seeding and ECRH injection in LHD (P4a.102) ♣ Dr Masahiro Kobayashi Magnetic Confinement F Thu - Poster Session 1
ĺ	286. Deterministic and Stochastic Radiation Reaction in Focused Laser-Electron Scattering (P4a.207) Mr Oscar Amaro (University of Lisbon Beam Plasmas and Inert Thu - Poster Session 1
	301. Direct laser acceleration in plasmas with a density gradients (P2a.206) Robert Babjak (University of Lisbon Beam Plasmas and Inert Tue - Poster Session 1
	357. Drive-laser-wavelength dependence of the power partitioning in a laser-produced tin plasma with relevance to EUV nanolithography (P2b.205) Mr Diko Hemminga (Advanced Research Beam Plasmas and Inert Tue - Poster Session 2
	494. Dust Ion Acoustic Modified Korteweg-de Vries Solitons in Dusty Plasmas with Boltzmann Electrons (P5a.302) ♣ Mr D.C. Das (Department of Math Low Temperature and D Fri - Poster Session 1
ĺ	204. Dynamic error fields derivation by inverting a validated interpretative perturbations model (P2a.104) ♣ Gabriel Miron Magnetic Confinement F Tue - Poster Session 1
	40. Dynamical study of chaotic magnetic fields in magnetohydrodynamic plasmas (P2b.401) ♣ Siba Prasad Acharya (Saha Institute of Nu Basic, Space and Astrop Tue - Poster Session 2
	273. ECWC experiments and modeling on TCV (P4b.114) Johan Buermans (Ghent University, Be Magnetic Confinement F Thu - Poster Session 2
	380. Effect of density ramp on electron acceleration driven by tightly focused ultrashort laser pulses (P2b.206) 2 Zsolt Lécz (ELI-ALPS, ELI-HU N Beam Plasmas and Inert Tue - Poster Session 2
	61. Effect of edge ion temperature on the divertor W sputtering on WEST (P1b.101) Dryongliang Li (Institute of Plasma Magnetic Confinement F Mon - Poster Session 2
	104. Effect of resistivity on the MHD pedestal stability in JET (P2a.101) ♣ Hampus Nyström (Royal Institute of Te Magnetic Confinement F Tue - Poster Session 1
	519. Effect of surface porosity on plasma assisted catalysis for ammonia synthesis (P5b.301) ♣ Surabhi Jaiswal Low Temperature and D Fri - Poster Session 2
	197. Effect of the divertor configuration on the JET edge radial electric field (P2a.103) ♣ Carlos Silva (University of Lisbon Magnetic Confinement F Tue - Poster Session 1
	483. Effect on the tearing mode by adding rotating resonant magnetic perturbation with different frequency in J-TEXT (P4b.121)

```
La Ruo Jia (International Joint R.
Magnetic Confinement F... Thu - Poster Session 2
217. Effects of alpha particles on the transport of helium ash driven by collisionless trapped electron
mode turbulence (P5a.110)
▲ 光艇 朱 (华中科技大学)
Magnetic Confinement F... Fri - Poster Session 1
553. Effects of isotopes on pedestal structure in DIII-D (P4b.123)
Ryan Chaban (William & Mary)
Magnetic Confinement F... Thu - Poster Session 2
350. Effects of non-Maxwellian electron distribution functions on properties of hot under-dense gold
plasmas (P1a.207)
Christophe Blancard
Beam Plasmas and Inert... Mon - Poster Session 1
343. Effects of the external current drive on three-dimensional magnetic islands in the CFQS quasi-
axisymmetric stellarator (P4b.117)
🚨 X Su
Magnetic Confinement F... Thu - Poster Session 2
166. Efficient high-order harmonic generation via surface plasma compression with lasers (P4b.203)
Dr Boyuan Li (Shanghai Jiao Tong...
Beam Plasmas and Inert... Thu - Poster Session 2
324. Electromagnetic emission via linear mode conversion mediated by stimulated Raman
backscattering (P4b.205)
L Xuyan Jiang (Shanghai Jiao Tong..
Beam Plasmas and Inert... Thu - Poster Session 2
535. Electromagnetic emissions at LMJ-PETAL facility: understanding, mitigation and measurement
(P5b.207)
Stephane Coudert (Commissariat à l'En...
Beam Plasmas and Inert... Fri - Poster Session 2
101. Electron swarm parameters for Alcohols plasma by using electron collision cross - sections
(P1a.303)
▲ Marcelo Silva (Federal University o...
Low Temperature and D... Mon - Poster Session 1
382. EMP measurements from MF to UHF at VEGA (P5b.204)
Micha Ehret
Beam Plasmas and Inert... Fri - Poster Session 2
115. Energetic decomposition of modes in resistive plasmas (P5b.105)

▲ Jonas Puchmayr (Max Planck Institut...)

Magnetic Confinement F... Fri - Poster Session 2
177. Energetic particle confinement and stability in the Spherical Tokamak for Energy Production
(P2b.108)
Len McClements (UKAEA)
Magnetic Confinement F... Tue - Poster Session 2
132. Energetic particle driven instabilities during the L-H transition in ASDEX Upgrade (P1a.105)
Philipp Lauber (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 1
151. Energetic particle nonlinear equilibria and transport processes in burning plasmas (P5b.106)
▲ Matteo Valerio Falessi (ENEA Italian Nation.
Magnetic Confinement F... Fri - Poster Session 2
290. Energetic particle transport: diffusion vs convection and phase-space barriers (P5a.113)
```

```
Dr Nakia Carlevaro (ENEA, FNS Departm..
Magnetic Confinement F... Fri - Poster Session 1
292. Energy confinement time in a magnetically confined thermonuclear fusion reactor (P5b.114)
L Dr CHIPING CHEN (Beyond Carbon Ene..
Magnetic Confinement F... Fri - Poster Session 2
249. Enhancement of nuclear reactions via the kinetic Weibel instability in plasmas (P1b.202)
Liu (Peking University)
Beam Plasmas and Inert... Mon - Poster Session 2
159. Establishment of island divertor configuration in the J-TEXT tokamak (P4b.107)
Song Zhou (International Joint R..
Magnetic Confinement F... Thu - Poster Session 2
605. Expanding Hydrogen plasma in diverging Magnetic fields in an ECR based Large Volume
Plasma System (P4a.411)
L Shweta Sharma (Indian Institute of T...
Basic, Space and Astrop... Thu - Poster Session 1
349. Experimental evidence of TIAGO torch dart at atmospheric pressure to be a Surface Wave
Discharge. (P2a.303)
▲ Mr Francisco Javier Morales-Calero (Universidad de Córd...
Low Temperature and D... Tue - Poster Session 1
305. Experimental helium exhaust studies in the full-W ASDEX Upgrade (P1a.115)
▲ Mr Antonello Zito (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 1
125. Experimental investigation of halo currents during vertical displacement events in the KSTAR
tokamak (P4b.104)
L Dr Jun-Gyo Bak (Korea Institute of Fu..
Magnetic Confinement F... Thu - Poster Session 2
241. Experimental observations of RMP induced toroidal rotation accelerations on EAST (P4a.112)
L Yifei Jin (Institute of plasma)
Magnetic Confinement F... Thu - Poster Session 1
309. Exploration of Alfven Eigenmode physics via active antenna excitation in JET Deuterium,
Tritium, and DT plasmas (P2a.107)
Roy Alexander Tinguely (MIT Plasma Scienc...
Magnetic Confinement F... Tue - Poster Session 1
514. Fast diagnostic mapping in non-nested magnetic topologies using 3D field compliant magnetic
surface labels and neural network based interpolation (P1b.123)
Alexander Knieps (Forschungszentrum.
Magnetic Confinement F... Mon - Poster Session 2
472. Fast-ion studies with three-ion ICRF scenarios in non-active JET plasmas (P2a.118)
♣ Dr Yevgen Kazakov (Laboratory for Plas...
Magnetic Confinement F... Tue - Poster Session 1
481. First divertor Thomson scattering measurements on MAST-U (P2a.119)
Mr James Clark (University of Liverp...
Magnetic Confinement F... Tue - Poster Session 1
448. First MAST-U Equilibrium Reconstructions using the EFIT++ Code (P2a.116)
Dr Lucy Kogan (United Kingdom Ato...
Magnetic Confinement F... Tue - Poster Session 1
275. First Simulations of Pellet Injections into Heliotron J using HPI2 (P5a.112)
Nerea Panadero (CIEMAT, Spain)
```

```
Magnetic Confinement F... Fri - Poster Session 1
277. Fluid modelling of the weakly magnetized plasma column MISTRAL (P2a.302)
Surabhi Aggarwal (Aix Marseille Univer...
Low Temperature and D... Tue - Poster Session 1
479. Force-free Collisionless Current Sheets: A Systematic Method for Adding Asymmetries (P4a.409)
Lilli Nadol (University of St And..
Basic, Space and Astrop... Thu - Poster Session 1
263. Formation studies of field-reversed configurations on the HFRC-F device (P2b.115)
Yue Peng (Huazhong Universit...
Magnetic Confinement F... Tue - Poster Session 2
79. Formulation and numerical benchmarck of improved magneto fluid-dynamics boundary
condtions for 3D nonlinear MHD code SPECYL (P5b.102)
Luca Spinicci (Università di Padov.
 Magnetic Confinement F... Fri - Poster Session 2
406. Fractal polymeric surfaces by plasma processing (P2b.303)
Cecilia Piferi
Low Temperature and D... Tue - Poster Session 2
28. Fractality and cumulative entropy of a magnetized plasma driven by fractional Brownian motion
(P4b 401)
L Víctor Fernández (Universidad de Chile)
Basic, Space and Astrop... Thu - Poster Session 2
499. Gamma-ray flares from magnetic reconnection in relativistically magnetized plasmas: minijets
vs. plasmoids (P2a.403)
L Krzysztof Nalewajko (Nicolaus Copernicu...
Basic, Space and Astrop... Tue - Poster Session 1
438. Generation and control of internal-injected electron beams in plasma for cancer therapies
(P4b.207)
Celine HUE (Weizmann Institute).
Beam Plasmas and Inert... Thu - Poster Session 2
240. Generation of second-harmonic in focusing structured laser beams inside dielectrics (P4b.204)
Kazem Ardaneh (Femto-st)
Beam Plasmas and Inert... Thu - Poster Session 2
362. Gliding arc discharge for CO2 conversion: An experimental study of different discharge
configurations (P5b.302)
Mr Vladislav Ivanov (Sofia University St. ...
Low Temperature and D... Fri - Poster Session 2
225. Global stability and MHD dynamics in TCV negative triangularity plasmas (P4b.113)
Leonardo Pigatto (Consorzio RFX)
Magnetic Confinement F... Thu - Poster Session 2
446. Growth of electron hole in 1D Vlasov plasma and 4D gyro and bounce averaged kinetic Vlasov
simulation (P5b.121)
Debraj Mandal (University of Lorrain...
Magnetic Confinement F... Fri - Poster Session 2
37. Gyrokinetic simulation of electrostatic microturbulence transport in ADITYA-U tokamak (P2b.102)
Tajinder Singh (Indian Institute of S...
Magnetic Confinement F... Tue - Poster Session 2
285. Gyrokinetic simulations of anisotropic energetic particle driven geodesic acoustic modes in
tokamaks (P1a.112)
Brando Rettino (Max Planck Institut...
```

```
Magnetic Confinement F... Mon - Poster Session 1
167. H-mode operation in Helium plasmas on TCV: access and pedestal characterisations (P4b.109)
Benoit Labit (École Polytechnique.
Magnetic Confinement F... Thu - Poster Session 2
550. High accuracy Landau collision operator and transport coefficients for gyrokinetic and fluid
turbulence simulations (P5a.121)
L Klaus Hallatschek (Max Planck Institut...
Magnetic Confinement F... Fri - Poster Session 1
484. High Frequency Incoherent and Coherent Radiation in SMILEI: application to XUV emission from
electrons accelerated in surface waves (P4b.208)
Paula S. Kleij (Commissariat à l'En..
Beam Plasmas and Inert... Thu - Poster Session 2
591. High heat fluxes testing of tungsten materials with different microstructure under QSPA
transient plasma impacts (P4b.127)
L Vadym Makhlai (National Science Ce...
Magnetic Confinement F... Thu - Poster Session 2
26. High-flux neutron generation by laser-accelerated ions from single- and double-layer targets
(P2a.201)
Vojtěch Horný (CNRS)
Beam Plasmas and Inert... Tue - Poster Session 1
601. High-repetition rate neutron source by few-cycle intense laser pulse (P2b.211)
Laser-indu...
Beam Plasmas and Inert... Tue - Poster Session 2
491. High-resolution Optical Emission Spectroscopy characterization of hydrogen and argon
laboratory magneto-plasmas of astrophysical interest (P5a.405)
Dr Giulia Emma (Università degli stu...
Basic, Space and Astrop... Fri - Poster Session 1
616. Higher Order Solutions for Dust Ion Acoustic Solitons in Complex Plasmas with Relativistic Ions
and Cairn's Distributed Electrons (P5b.304)
Mr D. C. DAS (Barnagar College, S..
Low Temperature and D... Fri - Poster Session 2
256. How flux rope heating affects solar prominence formation (P4a.404)
▲ Nicolas Brughmans (KU Leuven)
Basic, Space and Astrop... Thu - Poster Session 1
398. Hydrodynamic modeling of self-generated magnetic fields by ALE methods (P1b.206)
▲ Milan Kucharik (Czech Technical Uni..
Beam Plasmas and Inert... Mon - Poster Session 2
222. ICRH heating and turbulent transport modelling of the WEST L-mode plasma using ETS:
interpretative and predictive code validation (P1b.113)
philippe huvnh (Commissariat à l'En...
Magnetic Confinement F... Mon - Poster Session 2
411. Ideal core MHD stability in operational scenarios in JT-60SA (P1a.118)
Rui Coelho (University of Lisbon
Magnetic Confinement F... Mon - Poster Session 1
416. Impact of ICRF heating on core impurity transport in NBI-heated LHD plasmas (P4a.120)
L Dr Naoki Tamura (National Institute fo...
Magnetic Confinement F... Thu - Poster Session 1
123. Impact of impurities on drift wave instabilities in reversed-field pinch plasmas (P4b.103)
♣ Jingchun Li
```

```
Magnetic Confinement F... Thu - Poster Session 2
540. Impact of Suprathermal and Beam Electrons on Nonlinear Electrostatic Waves in an Electron-
Positron Plasma (P2b.406)
L Dr Ashkbiz Danehkar (University of Michig...
Basic, Space and Astrop... Tue - Poster Session 2
297. Impact of trapped particles on the plasma sheath around infinitely-long electron-emitting
objects in Maxwellian plasmas (P4a.406)
Luca Chiabò (University Carlos III ..
Basic, Space and Astrop... Thu - Poster Session 1
586. Importance of Electron drag force in EUV induced pulsed plasma (P2a.304)
▲ Manis Chaudhuri (ASML)
Low Temperature and D... Tue - Poster Session 1
77. Improvement of electron temperature and density evaluation in the 20 kHz Thomson scattering
diagnostics on LHD (P4a.104)
L Dr Hisamichi Funaba (National Institute fo...
Magnetic Confinement F... Thu - Poster Session 1
245. Improvement of plasma position control by decoupling of Fast Plasma Position Control coil
control and Poloidal Field coil control on JT-60SA (P1a.111)
Shinichiro Kojima (National Institutes f...
Magnetic Confinement F... Mon - Poster Session 1
318. Improving the Performance of a Fusion Neutron Science Facility (P2b.117)
Luca Guazzotto
Magnetic Confinement F... Tue - Poster Session 2
327. Impurity modelling with European Transport Simulator: implementation and verification (P2a.108)
Dmitriy Yadykin (Chalmers University...
Magnetic Confinement F... Tue - Poster Session 1
445. Inference of physics state variables from simulations. A new paradigm (P4a.408)
Richard Marchand (University of Alberta)
Basic, Space and Astrop... Thu - Poster Session 1
196. Influence of the laser pulse steep rising front on ion acceleration (P2b.202)
Martin Matvs (ELI Beamlines)
Beam Plasmas and Inert... Tue - Poster Session 2
333. Influence of the solid-to-plasma transition on the laser energy deposition in targets and
subsequent hydrodynamics for direct drive inertial confinement fusion (P1a.205)
romain liotard (CNRS)
Beam Plasmas and Inert... Mon - Poster Session 1
262. Injection tolerances for a quasilinear wakefield accelerator (P5a.203)
♣ John Farmer (Max Planck Institut.
Beam Plasmas and Inert... Fri - Poster Session 1
412. Inner-outer midplane density asymmetries and the link to the HFSHD close to double null at
ASDEX Upgrade (P1a.119)
■ Daniel Hachmeister (University of Lisbon .
Magnetic Confinement F... Mon - Poster Session 1
281. Integrated core transport modeling of NSTX plasmas (P4b.115)
G. Avdeeva (General Atomics)
Magnetic Confinement F... Thu - Poster Session 2
359. Interaction of Alfvénic modes and turbulence via the nonlinear modification of the equilibrium
```

profiles (P5b.117)

▲ Alessandro Biancalani (Léonard de Vinci Pô...

175. Kinetic Structure of Low Frequency Continuous Spectrum in General Tokamak Geometry (P5b.107)

d Astrop... Thu - Poster Session 2

Yueyan Li

```
419. L-H transitions and intermediate behaviours on MAST and MAST-U (P2a.112)
Lena Howlett (University of York, U...
Magnetic Confinement F... Tue - Poster Session 1
35. Laboratory modelling of equatorial 'tongue' accretion channels in young stellar objects (05.402)
LULI, Ecole polytech...
Basic, Space and Astrop... Fri - BSAP (Lab Plasma-...
86. Laser ion acceleration from tailored solid targets with micron-scale channels (P2b.201)
Lezhnin Lezhnin
 Beam Plasmas and Inert... Tue - Poster Session 2
376. Linear drive of Fast-ion-driven vertical modes (P2a.111)
▲ Tommaso Barberis (Politecnico di Torin...
   ignetic Confinement F... Tue - Poster Session 1
332. Localization of 3-D kinetic Alfven wave and turbulent spectra in the solar corona region (P4a.407)
Ms Garima Patel (Indian institute of te...
Basic, Space and Astrop... Thu - Poster Session 1
555. Long-term evolution of conditions within plasma capillary discharge devices, with application to
plasma accelerators (P5b.405)
Gregory Boyle (James Cook Univer...
Basic, Space and Astrop... Fri - Poster Session 2
348. Low proton bunch divergence from double-layer target driven by twisted light (P2b.204)
Lamilla Willim (GoLP/Instituto de Pl...
Beam Plasmas and Inert... Tue - Poster Session 2
143. Machine-learning enabled automatic classification of KSTAR ECE images (P4b.106)
Ralph Kube (Princeton Plasma P...
Magnetic Confinement F... Thu - Poster Session 2
370. Magnetic reconnection events in RFX-mod high current plasmas (P4b.119)
▲ Marco Gobbin (Consorzio RFX, CNR...
Magnetic Confinement F... Thu - Poster Session 2
53. Magnetic reconnection rate during sawtooth crashes in ASDEX Upgrade (P1a.101)
Oleg Samoylov (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 1
600. Measurement of the phase relationship of coupled n = 1 tearing modes in J-TEXT (P4b.126)
Langkang Ren (International Joint R...
            finement F... Thu - Poster Session 2
409. Measurements and determination of breakdown voltage in DC discharges at low pressure
(P5b.303)
Dragana Maric (Institute of Physics ...)
Low Temperature and D... (Fri - Poster Session 2)
307. Measuring RF-accelerated fast ions with DD and DT neutron spectroscopy: comparison of
velocity-space sensitivity (P2a.106)
♣ Dr Jacob Eriksson (Uppsala University)
 Magnetic Confinement F... Tue - Poster Session 1
238. Microtearing Modes in high-β Spherical Tokamaks (P2b.111)
Land Dr Daniel Kennedy (Culham Centre for F...
```

155. Microtearing turbulence and reduced transport model building in H-mode plasmas (P2a.102)

Myriam Hamed (Dutch Institute for F...

Magnetic Confinement F... Tue - Poster Session 2

Magnetic Confinement F... Tue - Poster Session 1 503. Microwave current drive for STEP and MAST Upgrade (P2a.122) La Simon Freethy (Culham Centre for F..., Dr Alf Köhn-Seemann (University of Stuttg... Magnetic Confinement F... Tue - Poster Session 1 423. Modeling of Alfven cascades in the TJ-II stellarator with STELLGAP and AE3D codes (P2b.121) Adriana Gabrielle Ghiozzi (Barcelona Superco... Magnetic Confinement F... Tue - Poster Session 2 582. Modeling of gas breakdown with "particle in cell" method (P1b.304) L Dr Stanislav Dudin (V.N. Karazin Kharkiv... Low Temperature and D... Mon - Poster Session 2 611. Modeling of the nanoparticle size segregation in magnetron discharge (P2b.304) Lecile Arnas (Aix Marseille Univer... rature and D... Tue - Poster Session 2 303. Modelling of the Neutral Gas and Plasma Transport in the Scrape- off Layer and Divertor of ST40-Tokamak (P2b.116) Albert Nicolai (Tokamakenergy.co.... Magnetic Confinement F... Tue - Poster Session 2 355. Models for modulated rotation of a Penning-trapped magnetized electron vortex in a variablecharge regime (P2a.402) La Giancarlo Maero (University of Milan, I... Basic, Space and Astrop... Tue - Poster Session 1 138. Modulating far-field properties of attosecond pulses based on relativistic plasma mirrors (P4b.202) Lambda Yi Zhang (Peking University; E... Beam Plasmas and Inert... Thu - Poster Session 2 150. Mono-charge super-heavy ion beams accelerated by a multi-PW laser (P2a.202) ▲ Jarosław Domański (Institute of Plasma ... Beam Plasmas and Inert... Tue - Poster Session 1 296. Narrow-band, GeV gold ion beams from ultra-thin foils irradiated by intense sub-picosecond pulses (P2a.205) ♣ Philip Martin (Queen's University B... Beam Plasmas and Inert... Tue - Poster Session 1 299. NBI ion losses at energy E0/2 driven by NTMs (P1a.113) L hugo ferrari (CNEA - CONICET - A... Magnetic Confinement F... Mon - Poster Session 1 427. Neon seeding effects on two JET high performance baseline plasmas (P2a.114) La Stefano Gabriellini (Sapienza University ... Magnetic Confinement F... Tue - Poster Session 1 604. Neural net modeling of equilibria in NSTX-U Josiah Wai (PPPL) Magnetic Confinement F... Thu - Poster Session 2 502. Neural Plasma Reconstruction from Diagnostic Imaging (P2a.121) ▲ Mx Ekin Ozturk (Imperial College Lo...

259. New insights into cryogenic and TESPEL pellet physics in TJ-II (P2b.113)

♣ Dr María Isabel García Cortés (CIEMAT, Spain)

finement F... Tue - Poster Session 1

Magnetic Confinement F... Tue - Poster Session 2

193. Non-linear visco-resistive MHD modelling of reversed field-pinch fusion plasmas: viscosity coefficient studies (P4b.110) ■ Nicholas Vivenzi (Università di Padov... Magnetic Confinement F... Thu - Poster Session 2 181. Nonlinear evolutions of energetic particle modes in tokamak plasmas with reversed magnetic shear configuration (P5b.108) A man li (Southwest Jiaotong... lagnetic Confinement F... Fri - Poster Session 2 141. Nonlinear growth of Rayleigh Taylor Instability single mode structure under the effect of collision with a second fluid (P1b.403) Quentin Cauvet (CEA) Rasic Space and Astrop... Mon - Poster Session 2 18. Nonlinear interaction between toroidal Alfvén eigenmode and tearing mode on HL-2A tokamak (P4a.101) L Dr Peiwan Shi (Southwestern Instit... Magnetic Confinement F... Thu - Poster Session 1 111. Nonlinear properties of the Kelvin-Helmholtz instability in compressible plasmas (P1a.401) A Zhiru Li Basic, Space and Astrop... Mon - Poster Session 1 328. Nonlocal thermal transport in magnetized plasma along different directions (P1a.402) hanzhi zhao (Shanghai Jiao Tong... Basic, Space and Astrop... Mon - Poster Session 1 145. Novel high speed spectrally resolved imaging system for simultaneous 2-D Te and ne edge plasma measurements with temporal resolution up to 100 kHz (P2b.106) ▲ Igor Voldiner (LNF Ciemat) Magnetic Confinement F... Tue - Poster Session 2 429. Novel methods for evaluating Thomson scattering data to improve the accuracy of the electron density and its error estimate (P1b.122) ▲ Golo Fuchert (Max Planck Institut... Magnetic Confinement F... Mon - Poster Session 2 490. Numerical investigation of non-homogeneous ECR plasma opacities assuming an external black-body radiation (P5a.404) La Dr Matteo Bezmalinovich (Università degli stu... Basic, Space and Astrop... Fri - Poster Session 1 71. Numerical modelling of fast electron transport on neoclassical tearing mode stabilization by electron cyclotron current drive (P5a.101) Xiaojing Wang lagnetic Confinement F... Fri - Poster Session 1 581. Numerical simulation of thermal quench triggered by density source in HL-2A (P4b.124) La Shilin Hu (Southwestern Instit... Magnetic Confinement F... Thu - Poster Session 2 510. Numerical simulations modelling the interaction of ultra-relativistic neutral fireball beams with magnetised plasmas (P2b.404) Linzia Chiappetta (Physics Department... Basic, Space and Astrop... Tue - Poster Session 2 344. Observations of confined fast ions in MAST-U with the NCU (P2a.110) A Marco Cecconello Magnetic Confinement F... Tue - Poster Session 1 489. On linear analysis of turbulence growth rates (P5a.118)

La Timo Kiviniemi (Aalto University, Finl...

617. On Relativistic Braginskii Transport Equations: Mixed Approach (P5a.125) Illia Marushchenko (V. N. Karazin Kharki... Magnetic Confinement F... Fri - Poster Session 1 88. On stochastic electron dynamics in colliding plane waves (P1b.402) Alexey Knyazev (University of Califor... Basic, Space and Astrop... Mon - Poster Session 2 215. On symplectic integration of the guiding-center equations in general 3D toroidal fields using GORILLA (P1b.112) Dr Michael Eder (Fusion@ÖAW, Austr... Magnetic Confinement F... Mon - Poster Session 2 121. On the effects of multi-pump Raman amplification of short laser pulses (P4b.201) Kirill Lezhnin Beam Plasmas and Inert... Thu - Poster Session 2 594. Onset of shearless transport barriers in a magnetically confined plasma (P5b.128) Leonardo Antonio Osorio Magnetic Confinement F... Fri - Poster Session 2 424. Optical shaping of high-pressure gas-jet targets for proton acceleration experiments in the nearcritical density regime (P2b.208) loannis Tazes Beam Plasmas and Inert... Tue - Poster Session 2 80. Optimisation of Resistive Wall Mode Control in STEP (P2b.104) La Guoliang Xia (Culham Centre for F... Magnetic Confinement F... Tue - Poster Session 2 147. Optimization of pressure gradient driven modes and Alfven Eigenmodes stability by the neutral beam current driven in LHD plasma (P4a.107) ▲ Jacobo Varela Rodriguez (University Carlos III ... Magnetic Confinement F... Thu - Poster Session 1 385. Optimization of y-photon sources using near-critical density targets towards electron-positron pairs generation through the linear and nonlinear Breit-Wheeler processes (P4a.201) ■ Iuliana-Mariana Vladisavlevici (West University of T... Plasmas and Inert... Thu - Poster Session 1 425. Parametric decay of microwave beams in the edge island of Wendelstein 7-X: theoretical modelling and correlation with edge fluctuations (P1b.121) Andrea Tancetti Magnetic Confinement F... Mon - Poster Session 2 317. Parametric Dependence of Sawtooth Crash Time in EAST Tokamak (P4a.115) ▲ Ms Ziwei Qiang (Department of Plas... infinement F... Thu - Poster Session 1 584. Particle Transport Barriers Dependence on the Magnetic Configuration (P5b.127) Gabriel Cardoso Grime Magnetic Confinement F... Fri - Poster Session 2 354. Performance assessment of a tightly baffled, long-legged divertor configuration in TCV with SOLPS-ITER simulations (P4b.118) ■ GUANGYU SUN (École Polytechnique... Magnetic Confinement F... Thu - Poster Session 2

♣ Dr Alexei Polevoi (ITER Organization, F...
Magnetic Confinement F... Fri - Poster Session 1

152. PFPO plasma scenarios for exploration of long pulse operation in ITER (P5a.106)

```
205. Physically based modelling of EC pre-ionization and assisted breakdown under ITER-like
constraints (P5a.109)
Dr Panos Papagiannis (School of Electrical ...
Magnetic Confinement F... Fri - Poster Session 1
234. Physics based design of a multi-purpose non-axisymmetric active coil system for the Divertor
Test Tokamak (P2b.110)
La Dr Tommaso Bolzonella (Consorzio RFX, Pad...
  lagnetic Confinement F... Tue - Poster Session 2
486. Physics informed fast Grad-Shafranov surrogates (P2a.120)
⚠ Ms Emily Lewis (University College L...
Magnetic Confinement F... Tue - Poster Session 1
131. PIC simulations and reduced model of confined ionising electron clouds relevant to gyrotrons
(P2a 401)
▲ Mr Guillaume Le Bars (École Polytechnique...
Basic, Space and Astrop... Tue - Poster Session 1
19. PIC simulations of strongly magnetized parallel collisionless shocks in pair plasmas (P5a.201)
▲ Antoine Bret (UCLM)
Beam Plasmas and Inert... Fri - Poster Session 1
434. PIC Simulations of the Interaction between Self-Modulation in the Front and Rear of an ultra-
relativistic Proton Bunch in Plasma (P2a.208)
Pablo Israel Morales Guzman (Max Planck Institut...
Beam Plasmas and Inert... Tue - Poster Session 1
432. PICSAR-QED: a Monte Carlo module to simulate strong-field quantum electrodynamics in
particle-in-cell codes for exascale architectures (P1b.404)
Luca Fedeli (Université Paris-Sac...
Basic, Space and Astrop... Mon - Poster Session 2
231. Plasma characterisation for nonlinear wave-plasma interaction experiments (P5a.401)
▲ Mr Liam Selman (University of Strathc...
Basic, Space and Astrop... Fri - Poster Session 1
612. Plasma density depletion caused by inhomogeneous stochastic electric fields (P4a.409)
Prof. Dmitry Chibisov (V. N. Karazin Kharki...
Basic, Space and Astrop... Thu - Poster Session 1
302. Plasma flow in tokamaks: unraveling the competition and synergy between turbulence and 3D
magnetic perturbations (P5b.115)
Robin Varennes (Commissariat à l'En...
Magnetic Confinement F... Fri - Poster Session 2
388. Plasma magnetic control scenarios for the ITER PFPO-1 phase (P5a.116)
♣ Dr Maksim Dubrov (ITER Organization)
 Magnetic Confinement F... Fri - Poster Session 1
85. Plasma Parameters of Compact Fusion Reactors using Similarity Scaling Laws of Spherical
Tokamak Fusion Plasmas (P5a.103)
♣ Dr francesco paolo orsitto (tokamak energy )
Magnetic Confinement F... Fri - Poster Session 1
108. Plasma perturbation by active probes in the SOL of W7-X (P1b.105)
Larsten Killer (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 2
482. Plasma potential control in a weakly magnetized plasma column using negatively-biased
emissive electrode (P5a.301)
⚠ Mr Francis Pagaud (LPENSL)
```

Low Temperature and D... Fri - Poster Session 1

```
L Chiara Badiali (University of Lisbon ...
 Beam Plasmas and Inert... Tue - Poster Session 1
375. Positron acceleration in a plasma channel with multi-Petawatt-class lasers (P5b.403)
▲ Bertrand Martinez (University of Lisbon ...
 lasic. Space and Astrop... Fri - Poster Session 2
504. Positron acceleration in plasma waves driven by non-neutral fireball beams (P4a.206)
♣ Thales Silva (University of Lisbon ...
Beam Plasmas and Inert... Thu - Poster Session 1
102. Possibility for neutral density measurements with beam emission spectroscopy (P1a.103)
Örs Asztalos (Budapest University...
Magnetic Confinement F... Mon - Poster Session 1
353. Potential profiles and transient response in H and D plasmas of the LHD (P4a.124)
▲ Masaki Nishiura (National Institute fo...
Magnetic Confinement F... Thu - Poster Session 1
356. Power exhaust in high-performance plasmas in Wendelstein 7-X (P1b.119)
L Yu Gao (Max Planck Institut...
Magnetic Confinement F... Mon - Poster Session 2
63. Predicting the physics of ion cyclotron emission from neutral beam-heated plasmas in the
Wendelstein 7-X stellarator (P1b.102)
Omstavan Samant (University of Warwi...
    netic Confinement F... Mon - Poster Session 2
442. Predictive modelling of D-T fuel mix control with gas puff and pellets for JET 3.5 MA baseline
scenario (P2a.115)
Lito Konrad Zotta (Sapienza University ...
Magnetic Confinement F... Tue - Poster Session 1
613. Preliminary ab-initio calculations of the mean excitation energy of ions with relativistic effects
for deriving their stopping power in fusion plasmas (P5a.124)
■ Jedrzej Walkowiak (Institute of Nuclear ...
  lagnetic Confinement F... Fri - Poster Session 1
493. Preliminary space and time resolved characterization of X-ray emission from an ECR magneto-
plasma in the PANDORA project frame (P5b.404)
♣ Dr Giorgio Finocchiaro (Università degli Stu...
 Basic, Space and Astrop... Fri - Poster Session 2
258. Preliminary study of early time dynamics during pulsed laser interaction with a CH ablator target
(P1a.203)
♣ Dr Evaggelos Kaselouris (Institute of Plasma ...
 eam Plasmas and Inert... Mon - Poster Session 1
455. Probing Strong Field QED in beam-plasma collisions (P4a.204)
Aimé Matheron (Laboratoire d'optiqu...
Beam Plasmas and Inert... Thu - Poster Session 1
105. Quantifying electron cyclotron power deposition broadening in DIII-D (P4b.102)
▲ Jelle Slief (Eindhoven Universit...
Magnetic Confinement F... Thu - Poster Session 2
140. Quantum Computing Approach to Electromagnetic Wave Propagation in Plasma (P2b.402)
Lefstratios Koukoutsis (National Center for ...
Basic, Space and Astrop... Tue - Poster Session 2
172. Quantum sensing of microparticle charges in plasmas (P1b.301)
```

▲ Mikhail Pustylnik

428. Plasma-based acceleration for non-relativistic particles (P2a.207)

```
462. Quasi-Linear transport model EDWM: Update and benchmarking (P2a.117)
Lemil Fransson (Chalmers University...
Magnetic Confinement F... Tue - Poster Session 1
609. Quasi-static modeling of two-dimensional adiabatic compression of FRC plasmas (P4a.125)
▲ Mr Abba Alhaji Bala (International Joint R...
Magnetic Confinement F... Thu - Poster Session 1
207. Qubit Lattice Algorithms for 2D Scattering of Electromagnetic Waves from Scalar Dielectric
Objects (P2b.403)
Prof. George Vahala (William & Mary)
Basic, Space and Astrop... Tue - Poster Session 2
248. Radial correlation reflectometry analysis in high-turbulence plasma scenario (P1b.115)
Prof. Stephane Heuraux (IJL, Universite de Lo...
Magnetic Confinement F... Mon - Poster Session 2
209. Research on the effect of non-resonant magnetic perturbation on low-q limit in J-TEXT tokamak
▲ Ms Ying He (International Joint R...
 Magnetic Confinement F... Thu - Poster Session 2
452. Resonance broadening in quasilinear theory: towards Kubo > 1 (P5b.122)
▲ Mr Alejandro Guillevic (University of Lorrain...
 Magnetic Confinement F... Fri - Poster Session 2
468. Results on the commissioning of the 1 PW experimental area at ELI-NP (P5b.206)
⚠ Dr Mihail Cernaianu (IFIN-HH ELI-NP)
Beam Plasmas and Inert... Fri - Poster Session 2
29. Sandpile on a network as a model for geomagnetic activity (P4a.402)
▲ Alejandro Zamorano (Universidad de Chile)
Basic, Space and Astrop... Thu - Poster Session 1
512. Scanning the optical path of a tabletop vortex EUV beam (P4b.209)
Patrícia Estrela
 Beam Plasmas and Inert... Thu - Poster Session 2
32. Scenarios for physics experiments in the COMPASS Upgrade tokamak (P2b.101)
▲ Fabien Jaulmes (Institute of Plasma ...
Magnetic Confinement F... Tue - Poster Session 2
223. Self-consistent simulation of Magnum-PSI target in SOLPS-ITER with a Finite Element Wall
model (P4b.112)
■ Jorge Gonzalez (Dutch Institute for F...
 Magnetic Confinement F... Thu - Poster Session 2
537. Self-generated magnetic fields during nanosecond laser-target interaction (P1b.208)
▲ Mr Jan Nikl (ELI Beamlines Centr...
Beam Plasmas and Inert... Mon - Poster Session 2
171. Self-induced transport barrier in the helium plasma on the tokamak GOLEM (P4a.108)
▲ Mr Petr Macha (Faculty of Nuclear S...
 Magnetic Confinement F... Thu - Poster Session 1
334. Simulation of multi-modes in ASDEX-Upgrade (P1a.116)
Lack Hao WANG (Japan | National Ins...
Magnetic Confinement F... Mon - Poster Session 1
```

471. Simulation of the Formation and Structuration of a Diamagnetic Cavity in a Magnetosphere Barium Cloud (P1a.403)

```
♣ Benoît Bernecker (Cea LMCE)
Basic, Space and Astrop... Mon - Poster Session 1
341. Simulation of X-ray sources driven by the picosecond PETAL laser pulse interacting with a solid
target (P5b.203)
Dr Xavier Davoine (CEA, DAM)
Beam Plasmas and Inert... Fri - Poster Session 2
346. Slow thermal quench in ITER disruptions (P5a.114)
Lenry Strauss (HRS Fusion)
Magnetic Confinement F... Fri - Poster Session 1
402. SOL modelling of the JT-60SA tokamak initial operational scenario using SOLEDGE3X-EIRENE
code (P1a.117)
🔔 Hugo Bufferand (CEA), Krzysztof Gałązka (Institute of Plasma ... , Mr Yannick Marandet (Aix-Marseille Univer...
Magnetic Confinement F... Mon - Poster Session 1
189. Solitary structures associated with parallel whistler field at magnetopause (P4b.404)
Ms . Jyoti (Department of Appli...
Basic, Space and Astrop... Thu - Poster Session 2
431. Sources of electrons, positrons and gamma-rays from lasers within plasma channels (P4a.202)
▲ Marija Vranic (University of Lisbon ...
Beam Plasmas and Inert... Thu - Poster Session 1
288. Spatially resolved x-ray spectroscopy of high energy density plasmas at the European XFEL
(P5b.201)
Mr Xiayun Pan (Helmholtz-Zentrum ...
Beam Plasmas and Inert... Fri - Poster Session 2
191. Stability analysis of low-n modes for the Divertor Tokamak Test facility Single Null Scenario
(P2a.125)
■ Valeria Fusco (ENEA)
Magnetic Confinement F... Tue - Poster Session 1
161. Start-up runaway generation with neutral and low Z impurity reduced screening effects at the
KSTAR Ohmic plasmas (P4b.108)
▲ Mr Yeongsun Lee (Seoul National Univ...
         Confinement F... Thu - Poster Session 2
470. Step- and pulse excitation methods for the characterization of a dust particle confined in a RF
plasma (P4a.303)
Armin Mengel (Kiel University)
 Low Temperature and D... Thu - Poster Session 1
473. Stochastic simulations of the L-H transition in fusion plasmas (P5b.123)
Patrick Fuller (University of Warwi...
 Aannetic Confinement F... Fri - Poster Session 2
580. Structure and Mechanical Properties of TaN and Ta205 Coatings Prepared by Sputtering Using
Non-Self-Maintained gas discharge (P1a.304)
Anton Taran (V. N. Karazin Kharki...
Low Temperature and D... Mon - Poster Session 1
430. Study of chromatic focusing, post-acceleration and bunching of protonsaccelerated by Target
Normal Sheath Acceleration in helical targets (P2b.209)
Arthur HIRSCH (Commissariat à l'En...
Beam Plasmas and Inert... Tue - Poster Session 2
```

345. Study of cross-beam energy transfer in spherical strong shock polar directdrive experiments at

Beam Plasmas and Inert... Mon - Poster Session 1

the NIF (P1a.206)

♣ Mr Diego Viala (CEA)

```
325. Study of Electrode Biasing in the Edge and SOL regions of a Tokamak (P5b.116)
L Vijay Shankar (Institute for Plasma...
 Aganetic Confinement F... Fri - Poster Session 2
379. Study of GAM-Turbulence intermittency in the FT-2 tokamak using GENE simulations (P2b.120)
♣ Francis Clinton Prasanth Albert Devasagayam (Aalto University, Finl...
 Magnetic Confinement F... Tue - Poster Session 2
524. Study of laser plasma instabilities on their suppression and simulation methods (P1a.209)
Ma Hanghang
Beam Plasmas and Inert... Mon - Poster Session 1
236. Study of radio frequency breakdown in a device with movable electrodes (P2a.301)
Leonardo Zampieri (Università degli Stu...
Low Temperature and D... Tue - Poster Session 1
599. Study of the shattered pellet injection on runaway current dissipation in the J-TEXT tokamak
(P4b.125)
LI (Huazhong Universit...
Magnetic Confinement F... Thu - Poster Session 2
340. Study on impurity suppression using resonant magnetic perturbations and on-axis electron
cyclotron resonance heating in EAST (P4a.116)
Liang he (Institute of Plasma ...
Magnetic Confinement F... Thu - Poster Session 1
403. Studying the onset of turbulence in flowing complex plasmas (P2b.302)
Eshita Joshi
  ow Temperature and D... Tue - Poster Session 2
415. Superradiance from superluminal nonlinear plasma wakefields (P4b.206)
Bernardo Malaca (University of Lisbon ...
Beam Plasmas and Inert... Thu - Poster Session 2
496. Systematic design and demonstration of a MIMO gas injection controller for the N-II emission
front and line averaged electron density in TCV (P4b.122)
⚠ Mr Jesse Koenders (Dutch Institute for F...
Magnetic Confinement F... Thu - Poster Session 2
114. Systematic dissection of the guiding center phase space based on orbital spectrum analysis
(P5a.104)
Ar Yiannis Antonenas (National Technical ...
Magnetic Confinement F... Fri - Poster Session 1
335. Target characteristics used in laser-plasma acceleration of protons based on the TNSA
mechanism (P2b.203)
⚠ Mr Alexandru Magureanu (Extreme Light Infras...
Beam Plasmas and Inert... Tue - Poster Session 2
585. Terahertz radiation emission from laser-induced plasmas inside dielectrics (P4b.210)
Dr Kazem Ardaneh (FEMTO-ST Institute....
Beam Plasmas and Inert... Thu - Poster Session 2
113. The Atomic Beam Probe Synthetic Diagnostic (P2b.105)
Mátyás Aradi (Barcelona Superco...
Magnetic Confinement F... Tue - Poster Session 2
212. The Chaotic Nature of Three-dimensional Magnetic Topology Revealed by Transversely
Intersecting Invariant Manifolds (P5b.110)
■ Wenyin Wei (Institute of Plasma ...
Magnetic Confinement F... Fri - Poster Session 2
```

```
498. The design and performance of an asymmetrical nozzle in Laser Wake Field electron
acceleration (P2b.210)
▲ Mrs Georgia Andrianaki (Institute of Plasma ...
 Beam Plasmas and Inert... Tue - Poster Session 2
365. The first experimental campaign results of plasmas heated by a new 1 MW neutral beam
injector on the COMPASS tokamak (P2b.119)
L Klara Bogar (Institute of Plasma ..
  agnetic Confinement F... Tue - Poster Session 2
136. The first observations of beta-induced Alfvén eigenmodes in edge remnant magnetic island on
J-TEXT (P4b.105)
♣ Jie Yang
Magnetic Confinement F... Thu - Poster Session 2
443. The first results from the x-ray emission measurements at Draco PW laser facility (P5b.205)
Radka Stefanikova
Beam Plasmas and Inert... Fri - Poster Session 2
84. The helically-trapped electron mode in W7-X stellarator (P1b.104)
▲ Javier H. Nicolau (University of Califor...
Magnetic Confinement F... Mon - Poster Session 2
538. The influence of a strong external magnetic field on laser-plasma interaction (P1a.210)
Ondrej Klimo (Czech Technical Uni...
Beam Plasmas and Inert... Mon - Poster Session 1
92. The synergetic effects of three-dimensional magnetic perturbations and finite beta on
collisionless trapped electron mode in tokamak plasmas (P5b.104)
Legisian Weixin Guo (Huazhong Universit...
Magnetic Confinement F... Fri - Poster Session 2
366. The universal instability in optimised stellarators (P1b.120)
♣ Paul Costello (National University ...
Magnetic Confinement F... Mon - Poster Session 2
608. Theoretical and Numerical Study of Stimulated Raman Scattering in a Finite Plasma (P5a.204)
▲ Mr Mao_Syun Wong (department of physi...
    n Plasmas and Inert... Fri - Poster Session 1
390. The properties of supersonic molecular beam injection in H-mode, L-mode and I-mode plasmas
(P4a.119)
ing chen
Magnetic Confinement F... Thu - Poster Session 1
447. Tokamak GOLEM for fusion education - chapter 13 (P1a.123)
♣ Petr Macha (Institute of Plasma ...
Magnetic Confinement F... Mon - Poster Session 1
153. Towards a fully 3D MHD plasma-structures model: Coupling JOREK and CARIDDI (P1a.107)
▲ Nicola Isernia (Università degli Stu...
Magnetic Confinement F... Mon - Poster Session 1
437. Towards multi-machine large-scale integrated modelling validation (P5a.117)
Aaron Ho (FOM institute DIFFE...
Magnetic Confinement F... Fri - Poster Session 1
261. Transport analysis of a DTT negative triangularity scenario (P2b.114)
La Dr Alberto Mariani (Università degli Stu...
Magnetic Confinement F... Tue - Poster Session 2
360. Transport barrier using a vorticity source in 5D gyrokinetic simulations (P5b.118)
```

▲ Mr Guillaume Lo-Cascio (University of Lorrain...

96. Turbulence Generation in High - power Laser - Plasma Interaction Relevant to Astrophysical Scenarios (P1b.201)

▲ Indraj Singh (Indian Institute of T...

Beam Plasmas and Inert... Mon - Poster Session 2

558. Update on development of Laser based hard X-ray sources at ELI Beamlines (P5b.208)

■ Uddhab Chaulagain (ELI Beamlines)

Beam Plasmas and Inert... Fri - Poster Session 2

210. Upgrade of the gas puff imaging system by developing a relay optical system and its application in EAST (P4a.110)

Shaocheng Liu (Institute of Plasma ...

Magnetic Confinement F... Thu - Poster Session 1

165. Upgrades of the Phase Contrast Imaging Diagnostic at Wendelstein 7-X (P1b.109)

▲ Jan-Peter Bähner (Max Planck Institut...

Magnetic Confinement F... Mon - Poster Session 2

453. Using Genetic Algorithms to Optimise Current Drive in STEP (P2b.123)

♣ Dr Stephen Marsden (Culham Centre for F...

Magnetic Confinement F... Tue - Poster Session 2

56. Using wavelet analysis to scale plasma fluctuations in the MHD range of solar wind turbulence seen by Parker Solar Probe (P4a.403)

Lagrangian Xueyi WANG (University of Warwi...

Basic, Space and Astrop... Thu - Poster Session 1

552. Validation of a new turbulence probe for MAST-U (P2a.124)

■ William Fuller (University of Warwi...

Magnetic Confinement F... Tue - Poster Session 1

395. Volatile Organic Compounds deplation by Surface Dielectric Barrier Discharge (P4a.301)

Cecilia Piferi

Low Temperature and D... Thu - Poster Session 1

451. Whistler wave destabilization by a runaway electron beam in COMPASS (P2b.122)

Dr Andrea Casolari (Institute of Plasma ...

Magnetic Confinement F... Tue - Poster Session 2



Powered by Indico v3.2.8

Help | Contact

Measurements and determination of breakdown voltage in DC discharges at low pressure

J. Marjanović¹, <u>D. Marić</u>¹, G. Malović¹ and Z. Lj. Petrović^{2,3}

¹ Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080, Belgrade, Serbia

² Serbian Academy for Sciences and Arts, Knez Mihailova 35, 11001 Belgrade, Serbia

³ School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom

1. Introduction

Non-equilibrium plasmas in gases and vapors are of interest due to multiple application possibilities, from nanotechnology, electronics, biomedicine, energetics to ecology and environmental protection. The development of various new applications is closely related to the knowledge and research of the elementary properties of discharge regarding breakdown, operating regimes, discharge structure, etc. Having breakdown voltage data (Paschen curve) for a wide range of the reduced electric fields E/N (E – electric field, N- gas density) is, in some cases, of great importance if we take into account the fact that the operation of some applications directly depends on the conditions of the breakdown. Also, breakdown measurements are crucial in providing insight into elementary processes such as ionization, secondary electron emission, and surface interactions that participate in discharges.

In our experiment, the breakdown voltage is determined by igniting discharge in a low-current regime and extrapolating the Volt-Ampere characteristic to zero-current [1-3]. While the advantage of this technique is in the elimination of overvoltage in the pre-breakdown, it can have limitations under certain conditions due to oscillations of voltage and current in the Townsend regime of the discharge. In principle, it is possible to suppress oscillations by adjustments of circuit elements, according to the model developed by Phelps, Petrović and coworkers [4,5]. However, with an increase in pressure, the negative slope of the Volt-Ampere characteristics in Townsend discharge also increases, making the discharge less stable. After a certain point, it is no longer possible to stabilize the discharge by varying circuit elements, while keeping the discharge currents sufficiently low.

We have developed a technique of estimation of the DC breakdown voltage from relaxation oscillations in the Townsend regime of discharge [4,5], with the aim of extending the range of breakdown measurements to higher pressures and gaps, i.e. lower E/N-s. In this paper, we illustrate the technique for an example of water vapour discharge at pd = 1.1 Torr cm (p-pressure, d-interelectrode distance).

2. Experimental setup

Figure 1 presents a schematics of the experimental setup and the electrical circuit used in the measurements. The breakdown is achieved between a plane cathode made of copper and a flat quartz window with a deposited thin platinum film that serves as an anode. The diameter (2r) of electrodes is 5.4 cm, while the interelectrode distance is variable. For these measurements, it was 1.1 cm. The plane-parallel electrode system is placed inside a tight quartz tube, to prevent long-path breakdown. Vapor is obtained from bi-distilled deionized water and introduced into the discharge chamber at a slow flow rate. Before measurement, a moderate pressure of water vapor is maintained in a chamber for 1-2 hours in order to achieve saturation of chamber walls [1,2].

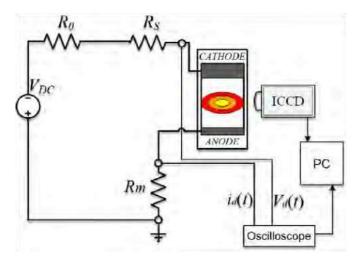


Figure 1. Schematics of the experimental setup and the electrical circuit used in measurements. The series resistors R_0 and R_s are used to limit current and keep it as low as possible for measurements in the Townsend discharge. R_m is the 'monitoring' resistor used to measure discharge current.

3. Results and discussion

During the measurements of breakdown voltage at higher pressures (in a right-hand branch of the Paschen curve), discharge may ignite in the oscillation mode. We will demonstrate that it is possible to determine the breakdown voltage, in the case that discharge ignites in relaxation oscillations. The main feature of such oscillations is that the current briefly passes through the high-current mode and then slowly relaxes to the Townsend low-current mode [4-6]. The breakdown voltage can be estimated from the part of the period corresponding to the lowest current values (fig.2a).

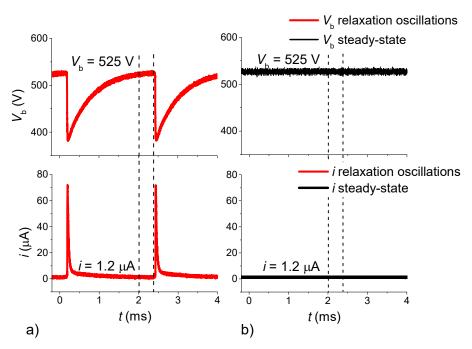


Figure 2. Estimation of breakdown voltage from: a) the relaxation oscillations (red line) and comparison with b) breakdown voltage in the steady-state mode (black line). Presented results are obtained for pd = 1.1 Torr cm, by varying the elements of the electrical circuit.

The reproducibility and reliability of results were tested in conditions under which it was possible to obtain a breakdown, both in the steady-state mode (fig.2b) and in the relaxation oscillations (fig.2a) for similar discharge parameters, by varying the elements of the electrical circuit.

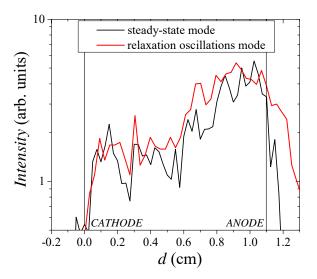


Figure 3. Axial emission profiles obtained by ICCD imaging for breakdown in the steady-state and the relaxation oscillations mode of discharge operation.

Results were also verified by time-resolved ICCD imaging of the discharge emission. These images are used for obtaining axial emission profiles (fig.3). Noise to signal ratio is high because images are taken in a single shot at a very low current, but it is clear that discharge emission in the low current limit of relaxation oscillations corresponds to steady-state conditions. In both cases, the discharge operates in the Townsend regime, with an exponential increase of emission intensity towards the anode. The slope of emission profiles in the log-lin scale is the same, indicating the same ionization coefficient for given conditions.

The presented technique enables breakdown measurements in a considerably wider range of gas pressures and electrode gaps. We have tested and validated the method on a number of gases. Water vapor is chosen as an illustrative example because it has a range of operating conditions where both, steady-state and relaxation-oscillation modes can be easily reached by slight adjustments of elements of electric circuits.

Acknowledgements

This research was supported by the MESTD of Serbia and Science Fund of the Republic of Serbia, Grant No. 7749560, Exploring ultra low global warming potential gases for insulation in high-voltage technology: Experiments and modelling – EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

- [1] Sivoš J., Marić D., Škoro N., Malović G. and Petrović Z. Lj., *Plasma Sources Sci. Technol.* **28** (2019) 055011.
- [2] Sivoš J., Škoro N., Marić D., Malović G. and Petrović Z. Lj., J. Phys. D: Appl. Phys. 48 (2015) 424011.
- [3] Marić D., Savić M., Sivoš J., Škoro N., Radmilović-Radjenović M., Malović G., Petrović Z. Lj., *Eur. Phys. J.* D **68** (2014) 155
- [4] Petrović Z. Lj. and Phelps A. V., Phys. Rev. E 47 (1993) 2806.
- [5] Phelps A V, Petrović Z Lj and Jelenković B M Phys. Rev. E 47 (1993) 2825.
- [6] Marić D., Malović G., and Petrović Z. Lj., Plasma Sources Sci. Technol. 18 (2009) 034009.

24 P5b.101	A flexible linear gyro-fluid eigensolver with Onsager symmetry	Magnetic Confinement Fusion	Gary	Staebler
79 P5b.102	Formulation and numerical benchmarck of improved magneto fluid-dynamics boundary condtions for 3D nonlinear MHD code SPECYL	Magnetic Confinement Fusion	Luca	Spinicci
82 P5b.103	Ballooning stability in negative and positive triangularity spherical tokamak plasmas	Magnetic Confinement Fusion	Robert	Davies
92 P5b.104	The synergetic effects of three-dimensional magnetic perturbations and finite beta on collisionless trapped electron mode in tokamak plasmas	Magnetic Confinement Fusion	Weixin	Guo
115 P5b.105	Energetic decomposition of modes in resistive plasmas	Magnetic Confinement Fusion	Jonas	Puchmayr
151 P5b.106	Energetic particle nonlinear equilibria and transport processes in burning plasmas	Magnetic Confinement Fusion	Matteo Valerio	Falessi
175 P5b.107	Kinetic Structure of Low Frequency Continuous Spectrum in General Tokamak Geometry	Magnetic Confinement Fusion	Yueyan	Li
181 P5b.108	Nonlinear evolutions of energetic particle modes in tokamak plasmas with reversed magnetic shear configuration	Magnetic Confinement Fusion	man	li
199 P5b.109	Can a monotonic electrostatic potential exist in the Debye sheath at very shallow magnetic field angles?	Magnetic Confinement Fusion	Alessandro	Geraldini
212 P5b.110	The Chaotic Nature of Three-dimensional Magnetic Topology Revealed by Transversely Intersecting Invariant Manifolds	Magnetic Confinement Fusion	Wenyin	Wei
257 P5b.111	Kinetic effects in tokamak scrape-off layer plasmas - nonlocal parallel transport and plasma-atomic reactions	Magnetic Confinement Fusion	Dominic	Power
270 P5b.112	A new turbulent transition in a toroidal plasma	Magnetic Confinement Fusion	Wesley	Agoua
292 P5b.114	Energy confinement time in a magnetically confined thermonuclear fusion reactor	Magnetic Confinement Fusion	CHIPING	CHEN
302 P5b.115	Plasma flow in tokamaks: unraveling the competition and synergy between turbulence and 3D magnetic perturbations	Magnetic Confinement Fusion	Robin	Varennes
325 P5b.116	Study of Electrode Biasing in the Edge and SOL regions of a Tokamak	Magnetic Confinement Fusion	Vijay	Shankar
359 P5b.117	Interaction of Alfvénic modes and turbulence via the nonlinear modification of the equilibrium profiles	Magnetic Confinement Fusion	Alessandro	Biancalani
360 P5b.118	Transport barrier using a vorticity source in 5D gyrokinetic simulations	Magnetic Confinement Fusion	Guillaume	Lo-Cascio
374 P5b.119	An active learning pipeline for surrogate models of gyrokinetic turbulence.	Magnetic Confinement Fusion	Lorenzo	Zanisi
446 P5b.121	Growth of electron hole in 1D Vlasov plasma and 4D gyro and bounce averaged kinetic Vlasov simulation	Magnetic Confinement Fusion	Debraj	Mandal
452 P5b.122	Resonance broadening in quasilinear theory: towards Kubo > 1	Magnetic Confinement Fusion	Alejandro	Guillevic
473 P5b.123	Stochastic simulations of the L-H transition in fusion plasmas	Magnetic Confinement Fusion	Patrick	Fuller
478 P5b.124	Causality analysis of turbulent structures in the stellarator TJ-K.	Magnetic Confinement Fusion	Nicolas	Dumérat
521 P5b.125	Confinement of fast ions and FLR effects in presence of magnetic islands	Magnetic Confinement Fusion	Julio	Martinell
547 P5b.126	Recent enhancements of ICRF modelling code PION	Magnetic Confinement Fusion	Mervi	Mantsinen
584 P5b.127	Particle Transport Barriers Dependence on the Magnetic Configuration	Magnetic Confinement Fusion	Gabriel Cardoso	Grime
594 P5b.128	Onset of shearless transport barriers in a magnetically confined plasma	Magnetic Confinement Fusion	Leonardo Antonio	Osorio Quiroga
288 P5b.201	Spatially resolved x-ray spectroscopy of high energy density plasmas at the European XFEL	Beam Plasmas and Inertial Fusion	Xiayun	Pan
323 P5b.202	Basic Commissioning of the Laser-Plasma Ion accelerator at the ELIMAIA user beamline	Beam Plasmas and Inertial Fusion	Lorenzo	Giuffrida
341 P5b.203	Simulation of X-ray sources driven by the picosecond PETAL laser pulse interacting with a solid target	Beam Plasmas and Inertial Fusion	Xavier	Davoine
382 P5b.204	EMP measurements from MF to UHF at VEGA	Beam Plasmas and Inertial Fusion	Micha	Ehret
443 P5b.205	The first results from the x-ray emission measurements at Draco PW laser facility	Beam Plasmas and Inertial Fusion	Radka	Stefanikova
468 P5b.206	Results on the commissioning of the 1 PW experimental area at ELI-NP	Beam Plasmas and Inertial Fusion	Mihail	Cernaianu
535 P5b.207	Electromagnetic emissions at LMJ-PETAL facility: understanding, mitigation and measurement	Beam Plasmas and Inertial Fusion	Stephane	Coudert
558 P5b.208	Update on development of Laser based hard X-ray sources at ELI Beamlines	Beam Plasmas and Inertial Fusion	Uddhab	Chaulagain
519 P5b.301	Effect of surface porosity on plasma assisted catalysis for ammonia synthesis	Low Temperature and Dusty Plasmas	Surabhi	Jaiswal
362 P5b.302	Gliding arc discharge for CO2 conversion: An experimental study of different discharge configurations	Low Temperature and Dusty Plasmas	Vladislav	Ivanov
409 P5b.303	Measurements and determination of breakdown voltage in DC discharges at low pressure	Low Temperature and Dusty Plasmas	Dragana	Maric
616 P5b.304	Higher Order Solutions for Dust Ion Acoustic Solitons in Complex Plasmas with Relativistic Ions and Cairn's Distributed Electrons	Low Temperature and Dusty Plasmas	Samiran	Das
81 P5b.401	A Two-photon Absorption Laser Induced Fluorescence diagnostic for atomic H in a helicon plasma device	Basic, Space and Astrophysical Plasmas	Lyes	Kadi
375 P5b.403	Positron acceleration in a plasma channel with multi-Petawatt-class lasers	Basic, Space and Astrophysical Plasmas	Bertrand	Martinez
493 P5b.404	Preliminary space and time resolved characterization of X-ray emission from an ECR magneto-plasma in the PANDORA project frame	Basic, Space and Astrophysical Plasmas	Giorgio	Finocchiaro
555 P5b.405	Evolution of plasma conditions within capillary discharges, with application to plasma accelerators	Basic, Space and Astrophysical Plasmas	Gregory	Boyle

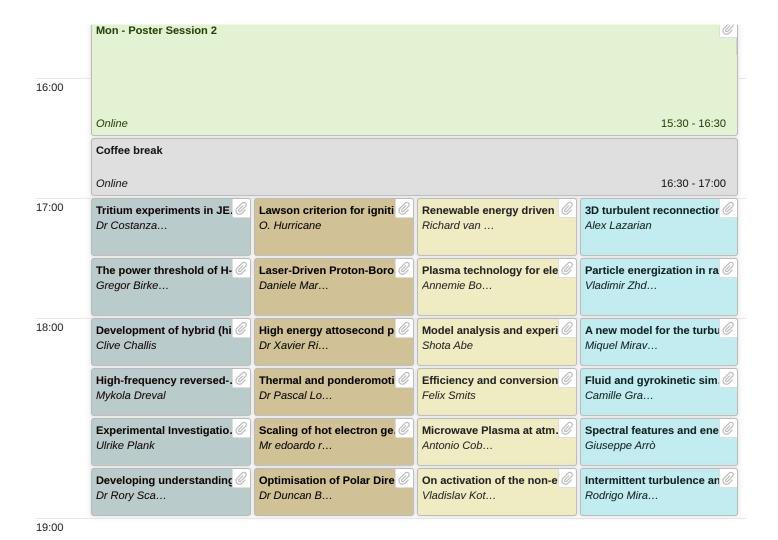
Pesenter first name Presenter last name

Topic

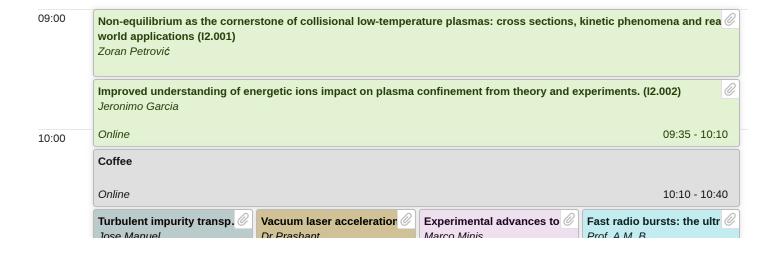
ID Posternumber Title

Mon 27/06

09:00	Conference Opening Ceremony	Richard Dendy
	Online	09:00 - 09:30
	Interactions of Waves and Turbulent Eddies: "Truth and Consequences" for transport and dissipation Prof. Annick Pouquet	n (I1.001)
10:00	Online	09:30 - 10:15
	Fascinating physics at the edge of magnetic fusion devices (I1.002) Serg	nei Krasheninnikov 🕜
	Online	10:15 - 11:00
11:00	Turbulent transport in magnetised plasmas (I1.003)	Xavier Garbet
	Online	11:00 - 11:45
	Lunch break	
13:00	Online	11:45 - 13:20
	Deuterium-tritium experiments in JET with the ITER-like wall (I1.004)	Joelle Mailloux
	Online	13:20 - 13:55
14:00	The Design of "Hybrid-E," the first igniting (by lawson criterion) indirect-drive inertial fusion target (I Andrea Kritcher	1.005)
	Online	13:55 - 14:30
	Mon - Poster Session 1	@
15:00		
	Online	14:30 - 15:30



Tue 28/06



	ooc marao	Di i rashan		
11:00	Radial electric fields, turbulence and transport studies in W7-X and TJ-II Ultra-bright laser-driven sources of MeV particles and radiation using low		Overview of SPIDER NBI Osource for ITER (I2.J302) Gianluigi	Kinetic model of Neutron Or Thomas
	(I2.102) Teresa Estrada	density foam (I2.202) Olga Rosmej	202) Serianni Online 11:10 - 11:40	Generating inverted Land <i>Mr Pablo Jai</i>
	Isotope effects on transpo	Hosing of a long proton b. Tatiana Nec	Spectroscopic observatio	General relativistic particl @ Rui Torres
2:00	Impurity flow measureme. Valeria Perseo	Experimental and numeric Paul Gibbon	Ultra-Fast Langmuir Probe	Prompt Emission Of High Prof. Bin Qiao
	Enhanced confinement aft Kieran McCa	Hybrid plasma accelerator Max Gilljohann	Radio frequency wall con. Dr Yurii Kovtun	Reconnection in black ho magnetospheres (I2.402) Bart Ripperda
	Transition from no-ELM re O	Plasma wedge diffraction Samuel Marini	Sensitivity of scrape-off la Mike Kryjak	Online 12:10 - 12:40
	Lunch / Break			
3:00				
4:00				
4:00	Online			12:40 - 14:30
.4:00	Online Tue - Poster Session 1			12:40 - 14:30
				12:40 - 14:30
	Tue - Poster Session 1			0
				12:40 - 14:30 (a) 14:30 - 15:30
	Tue - Poster Session 1 Online			<i>©</i>
L5:00	Tue - Poster Session 1 Online			0
.5:00	Tue - Poster Session 1 Online			<i>©</i>
.5:00	Tue - Poster Session 1 Online Tue - Poster Session 2			14:30 - 15:30
.5:00	Tue - Poster Session 1 Online Tue - Poster Session 2 Online			14:30 - 15:30
L4:00 L5:00	Tue - Poster Session 1 Online Tue - Poster Session 2 Online Coffee	The pursuit of net energy, Ryan Sweeney	Monoenergetic High-ener.	14:30 - 15:30 15:30 - 16:30
L5:00 L6:00	Tue - Poster Session 1 Online Tue - Poster Session 2 Online Coffee Online Particle balance and exha			14:30 - 15:30 15:30 - 16:30 16:30 - 17:00 Wave propagation in rotat

TO:00

A seit-consistent cross-tie @ Guido Ciraolo	The Physics of the Preferr Hendrik Meyer	Chloe Ho	Investigation of supratner Jean Cazab
Physics Exploitation of th. Marco Cave	Predict-first scenario moc Ms Irene Ca	Advanced time-of-flight di Martina Salv	Injecting positrons into a. Markus Singer

Wed 29/06

09:00	The journey to demonstrate th	ne first iodine electric propulsio	on system in space (I3.001)	Dr Dmytro Rafalskyi et al.	
	Online			09:00 - 09:35	
	NON-LINEAR COSMIC RAY INDUCED PLASMA PHENOMENA IN ACCELERATORS, AROUND SOURCES AND AROUND GALAXIES (I3.002) Pasquale Blasi				
10:00	Coffee				
	Online 10:10 - 10:40				
44.00	Experiments and 3D simul Nina Schwarz	Inter-machine comparison O Dorothea Gr	MITIGATION OF MAGNET. @ Farhat Beg	Cold atmospheric pressul @ Augusto Sta	
11:00	Controlled avoidance of d	Boundaries of high densit @ Thomas Eich	3D Simulations Capture th Or Arnaud C	Plasma jets stabilize wate Prof. Wonho	
12:00	Impact of externally applie O Joaquin Gal	First full-size turbulence s Davide Galassi	Spectroscopic and x-ray d @ Marta Fajardo	High-order moment mode Alejandro Al	
	Validation of 3D MHD sim. Daniele Bonf	Modelling of high field sid @ Sven Korving	Strong Laser-Driven Magn @ Joao Jorge	Lithostatic Pressure Effec @ Mr Mohame	
	Interpretative 3D MHD mo. O	SOLPS-ITER simulations . Ou Pan	Hydrodynamic Instability . @ Dr Shinsuke	Measurements and kineti. Jorge Gonza	
	Runaway dynamics in disi	First MAST-U detachment @ Kevin Verha	Spectroscopic characteriz @ Ricardo Florido	Quantum dot photolumin. @ Mr Mohamm	
13:00	Theory of vertical displace	Interpretative modelling of @ David Moulton	Relaxation of non-thermal @ Gareth Willia	Towards the anticorrosio. Mr Andrés M	
	Lunch / Break				
14:00					

Online 13:10 - 14:30 The dual role of the plasma boundary in tokamaks (13.003) Elisabeth Wolfrum Online 14:30 - 15:05 15:00 Prof. Tünde Fülöp Modelling of electron runaway in cooling fusion plasmas (I3.004) Online 15:05 - 15:40 Role of Energetic Ions in the ITER Research Plan (I3.005) Simon Pinches 16:00 Online 15:40 - 16:15 Coffee Online 16:15 - 16:45 Connecting the Dots: Understanding the Nature of Plasma and Liquid Interactions (I3.006) David Go 17:00 Online 16:45 - 17:20 Probing the plasma near supermassive black holes with the Event Horizon Telescope (I3.007) George Wong Online 17:20 - 17:55

Thu 30/06

09:00	Probing extreme physics with plasma accelerators (I4.001) Stuart Mangles			Stuart Mangles	
	Online			09:00 - 09:35	
	Strongly coupled complex pla Hubertus Thomas	smas under microgravity condi	tions on the International Space	e Station (I4.002)	
10:00	Online			09:35 - 10:10	
	Coffee				
	Online			10:10 - 10:40	
	Magnetic Control of the T. Pederico Felici	Pedestal particle balance @ Laszlo Horvath	On the coupling of vibrati.	Solar and stellar flares - r. Lucia Kleint	
11:00					
	Integrated modeling of H Teobaldo Lu	A quasi-continuous exhau @ Georg Harrer	Insight into into contractic Paola Diome	Revealing the Lagrangian Suzana de S	
	Examining Transport and O Joseph McCl	Extended gyrokinetic theo Alexandra D	Particle charging by EUV . @ Mark van de	Turbulence induced by m. Prancesco P	

12:00	Reduced transport model. @ Marco Muraca	Small-ELM-regime access @ guosheng xu	Drift-Diffusion modelling c @ Giacomo Pie	Online 11:40 - 12:10		
	Increased core ion temper @ Mr Maximilia	Impact of pellets on SOL a Christian Per	Dust charge distribution i. @ Prof. Igor De	MHD avalanches in magn. Dr Jack Reid		
	Current ramp-up modellin O Dr Frida Erik	Pedestal structure and sta Lorenzo Fra	Fast camera imaging of vi ODr Simon Vi	On the formation of multi- Veronika Jer		
	Lunch / Break					
L3:00						
.4:00						
	Online			12:40 - 14:30		
	Thu - Poster Session 1			0		
L5:00						
.5.00						
	Online Thu - Poster Session 2			14:30 - 15:30		
L6:00						
	Online			15:30 - 16:30		
	Coffee			16:30 - 17:00		
17:00	Gyrokinetic simulation of @ Guillaume Br	The increase in L-H power @ Matthias Will	Electron acceleration at supernova remnants (I4.401) Artem Bohdan	Creating observable QED @ Kenan Qu		
	Measurement and Simulat	High performance Ne-see.	Studying plasma heating . Or Marco Mi	Laser-plasma acceleratio.		
				Cedric Thaury		
L8:00	Experimental observation.	Core radiative collapse in Valeria Ostuni	Radiatively cooled shocks O Danny Russell	Carrier-envelope phase c. @ Lucas Rovige		
.8:00			-	Carrier-envelope phase c.		
.8:00	Juan F River Energetic particle modes i	Valeria Ostuni Understanding tungsten a	Danny Russell Experimental and numeric	Carrier-envelope phase c. Lucas Rovige Acceleration of positrons		

Fri 01/07

09:00	Measuring the H-He properties under Jupiter interior conditions: challenge, approach, data and implications (I5.001) Dr Stephanie Brygoo					
	Online 09:00 - 09:35					
	Learning Exchange-Correlation	Learning Exchange-Correlation Functionals from Nature (I5.002) Sam Vinko				
10:00	Online			09:35 - 10:10		
	Coffee					
	Online			10:10 - 10:40		
11.00	Characterization of Turbul @ Dr Shinsuke	Automated Laser Plasma . Matthew Str	Dr Christina	Laboratory evidence for p Weipeng YAO		
11:00	Recognizing the hallmark.	Automated control and op OCharlotte Pal	Influence of discharge par Lenaic Coue	Characterization of quasi- Vicente Vale		
	From L-mode to the L-H tr @ Nicola Bona	Deep Learning for the mo. OCCORD	Two-dimensional complex O Volodymyr N	Characterization of low-d. Pablo Perez		
12:00	Influence of safety factor . @ laure vermare	Plasma-photonic respons @ Alexander K	Experimental formation of Truell Hyde	Local characteristics of s. Yuliia Volkova		
	Saturation Physics in Neg M.J. Pueschel	On the nature of electrom. On the nature of electrom.	Plasma processing of nan Prof. Rugger	Particle-in-cell simulation @ Filipe Cruz		
	Zonally dominated dynam O Dr Plamen Iv	Looking into solid-density @ Andréas Sun	Artificial voids in nanodus Franko Greiner	Collisional effects on ultr. Jérémy Faure		
	Lunch / Break					
13:00						
14:00						

Online	12:40 - 14:30
Fri - Poster Session 1	D.
Online	14:30 - 15:30
Fri - Poster Session 2	0
Online	15:30 - 16:30
Coffee	
Online	16:30 - 17:00
Linear plasma devices as tools to study plasma surface interactions and divertor physics (I5.003)	Thomas Morgan
Online	17:00 - 17:35
Progress in Direct Drive Inertial Confinement Fusion: Conventional and Shock Ignition (I5.004)	R. Betti
Online	17:35 - 18:10
Closing Session	
Online	18:10 - 19:00
	Fri - Poster Session 1 Online Fri - Poster Session 2 Online Coffee Online Linear plasma devices as tools to study plasma surface interactions and divertor physics (I5.003) Online Progress in Direct Drive Inertial Confinement Fusion: Conventional and Shock Ignition (I5.004) Online Closing Session



31st Summer School and International Symposium on the Physics of Ionized Gases

Belgrade, Serbia, September 5 - 9, 2022

CONTRIBUTED PAPERS

ABSTRACTS of INVITED LECTURES,
TOPICAL INVITED LECTURES and PROGRESS REPORTS

Editors:
Dragana Ilić, Vladimir Srećković,
Bratislav Obradović and Jovan Cvetić



БЕОГРАД 2022

PUBL. ASTRON. OBS. BELGRADE No. 102, 1 - 302 BELGRADE, AUGUST 2022

31st Summer School and International Symposium on the Physics of Ionized Gases



September 5 – 9, 2022, Belgrade, Serbia

S P I G 2022

CONTRIBUTED PAPERS

&

ABSTRACTS OF INVITED LECTURES, TOPICAL INVITED LECTURES AND PROGRESS REPORTS

Editors

Dragana Ilić, Vladimir Srećković, Bratislav Obradović and Jovan Cvetić

University of Belgrade – School of Electrical Engineering University of Belgrade – Faculty of Physics Serbian Academy of Sciences and Arts

Belgrade, 2022

PUBLICATIONS OF THE ASTRONOMICAL OBSERVATORY OF BELGRADE FOUNDED IN 1947

EDITORIAL BOARD:

Dr. Srdjan SAMUROVIĆ, Editor-in-Chief (Astronomical Observatory, Belgrade)

Dr. Rade PAVLOVIĆ (Astronomical Observatory, Belgrade)

Dr. Miroslav MIĆIĆ (Astronomical Observatory, Belgrade)

Dr. Branislav VUKOTIĆ (Astronomical Observatory, Belgrade)

All papers in this Publication are peer reviewed.

Published and copyright © by Astronomical Observatory, Volgina 7, 11060 Belgrade 38, Serbia

Director of the Astronomical Observatory: Dr. Gojko Djurašević

Typesetting: Tatjana Milovanov

Internet address http://www.aob.rs

ISSN 0373-3742

ISBN 978-86-82296-02-7

Number of copies / tiraž : 200

Production: Skripta Internacional, Mike Alasa 54, Beograd

СІР - Каталогизација у публикацији - Народна библиотека Србије, Београд

537.56(082)

539.186.2(082)

539.121.7(082)

533.9(082)

SUMMER School and International Symposium on the Physics of Ionized Gases (31; 2022; Belgrade)

Contributed papers & abstracts of invited lectures, topical invited lectures and progress reports / 31st Summer School and International Symposium on the Physics of Ionized Gases - SPIG 2022, September 5-9, 2022, Belgrade, Serbia; editors Dragana Ilić ... [et al.]. - Belgrade: Astronomical Observatory, 2022 (Beograd: Skripta Internacional). - 302 str.: ilustr.; 24 cm. - (Publications of the Astronomical Observatory of Belgrade, ISSN 0373-3742)

Na nasl. str.: University of Belgrade, School of Electrical Engineering; University of Belgrade, Faculty of Physics; Serbian Academy of Sciences and Arts. - Tiraž 200. - Str. 17-18: Preface / editors Dragana Ilić ... [et al.]. - Bibliografija uz svaki rad. - Registar.

ISBN 978-86-82296-02-7

- 1. Ilić, Dragana, 1978- [уредник] [аутор додатног текста]
- а) Јонизовани гасови Зборници б) Атоми Интеракција Зборници в) Плазма Зборници

COBISS.SR-ID 72751881

SPIG 2022

SCIENTIFIC COMMITTEE

D. Ilić (Co-chair), Serbia

V. Srećković (Co-chair), Serbia

A. Antoniou, Greece

D. Borka, Serbia

J. Burgdörfer, Austria

J. Cvetić, Serbia

V. Guerra, Portugal

M. Ivković, Serbia

K. Kutasi, Hungary

I. Mančev, Serbia

D. Marić, Serbia

N. J. Mason, UK A. Milosavljević, France

V. Milosavljević, Serbia

K. Mima, Japan

Z. Mišković, Canada

L. Nahon, France

B. Obradović, Serbia

G. Poparić, Serbia

P. Roncin, France

I. Savić, Serbia

Y. Serruys, France

N. Simonović, Serbia

M. Škorić, Japan

M. Trtica, Serbia

S. Tošić, Serbia

R. White, Australia

ADVISORY COMMITTEE

D. Belić

N. Bibić

M. S. Dimitrijević

S. Đurović

N. Konjević

M. M. Kuraica

J. Labat

G. Malović

B. P. Marinković

Z. Mijatović

M. Milosavljević

Z. Lj. Petrović

L. Č. Popović

J. Purić

B. Stanić

ORGANIZING COMMITTEE

J. Cvetić (Co-chair)

B. Obradović (Co-chair)

M. Ignjatović (Co-secretary)

L. Gavanski (Co-secretary)

N. Konjević

N. Cvetanović

T. Gajo

I. Krstić

N. Sakan

BREAKDOWN IN SATURATED WATER VAPOR

JELENA MARJANOVIĆ¹, DRAGANA MARIĆ¹, GORDANA MALOVIĆ¹ and ZORAN LJ. PETROVIĆ^{2,3}

¹Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

²Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia

³School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom

E-mail sivosj@ipb.ac.rs

Abstract. This paper presents the results of breakdown measurements in water vapour at pressures around and higher than vapour pressure for water. Breakdown voltage dependences on pd (p – pressure and d – electrode gap) or Paschen curves are recorded for two electrode gaps: 0.5 mm and 1 mm. Measurements were performed at room temperature of 22°C (vapour pressure 19.8 Torr) and under conditions when the entire discharge chamber was cooled to the temperature of 8°C (vapour pressure 8.1 Torr), in order to reach conditions where droplet formation takes place at stable discharge conditions. Paschen curves indicate that at room temperature breakdown voltages obtained at 0.5 and 1 mm agree well with the values at the centimetre electrode distances, while at the temperature of 8°C, for pressures higher than vapour pressure, deviations occur. These deviations can be consequences of liquid droplet formation.

1. INTRODUCTION

Discharges in water and water vapour have a diverse field of application, in food, textile, and aerospace industries, for sterilization and decontamination of different surfaces and instruments in medicine, for the processing, treatment, and functionalization of materials, in biomedicine, etc. (see Stalder et al., 2006; Fumagalli et al., 2012; Rossi et al., 2009). Due to the variety of possible applications, there is a growing need to develop and design different plasma sources that can operate at atmospheric and low pressure, in vapour and in the liquid itself. A common feature of all the above-mentioned applications is the complex working environment – from a mixture of gas and vapour to an environment saturated with water vapour or humid air. In this respect, it is crucial to investigate and understand the breakdown in liquid and at the gas-liquid boundary.

Our previous studies of DC breakdown and discharges in water vapour included measurements of Paschen curves, axial emission profiles, emission spectra and Volt-Ampere characteristics at low pressures (Sivoš et al. 2015). This paper presents an investigation of the breakdown at pressures above the vapour pressure, under the conditions where condensation i.e. liquid droplets formation is expected in the discharge.

2. EXPERIMENTAL SET-UP

The schematic of the experimental setup is shown in Fig.1a) and the discharge chamber in Fig.1b). The discharge is ignited between plane-parallel electrodes that are tightly fitted inside the cylindrical teflon housing that prevents the breakdown around and behind the electrodes, ensures the parallelity of the electrodes, and fixes the electrode system itself. The electrodes are of circular cross-section, separated from each other by a ring-shaped dielectric, which also limits the volume for discharge ignition and operation. The interelectrode distance is adjustable and can be continuously changed.

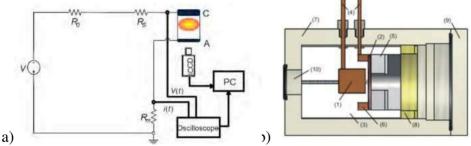


Figure 1: a) Schematic of the experimental setup and the electrical circuit used in measurements, and b) Cross-section of the chamber for micro-discharges with marked structural parts: (1)–stainless still cathode; (2)– transparent anode with ITO film; (3)–teflon electrodes housing; (4)–high-voltage inlets; (5)–anode mounting ring; (6)–metal contact ring; (7)–plexiglass outer cylinder; (8)–electrodes housing mounting ring; (9)–transparent chamber cover, and (10)–inlet for connection to the vacuum system.

The cathode is made of stainless steel and the anode is made of glass covered by a thin, conductive, and transparent indium-oxide film (Indium Thin Oxide coated glass). The effective diameter of the electrodes exposed to discharge is 2 mm. The electrode system with its housing is fitted inside a plexiglass cylinder, which one side is closed with a transparent lid. This design enables the ICCD recording of radial emission profiles from discharge.

Vapor is obtained from bi-distilled, deionized water in a test tube. The tube is connected to the discharge chamber by a pressure regulating valve. The other side of the discharge chamber is connected to a vacuum pump and a pressure gauge. The chamber is evacuated to low pressure ($<10^{-6}$ Torr), then water vapor is introduced into the system at a slow flow rate while monitoring that the pressure stays below the vapor pressure for water (19.8 Torr at $T=22^{\circ}$ C, and 8.1 Torr at

 $T=8^{\circ}$ C in the case of a cooled chamber). Before measurements, the vapor is left in the system for 1-2 hours to achieve saturation of all surfaces in the chamber.

3. RESULTS AND DISCUSSION

Measurement of breakdown voltages is performed for two electrode gaps 0.5 and 1 mm and compared with Paschen curves obtained for the standard size discharge - 0.5 and 1.1 cm (Fig.2). Paschen curves for micro-discharge are measured at two temperatures 22°C (vapor pressure is 19.8 Torr) and 8°C (vapor pressure is 8.1 Torr). In the second case, the entire chamber was cooled to enable measurements at higher pressures than the vapor pressure. Decreasing discharge size and decreasing operating temperatures enabled us measurements at more stable operating conditions, close to a Paschen curve minimum, but above a vapour pressure for water. At room temperature (22°C), there is good agreement between the Paschen curves recorded in standard size discharge (black and red lines) and micro-discharge (black and red diamonds).

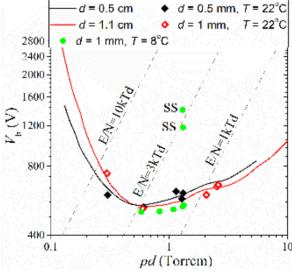


Figure 2: Comparison of the Paschen curves obtained in the chamber for standard size discharge for electrode distances of 0.5 cm (black line) and 1.1 cm (red line) and in the chamber for micro-discharges for electrode distances of 0.5 mm (black diamonds) and 1 mm (red diamonds). These measurements are done at room temperature of 22°C. Green diamonds show breakdown voltages obtained for electrode distance of 1 mm at a temperature of 8°C.

At micrometre interelectrode distances, the discharge was unstable, but it was possible to estimate the breakdown voltages from the relaxation oscillations (see Kuschel et al., 2011). In the case when the chamber was cooled (at 8°C) discharge ignited and operated in the relaxation oscillations mode up to ~1.1 Torr cm. At 1.29 and 1.33 Torr cm, discharge first operated in the steady-state mode (green diamonds marked with SS), and after approximately one minute of stable

operation, it switched to the relaxation oscillations mode. Figure 3 shows the waveforms for current and voltage at pd = 1.29 Torr cm. In Fig.3a discharge operates in steady-state mode at a high voltage of ~1.4 kV while the current is 1 μ A, and in Fig.3b discharge is in the oscillatory mode, where the voltage is lower for ~860 V, and the current higher for 18 μ A.

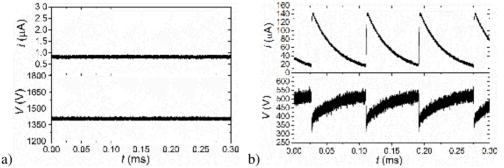


Figure 3: Voltage and current waveforms for micro-discharge in water vapor at pd = 1.29 Torr cm and d = 1 mm: a) when discharge operates in the stationary mode (i =0.8 μ A, Vb = 1405 V), and b) when discharge operates in the relaxation oscillations mode (i = 19 μ A, V_b = 541 V).

We assume that this behaviour is a consequence of the phase transition in the gas, and the occurrences of condensation or liquid droplets. As the chamber had to be cooled, we could not record the discharge through the transparent anode with an ICCD camera. Therefore, it could not be confirmed whether the discharge was in the Townsend mode upon breakdown. Our further investigation will include recordings of radial emission profiles of discharge, and measurements at shorter electrode gaps, in conditions when the chamber is cooled to lower the limit for the phase transition in water vapor. It must be noted that the ratio of electrode diameter and interelectrode distance should be taken into account, and maintained when reducing the electrode gap. That will limit the radial losses of charged particles to an acceptable level, and allow the application and validity of the one-dimensional Townsend theory.

Acknowledgements

The authors acknowledge support from the MESTD of Serbia.

References

Fumagalli, F., Kylián, O., Amato, L., Hanuš, J., and Rossi, F.:2012, *J. Phys. D: Appl. Phys.* 45, 135203.

Kuschel, T., Stefanović, I., Škoro, N., Marić, D., Malović, G., Winter, J. and Petrović, Z., Lj.: 2011, *IEEE Transactions on Plasma Science* 39, 2692.

Rossi, F., Kylián, O., Rauscher, H., Hasiwa, M., and Gilliland, D.:2009, *New Journal of Physics* 11, 115017.

Sivoš, J., Škoro, N., Marić, D., Malović, G.and Petrović Z. Lj.: 2015, J. Phys. D: Appl. Phys. 48, 424011.

Stalder, K., R., Nersisyan, G., and Graham, W., G.: 2006, J. Phys. D: Appl. Phys. 39, 3457.

SPIG 2022 PROGRAMME

Belgrade, Serbia, September 05 – 09, 2022

	nes are given in the Central European Summer Time (CEST) zone.			
	Monday 5 th September 2022			
	SPIG 2022 (day 1)			
	XiBiGP Workshop			
09:00-09:30	Registration			
09:30-09:40	Hall B: Opening and Introduction Aleksandar Milosavljević and Christophe Nicolas (SOLEIL)			
09:40-10:00	European Synchrotron and FEL User Organisation: Current Challenges and Prospects (COST Actions) Bratislav Marinković, Institute of Physics Belgrade, Serbia [Regular]			
	Session 1, Hall B, Chair: Aleksandar Milosavljević			
10:00-10:20	Ultrafast dynamics of photo-excited molecules at FERMI Free Electron Laser Michele di Fraia, Elettra-Sincrotrone Trieste, Italy [Virtual]			
10:20-10:40	UV-induced processes in DNA Lara Martínez-Fernandez, Universidad Autónoma de Madrid, Spain [Virtual]			
10:40-11:00	The 'LEGO bricks' of life: a gas-phase study of dipeptides Laura Carlini, CNR-ISM, Italy [Virtual]			
11:00-11:20	Photofragmentation of the radiation therapy enhancers: can we make better ones? Marta Berholts, Tartu University, Estonia [Virtual]			
11:20-12:00	Coffee break			
	Session 2, Hall B, Chair: Sergio Diaz-Tendero			
12:00-12:30	Plasmon-induced chemical reactions on noble metal nanoparticles studied by synchrotron XPS and surface-enhanced Raman scattering Ilko Bald, University of Potsdam, Germany [Virtual]			
12:30-12:50	Valence band structure of isolated biomolecule-functionalized gold nanoparticles Jelena Pajović, Faculty of Physics, University of Belgrade, Serbia [Regular]			
12:50-13:10	Determination of the Adenine-Thymine binding energy Sebastian Hartweg, Synchrotron SOLEIL, France [Virtual]			
13:10-13:30	In the search of peptide prebiotic building blocks: Studying the fragmentation of photoionized Diketopiperazines Darío Barreiro-Lage, Universidad Autónoma de Madrid, Spain [Regular]			
13:30-15:30	Lunch break			
	Session 3, Hall B, Chair: Lucas Schwob			
15:30-16:00	VUV and soft X-ray interactions with trapped biomolecular ions Thomas Schlathölter, University of Groningen, Netherlands [TBC]			
16:00-16:20	Covalent bond formation within clusters: a pathway for the synthesis of complex molecules in the interstellar medium Yoni Toker, Bar Ilan University, Israel [Regular]			
16:20-16:40	To be announced Kaja Schubert, DESY, Germany [Virtual]			
16:40-17:00	X-ray absorption spectroscopy and mass spectrometry of protonated ATP molecule Aleksandar Milosavljevic, Synchrotron SOLEIL, France [Regular]			
17:00-17:30	Coffee break			
	Session 4, Hall B, Chair: Christophe Nicolas			
17:30-18:00	An overview on the recent liquid-jet PES developments Bernd Winter, Fritz Haber Institute of the Max Planck Society, Germany [Virtual]			

18:00-18:20	Surface propensity of small organic biomolecules in vapour-water interface by XPS Alexandra Mocellin, Institute of Physics, Brasil [Virtual]		
18:20-18:40	Electronic structure and solvation effects from core and valence photoelectron spectroscopy of serum albumin Jean Philippe Renault, University Paris Saclay, France [Virtual]		
18:40-19:00	First (e,e) coincidence measurements at PLEIADES beamline on solvated benzoate in water using a new magnetic bottle time-of-flight spectrometer Jerome Palaudoux, Sorbonne Université, France [Virtual]		
19:30-22:00	Welcome cocktail (Gallery of Science and Technology, SASA)		

	th Contamban 2022			
_	th September 2022			
SPIG 2022 (day 2)				
PL – Plenary	lenary lecture: 35+10 min TL – Topical lecture: 25+5 min PR – Progress Report: 15+5 min			
08:45-09:00	Opening, Chairs: V. Srećković, D. Ilić, B. Obradović, J. Cvetić			
	Plenary Session 1, Hall A, Chair: V. Srećk			
09:00-09:45	Sven Thorwirth (Germany), Action-spectroscopic studies of transient carbon-rich			
	molecular ions [Regular]			
00.45.10.20				
09:45-10:30	Sergio Diaz-Tendero (Spain), Ultrafast dynamics of ionized molecules and molecular			
10.20 11.00	clusters in the gas phase [Regular] Break & Chat Room			
10:30-11:00		7 • /		
11.00.11.45	Plenary Session 2, Hall A, Chair: B. Obro			
11:00-11:45	Ryo Ono (Japan), Measurement and simul	lation of atmospheric-pressure streamer		
11 45 14 20	discharge [Virtual] Break			
11:45-14:30	Hall A - Parallel Session:	Hall B - Parallel Session		
	Chair: N. Simonović	Chair: D. Borka		
	Chair: N. Simonovic	Chair: D. Borka		
14:30-15:00	Stojan Madzunkov (USA), Utillization	Jiri Limpouch (Czech Republic), High-power		
	of Electric Dipole Fields in protection	laser interactions with low density porous		
	from GCR and SEPs [Regular]	materials and their applications [Virtual]		
15:00-15:30	Gregory Boyle (Australia),	Minna Patanen (Finland), Electron-ion		
	Thermalisation time of electron swarms	coincidence experiments with electron and		
	in Noble gases for uniform electric fields	photon ionization [Virtual]		
	[Virtual]			
15:30-16:00	Mikhail Pinchuk (Russia), Control of	Violeta N. Nikolic (Serbia), Spectroscopic		
	guided streamer propagation and	investigation of the influence of NO3- anions		
	interaction with substrate in helium	on the crystallization of the SiO2 matrix		
	atmospheric pressure plasma jet	[15:30-15:50] [Regular]		
	[Regular]			
16:00-16:30	Aranka Derzsi (Hungary), Surface	Dejan Dojić (Serbia), Measurements of		
	processes in low-pressure capacitively	continuous optical spectrum during		
	coupled plasmas [Regular]	nanosecond laser pulse [15:50-16:10] [Regular]		
		Milivoje Hadžijojić (Serbia), Study of two		
		dimensional crystals by rainbow scattering		
		effect [16:10-16:30] [Regular]		
16:30-17:00	Break & Chat Room			
	Hall A - Parallel Session	Hall B - Parallel Session		
	Chair: S. Tošić	Chair: M. Trtica		
	S. 10000			
	I	· ·		

17:00-17:30	Vasco Guerra (Portugal), Coupled	Nikola Starčević (Serbia), Ion-crystal
	kinetics in CO2-N2 plasmas [Regular]	rainbow interaction potential in channeling
		[17:00-17:20] [Regular]
17:30-18:00	Teodora Velcheva Kirova (Latvia),	Jovan V. Ciganovic (Serbia), Action of pulsed
	Numerical investigations of the impact of	lasers on titanium target: surface effects
	the magnetic field of radiation on amino	[17:20-17:40] [Regular]
	acids [Regular]	
18:00-18:30	Lucas Schwob (Germany), X-ray action	Dušan Popović (Serbia), Picosecond
	spectroscopy of gas-phase biomolecular	pulsed laser ablation of silicon single
	ions [Virtual]	crystal
		[17:40-18:00] [Virtual]
18:30-20:00	Poster session (1) Poster presentation –	Hall A (Chair: D. Borka)
	1	

	7th Septembe	r		(- (-)	
	SPIG 2022 (day 3)				
PL – Plenary lecture: 35+10 min TL – Topical lecture: 25+5 min PR – Progress Report: 15+5 min					
	Plenary Session 3,	Hall A, Chair: D. Mar	ić		
09:00-09:45	Darryl Jones (Australia), Electron spectroscopies for probing electronic structure and collision dynamics [Virtual]			r probing electronic structure and	
09:45-10:30	James Sullivan (A science [Virtual]	australia), Experiments	with positro	ons - from fundamental to applied	
10:30-11:00	Break & Chat Roo	om			
	Hall A - Parallel S Chair: G. Poparió			Parallel Session Srećković	
11:00-11:30	Nicolina Pop (Ror recombination and molecular cations lelectron-impact in	nania), Dissociative excitation of	Stéphane ro-vibrati VUV-abs productio	Béchu (France), Investigation of the onal levels of H2/D2 molecules by orption spectroscopy for the n of H-/D- negative ions for fusion on [Virtual]	
11:30-12:00	Saša Dujko (Serbi transient plasmas a phenomena in plan [Regular]		magnetic	to (France), Line shape modeling for fusion and astrophysical plasmas: an of recent result [Virtual]	
12:00-12:20	Milan Ignjatovic influence of corona lightning surge pro transmission lines	a discharge on the pagation along the [Regular]	processes in multilevel n-pod quantum system from the perspective of riemannian geometrical [Virtual]		
12:30-14:30		mittee meeting at 13h			
	Hall A - Parallel S Chair: V. Milosavl			Parallel Session Č. Popović	
14:30-15:00		tive kinetic model for ormal glow discharges	What can astronome	elmonte Sainz-Ezquerra (Spain), plasma spectroscopy do for ers? Measuring atomic parameters of ical importance [Virtual]	

15:00-15:20	Danilo Delibasic (Serbia), Relative importance of the electron continuum intermediate state in single-electron capture into any state of fast protons from helium-like atomic systems. [Regular]	Antonios Antoniou (Greece), Describing the Mathematical Methods for Calculating Basic Physical Parameters of the Gaussian- Rotational (Gr) Model [Virtual]
15:20-15:40	Leo Sala (Czech Republic), Interaction	Thomas Salomon (Germany), Recent
	of ionizing radiation with DNA	Progress on Action Spectroscopy of loosely
	nanostructures [Regular]	bound Hydrogen-Helium complexes [Regular]

_	8th September 2022				
SPIG 2022 (day 4) PL – Plenary lecture: 35+10 min TL – Topical lecture: 25+5 min PR – Progress Report: 15+5 min					
1L-1 tenary	Plenary Session 4, Hall A, Chair: M. Trtica				
	, ,				
09:00-09:45	Jorn Bonse (Germany), Laser-induced periodic surface stuctures, mechanisms,				
09:45-10:30	applications, and unsolved prob			twork for Laboratory Astrophysics	
09.43-10.30	Activities and Data [Virtual]	i, Toward	is a Global Ive	twork for Eaboratory Astrophysics	
10:30-11:00	Break & Chat Room				
	Plenary Session 3, Hall A, Cha	ıir: V. Gu	erra		
11:00-11:45	Lawrence Overzet (USA), Measurements of RF plasma re-ignition: RF-IV and PROES [Virtual]				
11:45-14:00	Break				
	Hall A - Parallel Session Chair: M. Škorić		Hall B - Pare		
14:00-14:30	Nathan Garland (Australia), V	When	Pavel Dvorak (Czech Republic), Higher		
	fusion plasmas get cool: A need			quencies of discharge voltage and	
	more atomic physics in classica	al	current in cap	pacitively coupled discharges	
	fusion models [TBC]		[Regular]		
14:30-15:00	Mohammed Koubiti (France),		Milica Vasiljević (Serbia), Determination of the		
	Application of machine-learning	g to		strength in glow discharges using	
	spectroscopic line emission by			l lines. [Regular]	
	hydrogen isotopes in fusion dev	vices	14:30-14:50		
	for isotopic determination and prediction [Virtual]				
15:00-15:40	Break & Chat Room				
			l		
	Hall A - Parallel Session		Hall B - Par Chair: D. Ili		
	Chair: V. Milosavljević		Chair. D. Ill	C	
15:40-16:00	Amit Kumar (Serbia), Design,			vic (Serbia), Development of a	
	development and characterization			pipeline for detecting binary	
	atmospheric plasma system for wastewater treatment [Regular			black holes in the upcoming ey of Space and Time (LSST)	

16:00-16:20	Nenad Selaković (Serbia), Mass spectrometry of plasma jet and application of electrical discharges operating at atmospheric pressure in biomedicine [Regular]	Milena Jovanovic (Serbia), Matter distribution in nearby galaxies [Virtual]	
16:20-17:00	Break & Chat Room		
	Hall A - Parallel Session Chair: I. Savić	Hall B - Parallel Session Chair: I. Mančev	
17:00-17:20 CET	Marija Puač (Sebia), Modeling of radio frequency breakdown by Monte Carlo technique [Regular]	Smita Omkarnath Ganguly (Sweden), Fragmentation of core-ionized adamantane molecule [Regular]	
17:20-17:40 CET	Madhusree Roy Chowdhury (France), VUV Photoionization and Fragmentation of cyano-PAHs [Regular]	Dale Muccignat (Australia), Simulating the feasibility of using liquid micro-jets for determining electron-liquid scattering cross- sections [Virtual]	
17:40-20:00	Poster session (2) - Virtual poster presentations - <i>Hall A (Chair: N. Cvetanović)</i> [*Optional: 3min presentation per poster]		
20:30 -	Conference dinner and Closing		

Friday 9th September 2022	
SPIG 2022	(day 5)
10:00-17:00	Excursions (optional, info at registration desk)
17:00	Departure

LIST OF POSTERS

No	Session	Title	Authors
1.	1.1.	Total cross section measurements for electron scattering on methyl formate (HCOOCH ₃) molecule: methylation effect	Natalia Tańska, Kuba Wójcik, Sylwia Dylnicka, Elżbieta Ptasińska-Denga, Czesław Szmytkowski and Paweł Możejko
2.	1.1.	Dissociation of N_2 by electron impact in RF electric field	V. Stanković, M. Ristić, R. Ranković, M. Aoneas, M. Vojnović and G. B. Poparić
3.	1.1.	Rate coefficients for O_3^+ dissociation to O_2^+ and O_2^+ by electron impact	M. M. Vojnović, M. M. Ristić and D. S. Belić
4.	1.1.	Photoelectron energy spectra in sequential two-photon ionization of hydrogen by gaussian and half-gaussian laser pulses	N. S. Simonović, D. B. Popović, A. Bunjac
5.	1.2.	Single-electron capture from He by fast alpha particles	Nenad Milojević, Danilo Delibašić Ivan Mančev

6.	1.3.	Reduced mobility of H+ ions in n-butanol gas	Željka Nikitović and Zoran Raspopović
7.	1.3.	Excitation of $^1\Sigma^+_u$ and $^1\Pi_u$ states and ionization of CO_2 in DC electric field	Violeta V. Stanković, Mirjana M. Vojnović, Miroslav M. Ristić, Sava M.D. Galijaš and Goran B. Poparić
8.	1.3.	Formation and propagation of streamers in CF ₃ I-SF ₆ gas mixtures	J. Atić, D. Bošnjaković, I. Simonović, Z.Lj. Petrović and S. Dujko
9.	1.3.	Electron transport coefficients in CO: Scanning drift tube measurements and kinetic computations	S. Dujko, D. Bošnjaković, M. Vass, I. Korolov, P. Hartmann, N. Pinhao, D. Loffhagen and Z. Donko
10.	1.3.	Third-order transport coefficients for electrons in C ₃ F ₈	I. Simonović, D. Bošnjaković, Z.Lj. Petrović and S. Dujko
11.	2.1.	The time-symmetric description of electron exchange in ion-ion collision	S. M. D. Galijaš, V. M. Milosavljević and G. B. Poparić
12.	2.1.	Analytical expression for stopping force acting on a slow charged particle moving parallel to a thick graphene-sapphiregraphene structure	Ana Kalinić, Ivan Radović, Lazar Karbunar, Vito Despoja and Zoran L. Mišković
13.	2.1.	Bohmian dynamics of positrons channeled through a chiral carbon nanotube	M. Ćosić, M. Hadžijojić, and N. Nešković
14.	2.1.	Study of graphene by rainbow scattering effect	M. Hadžijojić and M. Ćosić
15.	2.1.	The influence of the ion-target parameters on the size of the surface nanohillocks created by an impact of highly charged ions	N. N. Nedeljković, M. D. Majkić, M. A. Mirković, I. Stabrawa, D. Banaś
16.	2.1.	Effect of the ionic type on the shape of the nanostructures created by an impact of slow highly charged ions on gold surface	M. D. Majkić, N. N. Nedeljković M. A. Mirković,
17.	2.2.	Influence of carbon ions of different multiplicity on regimes of promising laser technologies for the deposition of diamond-like carbon nanocoatings	V.K.Goncharov, G.A.Gusakov, M.V.Puzyrev
18.	2.3.	Elemental analysis of austenitic steel by calibration-free laser-induced breakdown spectroscopy (CF-LIBS)	I. Traparić, M. Jovanović, M. Kuzmanović, M. Ivković

19.	2.3.	ODS+Hf and AISI 316L steel surface variations at high laser intensity, 1013 W/cm², in air and vacuum: comparative study	M. Trtica, J. Stasic, X. Chen and J. Limpouch
20.	2.3.	Silicon spalling destruction and ablation in air under bichromatic laser radiation	A.N. Chumakov, V.V. Luchkouski and I.S. Nikonchuk
21.	2.3.	Features of silicon ablation in air under the influence of Nd:YAG laser harmonics	A.N. Chumakov, V.V. Lychkovsky, I.S. Nikonchuk
22.	2.3.	Investigation of properties of yttrium vanadate YVO ₄ films	N.A. Bosak, A.N. Chumakov, L.V. Baran, V.V. Malyutina-Bronskaya, T.F. Raichonok, A.A. Ivanov, V.V. Kiris, E.M. Dyatlova, A.A. Shevchenok, A.V. Buka, A.S. Kuzmitskaya
23.	2.3.	Treatment of steel 16MnCr5 and steel 42CrMo4 by plasma flow generated in magnetoplasma compressor	Nora Trklja Boca, Žarko Z. Mišković, Radivoje M. Mitrović, Bratislav M. Obradović, Milorad M. Kuraica
24.	2.3.	Combining plasma-assisted synthesis of metal oxide nanoparticles with thin films deposition	Natalie Tarasenka, Vladislav Kornev, Alena Nevar, Mikhail Nedel'ko, Anton Radomtsev and Nikolai Tarasenko
25.	2.3.	Perspective on the use of nanoparticles to improve the tea CO2 based LIBS analytical performances: copper nanoparticles for NELIBS analysis of polypropylene	S. Živković, J. Petrović, M. Momčilović, M. Radenković, N. Krstulović, J. Car, D. Palasti, F. Casian Plaza and G. Galbács
26.	2.3.	Analytical prediction and numerical analysis of plasma mediated ablation of skin tissue samples with nanosecond-to-femtosecond laser pulses	H. Delibašić, Marković, V. Petrović and I. Petrović
27.	2.3.	Pulsed laser assisted fabrication of Co- doped ZnO nanocrystalline layers on a glass substrate	Natalie Tarasenka, Vladislav Kornev, Svetlana Pashayan, and Nikolai Tarasenko
28.	3.1.	The gas temperature diagnostics by means of AlO (B2 Σ +-X2 Σ +) molecular band system from the upgraded atmospheric pressure pulsed discharge source in argon	Jovica Jovović <u>.</u> Gordana Lj. Majstorović
29.	3.1.	High-resolution spectroscopy of astrophysically relevant molecular ions	O. Asvany, S. Thorwirth, P. C. Schmid, T. Salomon, and S. Schlemmer

30.	3.1.	Polarization spectroscopy of neon lines for electric field distribution measurement in the cathode sheath of a Grimm-type glow discharge	N. V. Ivanović, N. V. Nedić, I. R. Videnović and D. Spasojević
31.	3.1.	Analysis of printed circuit board LIBS data using deep learning	M.S. Rabasovic, B.P. Marinkovic, D.Sevic
32.	3.1.	Spectroscopic determination of the degree of dissociation of hydrogen in the glow discharge	M. M. Vasiljević, G. Lj. Majstorović I. R. Videnović and D. Spasojević
33.	3.1.	Spectroscopic characterization of laser- induced plasma on doped tungsten	Biljana Stankov, Marijana R. Gavrilović Božović, Jelena Savović and Milivoje Ivković
34.	3.1.	Features of the HeI 492.2 nm line profile registered at diagnostics of DC and streamer discharges	L.V. Simonchik and A.V. Kazak
35.	3.1.	Temperature estimation in the early stage of laser induced plasma formation relaying on black body radiation	Milos Skocic, Nikodin Nedic, Dejan Dojic, Luka Rajacic, Srdjan Bukvic
36.	3.1.	Formation and heating of silicon plasma in air under pulsed bichromatic laser irradiation	V.V. Luchkouski and A.N. Chumakou
37.	3.1.	Self-mixing interferometry for plasma diagnostics	Nikola Goleš, Neda Babucić, Nenad M. Sakan and Milivoje Ivković
38.	3.1.	Study of plasma-flow interaction in low temperature plasma jets	G. B. Sretenović, P. S. Iskrenović, V.V. Kovačević, B. M. Obradović and M. M. Kuraica
39.	3.1.	Application of artificial neural network in the analysis of the spectra from laser ablation combined with fast pulse discharge	Nenad M. Sakan, Milica L. Vinić, Vladimir A. Srećković, Ivan Traparić, and Milivoje R. Ivković
40.	3.1.	Detection of fast nitrogen and oxygen atoms via emission spectroscopy	B.M. Obradović, N. Cvetanović, I.B. Krstić and M.M. Kuraica
41.	3.1.	Modeling of Stark spectral line broadening by machine learning algorithms	Irinel Tapalaga, Ivan Traparić, Nora Trklja Boca, Jagoš Purić and Ivan P. Dojčinović

42.	3.2.	Looking behind the negative glow plasma: estimating cathode sheath parameters by end-on optical emission spectroscopy in a Grimm-type glow discharge source	N. V. Nedić, N. V. Ivanović, I. R. Videnović, D. Spasojević and N. Konjević
43.	3.2.	Corona model for surge wave propagation along the transmission lines	Milan Ignjatovic, Jovan Cvetic, Vera Protic, Nemanja Grbic
<mark>44.</mark>	3.2.	Breakdown in saturated water vapor	Jelena Marjanović, Dragana Marić, Gordana Malović and Zoran Lj. Petrović
45.	3.3.	Comparison of biocompatibility of organic polymers modified in various types of non-temperature plasmas	Tatiana Vasilieva, Elena Nikolskaya, Michael Vasiliev, Nikita Yabbarov, Maria Sokol, Mariia Mollaeva, Margarita Chirkina
46.	3.3.	Characterization of the dielectric barrier- free atmospheric plasma system	Miroslav Gulan and Vladimir Milosavljević
47.	3.3.	The effect of plasma seed treatment on germination and early growth of thuja koraiensis nakai plants	I.I. Filatova, V.A. Lyushkevich, S.V. Goncharik, U.I. Torchyk, Y.V. Kandratau, M.O. Slesarenka
48.	3.3.	Laser driven electron acceleration by q-Gaussian laser pulse in plasma: effect of self focusing	N. Gupta
49.	4.2.	Winged DRAGN source from Leahy's atlas: 3C 315	A. Arsenic, D. Borka, P. Jovanovic and V. Borka Jovanovic
50.	4.2.	Decomposition of the blended Hα+[N II] lines in spectra of the active galactic nuclei type 1.8-2	Jelena Kovačević-Dojčinović, Ivan Dojčinović, Maša Lakićević and Luka Č. Popović
51.	4.2.	The chemi-recombination processes in alkali-metal astrophysical and low-temperature laboratory plasmas: rate coefficients	V.A. Srećković, L.M. Ignjatović, V. Vujčić, M.S. Dimitrijević
52.	4.2.	Higher order non-linear dust ion acoustic (dia) solitary waves in plasmas with weak relativistic effects in electrons and ions	S. Das and D. C. Das
53.	4.2.	The effect of negative ions on Weibel instability in the presence of large amplitude electrostatic waves	Amit Kumar, Jyotsna Sharma



32nd Summer School and International Symposium on the Physics of Ionized Gases

Belgrade, Serbia, August 26 - 30, 2024

CONTRIBUTED PAPERS

&

ABSTRACTS of INVITED LECTURES,
TOPICAL INVITED LECTURES and PROGRESS REPORTS

Editors:

Bratislav Obradović, Jovan Cvetić, Miroslav Kuzmanović and Nikola Cvetanović



БЕОГРАД 2024

PUBL. ASTRON. OBS. BELGRADE No. 103, 1 - 216 BELGRADE, AUGUST 2024

32nd Summer School and International Symposium on the Physics of Ionized Gases



August 26 – 30, 2024, Belgrade, Serbia

S P I G 2024

CONTRIBUTED PAPERS

&

ABSTRACTS OF INVITED LECTURES, TOPICAL INVITED LECTURES AND PROGRESS REPORTS

Editors

Bratislav Obradović, Jovan Cvetić, Miroslav Kuzmanović and Nikola Cvetanović

University of Belgrade – Faculty of Physical Chemistry Serbian Academy of Sciences and Arts

PUBLICATIONS OF THE ASTRONOMICAL OBSERVATORY OF BELGRADE FOUNDED IN 1947

EDITORIAL BOARD:

Dr. Srdjan SAMUROVIĆ, Editor-in-Chief (Astronomical Observatory, Belgrade)

Dr. Rade PAVLOVIĆ (Institute of Physics, Belgrade)

Dr. Miroslav MIĆIĆ (Astronomical Observatory, Belgrade)

Dr. Branislav VUKOTIĆ (Astronomical Observatory, Belgrade)

All papers in this Publication are peer reviewed.

Published and copyright © by Astronomical Observatory, Volgina 7, 11060 Belgrade 38, Serbia

Director of the Astronomical Observatory: Dr. Luka Č. Popović

Typesetting: Tatjana Milovanov

Internet address https://publications.aob.rs

ISSN 0373-3742 ISBN 978-86-82296-08-9

Financially supported by the Ministry of Science, Technological Development and Innovation of the Republic of Serbia

СІР - Каталогизација у публикацији - Народна библиотека Србије, Београд

537.56(082)

539.186.2(082)

539.121.7(082)

533.9(082)

SUMMER School and International Symposium on the Physics of Ionized Gases (32; 2024; Beograd)

Contributed papers & abstracts of invited lectures, topical invited lectures and progress reports / 32nd Summer School and International Symposium on the Physics of Ionized Gases - SPIG 2024, August 26 – 30, 2024, Belgrade, Serbia; editors Bratislav Obradović ... [et al.]. - Belgrade: Astronomical Observatory, 2024 (Beograd: Skripta Internacional). - 215 str.: ilustr.; 24 cm. - (Publications of the Astronomical Observatory of Belgrade, ISSN 0373-3742)

Na nasl. str.: University of Belgrade, Faculty of Physical Chemistry; Serbian Academy of Sciences and Arts. - Tiraž 200. - Str. 17-18: Preface / editors Bratislav Obradović ... [et al.]. - Bibliografija uz svaki rad. - Registar.

ISBN 978-86-82296-08-9

- 1. Kuzmanović, Miroslav, 1967- [urednik] [autor dodatnog teksta]
- а) Јонизовани гасови Зборници b) Атоми Интеракција Зборници
- v) Плазма Зборници

COBISS.SR-ID 150439689

SPIG 2024

SCIENTIFIC COMMITTEE

- J. Cvetić (Co-chair), Serbia
- B. Obradović (Co-chair), Serbia
- A. Antoniou, Greece
- J. Burgdörfer, Austria
- M. Ćosić, Serbia
- V. Guerra, Portugal
- M. Ivković, Serbia
- J. Kovačević-Dojčinović, Serbia
- K. Kutasi, Hungary
- I. Mančev, Serbia
- D. Marić, Serbia
- N. J. Mason, UK
- A. Milosavljević, France
- V. Milosavljević, Serbia
- D. Milošević, BH
- K. Mima, Japan
- L. Nahon, France
- G. Poparić, Serbia
- I. Radović, Serbia
- P. Ranitovic, Serbia
- P. Rousseau, France
- I. Savić, Serbia
- Y. Serruys, France
- N. Simonović, Serbia
- V. Srećković, Serbia
- M. Škorić, Japan
- S. Tošić, Serbia
- M. Trtica, Serbia
- R. White, Australia

ADVISORY COMMITTEE

- D. Belić
- N. Bibić
- M. S. Dimitrijević
- S. Đurović
- D. Ilić
- N. Konjević
- M. M. Kuraica
- J. Labat
- G. Malović
- B. P. Marinković
- M. Milosavliević
- Z. Mišković
- Z. Li. Petrović
- L. Č. Popović
- B. Stanić

ORGANIZING COMMITTEE

- M. Kuzmanović (Chair)
- M. Ristić (Co-secretary)
- B. Stankov (Co-secretary)
- N. Konjević
- N. Cvetanović
- D. Ranković
- M. Milovanović
- M. Marković
- A. Šajić
- I. Traparić

Reviewers for the Book of SPIG 2024

- Jovan Cvetić, Full Professor, University of Belgrade, School of Electrical Engineering, Belgrade, Serbia
- Marko Ćosić, Associate research professor, Vinča Institute of Nuclear Sciences, Belgrade, Serbia
- Milivoje Ivković, Principal Research Fellow, Institute of Physics, Belgrade, Serbia
- Jelena Kovačević-Dojčinović, Associate research professor, Astronomical Observatory Belgrade, Serbia
- Ivan Mančev, Full Professor, University of Niš, Faculty of Sciences and Mathematics, Niš, Serbia
- Dragana Marić, Principal Research Fellow, Institute of Physics, Belgrade, Serbia
- Aleksandar R. Milosavljević, Principal Research Fellow, Synchrotron SOLEIL, Saint-Aubin, France
- Vladimir Milosavljevic, Full Professor, University of Belgrade Faculty of Physics, Belgrade, Serbia
- Dejan Milošević, Full Professor, University of Sarajevo Faculty of Science, Sarajevo, Bosnia and Herzegovina
- Bratislav Obradović, Full Professor, University of Belgrade Faculty of Physics, Belgrade, Serbia
- Goran Poparić, Full Professor, University of Belgrade Faculty of Physics, Belgrade, Serbia
- Ivan Radović, Principal Research Fellow, Vinča Institute of Nuclear Sciences, Belgrade, Serbia
- Predrag Ranitović, Principal Research Fellow, University of Belgrade Faculty of Physics, Belgrade, Serbia
- Igor Savić, Full Professor, University of Novi Sad, Faculty of Sciences and Mathematics, Novi Sad, Serbia
- Nenad Simonović, Principal Research Fellow, Institute of Physics, Belgrade, Serbia
- Vladimir Srećković, Principal Research Fellow, Institute of Physics, Belgrade, Serbia
- Miloš Škorić, Principal Research Fellow, Vinča Institute of Nuclear Sciences, Belgrade, Serbia
- Sanja Tošić, Research Associate Assistant, Institute of Physics, Belgrade, Serbia
- Milan Trtica, Principal Research Fellow, Vinča Institute of Nuclear Sciences, Belgrade, Serbia

CONTENTS

Bratislav Obradović, Jovan Cvetić, Miroslav Kuzmanović and Nikola Cvetanović <i>Preface</i>	17
Section 1. ATOMIC COLLISION PROCESSES	
Invited Lectures	
O. Asvany, P.C. Schmid, S. Thorwirth and S. Schlemmer Missing Ions in Laboratory and Space	21
Himadri Chakraborty Impact Spectroscopy and Chronoscopy of Gas Phase Atoms, Molecules and Fulleene	22
Alicja Domaracka Ion Processing of Molecular Systems: A Way to Form Complex Systems in Scpace	23
Carla Figueira de Morisson Faria Exploring Quantum Effects in the Attosecond Domain	24
G. G. Paulus Extreme UV Imaging with High Harmonics	25
Xiao-Min Tong Theory on Dynamics of Atoms in Strong Laser Field	26
Topical Invited Lectures	
N. Pinhão Description of Electron Swarms in an Electric Field: A Finite Elements Computation Including Third-order Transport Parameters	27
Helgi Rafn Hrodmarsson VUV Photionization of Interstellar Molecules: Making Sense of Our Beautifully Mysterious Universe, Molecule by Molecule	28
Progress Reports	
Jasmina Atić and Saša Dujko Electron Transport and Negative Ionization Fronts in Strongly Attaching Gases	29

Daan Boer and Jan Van Dijk LOKI-B C++: An Open-Source Boltzmann Solver for Reproducible Electron Boltzmann Calculations	30
Danijela Danilović, Dušan K. Božanić, Aleksandar R. Milosavljević, Radovan Dojčilović and Vladimir Djoković Synchrotron Radiation Photoelectron Spectroscopy Study of the Electronic Structure of Ag-Bi-I Rudorffite Nanoparticles	31
M. Fournier, J. Palaudoux, R. Dupuy, F. Penent and C. Nicolas Photoelectron Spectroscopy of Solvated Biological Interest Molecules in Liquid Jet Configuration	32
D. Habibović and D. B. Milošević Strong-field Processes Induced by Tailored Laser Fields	33
Emilia Heikura, Christina Zindell, Denis Kargin, Aleksandar Milosavljevic, Andreas Hans, Rudolf Pietschnig and Arno Ehresmann Towards Distant Dependent Inner-shell Photoelectron Circular Dichroism	34
Laura Pille, Bart Oostenrijk, Juliette Leroux, Carlos Ortiz Mahecha, Robert Meißner, Debora Scuderi, Sadia Bari and Lucas Schwob Exploring Biomolecular Properties in the Gas Phase by Using Advanced Light Sources	35
M. Werl, T. Koller, P. Haidegger, S. Wrathall, L. Esletzbichler, A. Niggas, F. Aumayr, K. Tőkési and R.A. Wilhelm De-excitation Cascade Calculation for Highly Excited Hollow Atoms	36
Posters	
Danko Bošnjaković, Ilija Simonović and Saša Dujko Studies on Streamer Discharges in Ultra-low GWP Gases	37
G. J. Boyle, N. A. Garland, R. P. Mceachran and R. D. White Electron Transport in Simple Liquid Mixtures	38
Saša Dujko, Ilija Simonović, Danko Bošnjaković, Jasmina Atić and Zoran Lj. Petrović Electron Transport in Radio-Frequency Electric and Magnetic Fields in Ultra-low GWP Gases	39
Saša Dujko, Ilija Simonović, Danko Bošnjaković, Zoran LJ. Petrović and J. De Urquijo Studies on Electron Swarms and Streamer Discharges in Eco-friendly RPC Gases	40

N. A. Garland, R. D. White, R. E. Robson and M. Hildebrandt An Aliasing Method for Determination of Transport Data for Exotic Charged Particles in Crossed Electric and Magnetic Fields	41
Mai Hao, Gerjan Hagelaar, Boya Zhang and Xingwen Li Monte Carlo Simulation of Electron Swarms in Pulsed Townsend Experiment and Validation of the Swarm Data Derived from Waveform Analysis	45
Jelena B. Maljković, Jelena Vukalović, Francisco Blanco, Gustavo Garcia and Bratislav P. Marinković Investigation of Elastic Electron Scattering by Anaesthetic Molecules in Gaseous Phase	46
Bratislav P. Marinković and Stefan Đ. Ivanović Electron Scattering Cross Sections Represented in Belgrade Electron-atom/molecule Database (BEAM)	47
Bratislav P. Marinković, Jozo J. Jureta and Lorenzo Avaldi Ejected Electron Spectra of Krypton Studied by High and Low Energy Electrons	48
Nenad Milojević, Ivan Mančev, Danilo Delibašić and Miloš Milenković Post-prior Discrepancy in the CB1-4B Method for Single-electron Capture in Fast Li ³⁺ + He Collisions	49
D. L. Muccignat, D. B. Jones, J. R. Gascooke, G. J. Boyle, N. A. Garland and R. D. White Direct Electron-liquid Energy Loss Spectra Measurements Using a Liquid Micro-jet	53
Željka Nikitović and Zoran Raspopović Diffusion Coefficients of H_2^+ Ions in H_2 Gas	57
T. Rook, L. Cruz Rodriguez and C. Figueira de Morisson Faria Influence of Catastrophes and Hidden Dynamical Symmetries on Ultrafast Backscattered Photoelectrons	61
Ilija Simonović, Danko Bošnjaković and Saša Dujko Three-dimensional Streamer Model in the AMReX Environment	62
Barbora Stachová, Juraj Országh and Štefan Matejčík Excitation of Acetone Induced by Electron Impact	63
Sanja Tošić, Vladimir Srećković and Veljko Vujčić Small Molecules Essential to Astrophysics: Collisional and Radiative Processes	64

Mırjana M. Vojnović, Mıroslav M. Ristić, Violeta V. Stanković-Mališ and Goran B. Poparić Dissociative Electron Attachment to CO ₂ in Electric and Magnetic Fields	65
Jelena Vukalović, Jelena B. Maljković, Francisco Blanco, Gustavo Garcia and Bratislav P. Marinković Investigation of Elastic Electron Scattering from Desflurane Molecule at Intermediate Electron Energy	66
Guanyu Wang, Boya Zhang and Xingwen Li Transport Properties of Two-temperature SF ₆ and Its Alternative Gases	67
Section 2. PARTICLE AND LASER BEAM INTERACTIONS WITSOLIDS	ГΗ
Topical Invited Lectures	
Marija Gorjanc Plasma Modification of Natural Fibres to Improve Adhesion in Bio-composites	71
Milan Radović Integrating Pulse Laser Deposition and Advanced Spectroscopy: Unveiling Hidden Phenomena in Transition Metal Oxides	72
Progress Reports	
Hristina Delibašić-Marković Characterizing Ionization and Electron Dynamics in Biological Materials: Theoretical and Numerical Insights into Pulsed Laser-induced Breakdown Processes	73
Ana Kalinić, Ivan Radović, V. Despoja, Lazar Karbunar and Z. L. Mišković Interaction of Ions with Graphene-insulator-graphene Composite Systems	74
Violeta V. Stanković Mališ and Goran B. Poparić Modeling the Surface Interaction of Cellulosic Materials with CO ₂ Plasmas	75
Posters	
Milivoje Hadžijojić and Marko Ćosić Low Energy Heavy Ion Rainbow Scattering by Graphene	76
Ana Kalinić, Ivan Radović, Lazar Karbunar and Z. L. Mišković Interaction of Ions with Drift-current Biased Supported Graphene	80

F. Komarov, O. Milchanin, M.V. Puzyrev and I.S. Rahavaya Forming Nanocrystalline SnO ₂ Films on Silicon and Silicon Dioxide by Laser-Plasma Deposition Method	81
Dragan Ranković, Biljana Stankov, Ivan Traparić, Miroslav Kuzmanović and Milivoje Ivković Target Selection for LIBS Studies of Hydrogen Isotope Retention	85
Miroslav Ristić, Aleksandra Šajić, Jovana Babić and Miroslav Kuzmanović Equilibrium Composition of Plasma Obtained by Laser Ablation of Glass	86
Violeta V. Stanković Mališ and Goran B. Poparić Semiquantum Simulation of Cellulosic Materials Interaction with CO ₂ Plasmas	87
Nikola Starčević and Srdjan Petrović Rainbows in Transmission of Proton Through Thin Silicon Carbide Crystal	88
N. Tarasenko, V. Kornev, M. Nedelko, A. Radomtsev, N. Tarasenka, Jovan Ciganovic, Sanja Zivkovic and Miloš Momcilovic <i>Properties of Cu/Zn Oxide Nanostructures Formed by Plasma-activated Electrolysis.</i>	92
Section 3. LOW TEMPERATURE PLASMAS	
Invited Lectures	
Satoshi Hamaguchi Opportunities and Challenges in Low-temperature Plasma Science for Atomic-layer Processing	99
Jan van Dijk and Daan Boer LXCat 3 and Beyond – Fostering Reproducibility in Low-temperature Plasma Science	100
Topical Invited Lectures	
Peter Hartmann Using Dust Particles as Probes in Low Pressure Gas Discharges	101
Mirjana Kostic, Ana Kramar, Bratislav Obradovic and Milorad Kuraica Atmospheric Pressure Plasma in Processing of Cellulose Fibers: From Surface Cleaning to Tailored Properties	102
Violeta Lazic LIBS Spectroscopy: What We Can Measure, and How?	103

C. Lazzaroni, A. Remigy, M. Jacquemin, H. Kabbara, S. Kasri, B. Menacer, K. Gazeli, V. Mille and G. Lombardi Micro Hollow Cathode Discharges in Argon/Nitrogen Used for Boron Nitride PECVD	104
P. Maguire, N. Hendaway, H. Mcquaid and D. Mariotti Liquid Microdroplets in a Microplasma: Phenomena and Technological Applications	105
Peter Papp, Samuel Peter Kovár, Ladislav Moravský and Štefan Matejčík Ion Induced Reactions in IMS Studied by DFT	106
G. Primc, M. Zver, R. Zaplotnik, A. Filipič, D. Dobnik and M. Mozetič Inactivation of Viruses in Water by Plasma Treatment	107
Nevena Puač, Nikola Škoro, Sergej Tomić, Andjelija Marković, Neda Babucić, Olivera Jovanović, A. Morina, Gordana Malović, Miodrag Čolić and Zoran Lj. Petrović Diagnostics and Applications of Atmospheric Pressure Plasmas for Triggering of Cell Mechanisms	108
Progress Reports	
A. P. Jovanović, H. Höft, D. Loffhagen, T. Gerling and M. M. Becker Fluid Modelling of Single-filament DBD and Self-pulsing Discharges at Atmospheric Pressure Using FEDM	109
Sanja Pavlovic and Goran Poparić Thermal and Acoustic Properties of Cellulose Fibrous Materials	110
M. Stankov, M. M. Becker, L. Bröcker, CP. Klages and D. Loffhagen Analysis of Dielectric Barrier Discharges in Ar-monomer Mixtures Using a Standardized Fluid Modelling Approach	111
Olga Stepanova, Vadim Snetov, Oleg Grushko, Dmitry Subbotin, Ilya Ruchkin and Mikhail Pinchuk "Air-plasma-water" Electrophysical System Based on DBD Plasma Jet: Prospects and Problems	112
Ivan Traparić Application of Machine Learning and Artificial Intelligence in Plasma Spectroscopy	113

Posters

E.N. Bocharnikova, O.N. Tchaikovskaya, S.A. Chaykovsky, V.I. Solomonov, A.S. Makarova and I.V. Sokolova Luminescent Analysis of E-beam Induced Transformation of Phenol in the Presence of Humic Substances	114
N.N. Bogachev, A.S. Bakshaev, L.V. Kolik, E.M. Konchekov and A.S. Kon'kova Compact Piezotransformer Sourse of the Cold Amospheric Plasma with Three Types of Discharges	118
N.N. Bogachev, I.L. Bogdankevich, V.I. Zhukov, D.M. Karfidov, V.P. Stepin and N.G. Gusein-Zade Ionization of a Plasma Antenna Channel in a Dielectric Gas-discharge Tube	119
Nikola Cvetanović, Saša S. Ivković and Bratislav M. Obradović Estimation of Nitrogen Impurity Level in Helium Atmospheric Discharge via Emission Spectroscopy	120
Lazar Gavanski, Nataša Simić and Stevica Djurović Measurement of the Velocity of the Plasma Jet Appearing from a Wall Stabilized Arc	121
Jovica Jovović The Measurement of Pulsed Gas Discharge Parameters by Means of Fe I Lines in Argon and Argon-hydrogen Mixture	125
E.M. Konchekov, N.G. Gusein-Zade, D.V. Yanykin, L.V. Kolik, Yu.K. Danileiko, V.I. Lukanin, K.F. Sergeichev, I.V. Moryakov, V.D. Borzosekov, V.V. Gudkova, M.E. Astashev and S.V. Gudkov Low-temperature Plasma and Plasma-activated Liquids in Solving Agricultural Problems: Experimental Technique	129
A. Kropotkin, A. Chukalovsky, A. Kurnosov, T. Rakhimova and A. Palov Modelling of an ICP Discharge in Oxygen with Full Kinetics Scheme with Newly Calculated VV/VT Rate Constants	130
Vitaly Kuzmenko, Andrey Miakonkikh and Konstantin Rudenko The Formation of Microneedles Structures from Silicon Using Plasma Etching in SF ₆ /O ₂ Mixture in Inductively Coupled Plasma	134
James Lalor and Vladimir Milosavljević Investigating the Thermal Profile of an Atmospheric Pressure Argon Plasma Jet on a Conductive and Insulating Mesh Surface	135

Zlatko Majlinger Stark Width Estimates for the Most Prominent Ce II Spectral Lines Important for Astrophysical Investigations	136
Zlatko Majlinger, Milan S. Dimitrijević and Vladimir A. Srećković Stark Widths of Several Te II Spectral Lines for Investigation of Astrophysical Spectra.	137
Jelena Marjanović, Dragana Marić, Marija Puač, Antonije Đorđević and Zoran Lj. Petrović RF Breakdown in Argon at Low-pressures: Experiment and Modelling	138
Milica Marković, Dragan Ranković and Miroslav Kuzmanović The Effect of Acids on Pig Bone Estimated by LIBS	142
A. Miakonkikh, V. Kuzmenko and K. Rudenko Fluorocarbon Polymerizing Plasmas Etching Processes for Structures of Micrelectronics	143
Nikodin V. Nedić, Nikola V. Ivanović, Ivan R. Videnović, Djordje Spasojević and Nikola Konjević Cathode Sheath Diagnostics by Integral End-on Optical Emission Spectroscopy in an Analytical Glow Discharge Source in Argon	144
S.A. Poniaev, P.A. Popov, N.A. Monakhov, T.A. Lapushkina and M.A. Kotov The Use of Thermoelectric Radiation Detectors for Heat Flux Measurements in Shock-tubes with Gas Ionization	145
Aleksandra Šajić, Dragan Ranković, Miroslav Ristić and Miroslav Kuzmanović Determination of Unknow Analyte Concentration in Glass Samples Using the LIBS Method	146
Biljana Stankov, Marijana R. Gavrilović Božović, Dragan Ranković, Jelena Savović and Milivoje Ivković Fast Photography in the Service of Spatially and Temporally Resolved LIBS Diagnostics of Doped Tungsten	147
Desanka Topalović, Neda Babucić, Nikola Škoro and Nevena Puač Measurements of Reactive Oxygen and Nitrogen Species in Plasma Activated Water by Microwave Discharge	148
Ivan Traparić, Biljana Stankov and Milivoje Ivković Detection of Rhenium in Tungsten Using LIBS with Additional Fast Pulse Discharge	152

Ivan Traparić, Biljana Stankov, Nikola Vujadinović, Milica Vinić and Milivoje Ivković Influence of the Ablation Angle Change on Spectral Line Intensities in LIBS Experiments	153
V.V. Voevodin, O.I. Korzhova, V.Yu. Khomich, V.A. Yamschikov, N. Yu. Lysov and A.V. Klubkov Influence of Interelectrode Distance on the Characteristics of Three-electrode Pulsed SDBD.	154
Veljko Vujčić, Vladimir A. Srećković, Ognyan Kounchev and Felix Iacob A&M Datasets for LTP Treatment of Plants	158
Section 4. GENERAL PLASMAS	
Invited Lecture	
Andreja Gomboc How Stars Get Thorn Apart by Supermassive Black Holes	161
Paola Marziani Super-Eddington Quasars: From Atomic Physics to Cosmology	162
Luca Volpe Current Situation and Future Prospectives of the European IFE Program, Technology Development, Science and Related Applications	163
Topical Invited Lectures	
M. D. Christova, Milan S. Dimitrijević and S. Sahal-Bréchot Astrophysical Applications of Stark Broadening of Spectral Lines	164
A. Cinins, Milan S. Dimitrijević, Vladimir A. Srećković, K. Miculis, I. I. Beterov and N. N. Bezuglov Penning and Photo Ionizations of Cold Rydberg Alkali-metal Atoms Under Föster Resonance Conditions	165
Ugo Jacovella Exploring the Importance of Interstellar Ions in the Enigma of Diffuse Interstellar Bands	166
G. La Mura, G. Mulas, M. A. Iatì, C. Cecchi-Pestellini, S. Rezaei and R. Saija Interstellar Dust as a Dynamic Environment	167
S.V. Ryzhkov Magneto-inertial Fusion and Powerful Installations	168

C. Suzuki, F. Koike, N. Tamura, T. Oishi, Y. Kawamoto, T. Kawate, M. Goto, N. Nakamura and I. Murakami Comprehensive Z-dependence Analysis of Soft X-ray Spectra from Highly Charged Heavy Ions Using Magnetically Confined High-temperature Plasmas.	169
Miroslava Vukcevic On the Conditions for Soliton Formation in the Galactic Environment	170
Progress Reports	
B. Z. Djordjević, D. J. Strozzi, C. A. Walsh, J. D. Moody, C. R. Weber, S. A. Maclaren and G. B. Zimmerman Integrated Radiation-magneto-hydrodynamic Simulations of Magnetized Burning Plasmas	171
M. Drissi, G.A. Garcia, L. Nahon, S. Boye-Peronne, B. Gans, H.R. Hrodmarsson, H.L. Le, MX. Jiang and JC. Loison <i>Photoelectron Spectroscopy of Radicals of Astrochemical Interest</i>	172
Felix Iacob Electron NS ⁺ Collisions in Cold Plasma	173
Aleksandra Kolarski Properties of Earth's Lower Ionospheric Plasma Perturbed by Solar Flares	174
Petar Kostić Supernova Remnants in Clumpy Medium: Hydrodynamic and Radio Synchrotron Evolution	175
Nikola Veselinović, Mihailo Savić, Aleksandar Dragić, Dimitrije Maletić, Dejan Joković, Radomir Banjanac, Miloš Travar and Vladimir Udovičić	
Fluctuations in the Flux of Energetic Protons in Heliosphere Before and During Sudden Decreases in Galactic Cosmic Ray Intensity	176
Vladimir Zeković SLAMS-enhanced Particle Acceleration at High-Mach Number Astrophysical Shocks: TeV in a Blink of Supernova	177
Posters	
Edi Bon, Paola Marziani and Nataša Bon Varability Along the Main Sequence of Quasars	178
Andjelka B. Kovačević, Dragana Ilić, Luka Č. Popović, Marina Pavlović, Aman Raju, Momčilo Tošić and Iva Čvorović-Hajdinjak	
Advanced Nonlinear Analysis for Detecting Binary Quasars and Transient Events in the LSST Fra	182

Jelena Kovačević-Dojčinović, Ivan Dojčinović and Luka C. Popović Two-component Model of Fe II Lines in Spectra of Active Galactic Nuclei	183
Nenad M. Sakan, Zoran Simić, Vladimir A. Srećković and Momchil Dechev The Complex Emmiter Inside Dense Plasma, Continuation of a Coulomb Cut-off Approach, Argon Case	184
Vladimir A. Srećković, Nicolina Pop, Milan Dimitrijević and Magdalena Christova Investigation of Chemistry of Hydrogen, Helium and Lithium Molecular Ions in the Early Universe	185
Vladimir A. Srećković, Nicolina Pop, Milan S. Dimitrijević, Magdalena D. Christova and Veljko Vujčić Dataset for Photodissociation of Small Molecular Ions	186
Vladimir A. Srećković, Nicolina Pop and Veljko Vujčić New Molecular Data for Confined Molecular Systems and Astrochemical Modelling	187
2 nd Workshop on Swarm Physics and Gaseous Dielectrics (2 nd SPG)	D)
G. J. Boyle, D. L. Muccignat, M. J. E. Casey, R. D. White, H. Vemulapilli, M. M. van Rijn and C. M. Franck Analysis of Current Waveforms in the Pulsed-Townsend Experiment	191
N. A. Garland, D. L. Muccignat, G. J. Boyle and R. D. White Rapidly Exploring and Designing Electron Transport Quantities in Dielectric Gas Insulator Mixtures with Approximation Theories	192
Satoru Kawaguchi, Kazuhiro Takahashi and Kohki Satoh Physics-informed Neural Networks for Studies on Electron Swarms in Gases	193
Marnik Metting van Rijn, Stephen F. Biagi and Christian M. Franck Electron Scattering Cross Sections of 1,1,1,2-Tetrafluoroethane (R134a)	194
D. L. Muccignat, G. J. Boyle, N. A. Garland and R. D. White Advances in Machine Learning Methods for the Determination of Electron Scattering Cross-section Sets	195
L.G. Pérez, O. González and J. De Urquijo Three-body Electron Attachment Processes In H ₂ O, CO ₂ , and Their Mixtures	196

N. Pinhão Fitting of Electron Collision Cross Sections from Swarm Data Using a Genetic Algorithm	
M. Ranković, R. Kumar T P, P. Nag, J. Kočišek and J. Fedor Electron Induced Processes in Dielectric Insulation Gases	198
Jacob Stephens, Max Flynn and Andreas Neuber Multi-term Boltzmann Models: Engineering Tools for the Pulsed Power Community	199
L. Vialetto Particle Propagation and Electron Transport in Gases	200
Boya Zhang, Mai Hao, Peiqiong Liu and Xingwen Li Deriving Swarm Parameters from Ion Kinetics and Determining Collision Cross Sections Through Data-driven Methods for	201
J, G	201
Authors' Index	203
Programme of the SPIG 2024	207

RF BREAKDOWN IN ARGON AT LOW-PRESSURES: EXPERIMENT AND MODELLING

JELENA MARJANOVIĆ¹, DRAGANA MARIĆ¹, MARIJA PUAČ¹, ANTONIJE ĐORĐEVIĆ², and ZORAN LJ. PETROVIĆ²

¹Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

E-mail sivosj@ipb.ac.rs

Abstract. We present results for RF breakdown in argon discharge at low pressures, obtained experimentally and using Monte Carlo code for a frequency of 13.56 MHz. Experimental measurements are conducted at an interelectrode distance (*d*) of 0.7 cm for pressures (*p*) ranging from 0.9 to 29 Torr. In our experiment, we employ a technique that eliminates issues related to displacement current. This technique is based on the use of a balanced capacitive bridge, enabling precise breakdown detection and time–domain tracking.

1. INTRODUCTION

Low-temperature plasmas generated using RF power in the frequency range of 1 to 100 MHz find widespread applications in various industrial processes. These applications, such as plasma etching and deposition in the integrated circuit industry, electric propulsion in aerospace, materials processing, surface cleaning, and thin-film deposition, are closely tied to the breakdown itself and the underlying processes. However, when it comes to the breakdown in RF fields, there have been limited attempts to correlate experimentally measured parameters with elementary processes, as is commonly done in the case of direct current (DC) breakdown and discharge. Despite attracting considerable attention from researchers in the past period, the study of RF breakdown faces challenges due to the need to isolate minute breakdown currents from the displacement current. In this study, we present results from RF breakdown measurements at 13.56 MHz in argon and compare them with results from the Monte Carlo simulation, aiming to provide insights that can enhance the efficiency and reliability of these industrial processes.

2. EXPERIMENTAL SET-UP

Breakdown is achieved between two plane-parallel copper electrodes placed inside a tightly fitting borosilicate glass cylinder. This arrangement prevents

²Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia

long-path electric discharges towards the metal parts of the housing while allowing the recording of the emission intensity distribution along the axis of the chamber. The electrodes' diameter is 3.5 cm, and their gap is adjustable. For this work, it was set at 0.7 cm. One electrode is excited, while the other remains at zero potential. The discharge chamber is housed in a special metal box to eliminate interference with the extremely sensitive balance of the capacitive bridge. The box has only openings for recording the emission distribution using an ICCD camera (Figure 1a). The chamber is first evacuated to low pressure ($<10^{-6}$ Torr), and argon is introduced into the system and kept at a slow flow rate to maintain the required gas purity during measurements. Electrodes were treated and stabilized using an argon discharge at 1 Torr for approximately 60 minutes. The treatment is done at a pressure corresponding to conditions in the left-hand branch of the breakdown curve, where ions receive enough energy from the electric field to reach electrodes and remove impurities and oxides from electrode surfaces through bombardment. Throughout the electrode treatment, we monitored changes in the discharge voltage. The process is terminated when further treatment no longer results in a change in the discharge voltage.

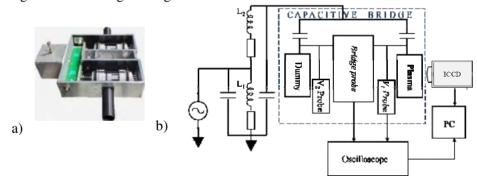


Figure 1: a) Photo of the capacitive bridge, b) schematic of the experimental set-up.

The schematic of the experimental set-up is shown in Figure 1b. The entire electrical circuit is housed in an aluminum box to protect against interference and losses. We utilized a Rigol DG5102 RF signal generator for the power source, which provides a sine signal set to a frequency of 13.56 MHz. This signal is then amplified by a linear amplifier, specifically the Barthel RFA-0.1/50-100 BOO. Coils L_1 and L_2 are part of an inductive coupling and represent a resonant transformer that operates exclusively at 13.56 MHz. This resonant transformer raises the generator voltage to the kilovolt range. The capacitive bridge comprises four capacitors, two of which are physically identical discharge chambers. While the 'Dummy' remains inactive and functions solely as a capacitor, the 'Plasma' acts as the active chamber where the discharge is observed. We monitor the voltage signal from the bridge diagonal using the 'Bridge probe'. Before taking measurements, we calibrated probe V_1 , which we use to measure the voltage on the discharge chamber. When the bridge is in balance, the signal from the diagonal is

minimal. We detect the moment of breakdown in the gas using an oscilloscope (Keysight Infiniium DSO9104A). The amplitude of the voltage signal from the diagonal of the bridge increases sharply. In other words, the bridge suddenly goes out of balance due to a change in impedance when the breakdown occurs.

3. RESULTS AND DISCUSSION

Figure 2 compares radio frequency (RF) breakdown curves for argon discharge obtained at 13.56 MHz. The curves are derived from measurements (represented by full circles) and Monte Carlo simulations (represented by open circles). The breakdown curve, obtained at the electrode distance of 0.7 cm, covers a range from 0.65 Torr cm to 20 Torr cm. Monte Carlo (MC) code was described and explained elsewhere (Raspopović et al., 1999). These simulations were carried out with only electrons, and their movement is determined by the external electric field (Puač, et al., 2018). The set of cross-sections consists of momentum transfer, two excitations and an ionization cross-section and has been tested for argon swarms in our group (Petrović et al., 2007). Physical processes on the electrodes and the effects of the heavy particles were modelled by factors of reflection R = 0.4 and $\gamma = 0.07$. These values were chosen to modify the breakdown voltage curve to better correspond to the measured curve. Breakdown points were determined in two ways. For the right-hand branch, pressure was fixed, and voltage was slowly increased until the number of electrons in time didn't get a positive slope (Savić et al., 2011). Similarly, points in the left-hand branch were determined by fixing the voltage and increasing the pressure until the breakdown occurred. The RF breakdown curves are expected to have the characteristic 'S' shape. However, for small interelectrode distances the curves are distorted (Lisovskiy, Yegorenkov, 1998), in such a way that the left-hand branch is somewhat flattened, which is also observed in both of our curves (experiment and MC).

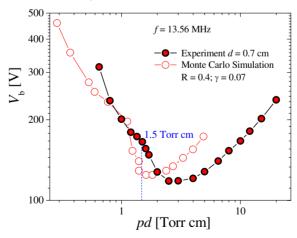


Figure 2: RF breakdown curves for Ar discharge at f = 13.56 MHz. Comparison of experimental results for electrode gap of 0.7 cm (full circles) and MC simulation (open circles) when the secondary electron yield is $\gamma = 0.07$, and the reflection is assumed to be R = 0.4.

Analyzing the breakdown behavior at high pd values, we observe that the breakdown voltage decreases with decreasing pressure (p) (the electrode gap (d) is fixed). At pd+=2.5 Torr cm, the minimum breakdown voltage occurs. Beyond this point, the breakdown voltage increases as pressure decreases further. In the left-hand branch of the curve, an inflexion point appears at 1.5 Torr cm. This inflexion can be attributed to conditions where the amplitude of electron oscillations in the RF field becomes comparable to the interelectrode distance (d), leading to increased losses. From this point on, the breakdown is conditioned by a balance between losses at the surface of electrodes and the gain of energy from the increasing field and numerous electrons crossing the threshold for ionization. Thus, the secondary electron yield at the electrodes becomes significant.

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155 and Antonije Đorđević to the project F133.

References

Burm, K.T.A.L: 2005, Contrib. Plasma Phys. 45, 54.

Conrads H., Schmidt M.: 2000, Plasma Sources Sci. Technol. 9, 441.

Mahony C. M. O., Gans T., Graham W. G., Maguire P. D., Petrović Z. Lj. :2008, *Appl. Phys. Lett.*, 93, 011501.

Makabe, T., Petrovic, Z. Lj.: 2006, *Plasma Electronics: Applications in Microelectronic Device Fabrication (1st ed.)*, CRC Press.

Lee H.C.: 2018, Appl. Phys. Rev. 5, 011108.

Lisovskiy A. V., Yegorenkov V. D.: 1998, J. Phys. D, Appl. Phys., 31, 3349.

Korolov I., Donkó Z.: 2015, Phys. Plasmas, 22, 093501.

Petrović Z. Lj., Šuvakov M., Nikitović Ž., Dujko S., Šašić O., Jovanović J., Malović G., Stojanović V.: 2007, *Plasma Sources Sci. Technol.*, 16, S1–S12.

Puač M., Marić D., Radmilović-Radjenović M., Šuvakov M., Petrović Z. Lj.: 2018, *Plasma Sources Sci. Technol.*, 27, 075013.

Raspopović Z. M., Sakadžić S., Bzenić S. A., Petrović Z. Lj.: 1999, *IEEE Trans. Plasma Sci.* 27, 1241.

Savić M., Radmilović-Radjenović M., Šuvakov M., Marjanović S., Marić D., Petrović Z. Lj.: 2011, *IEEE Trans. Plasma Sci.* 39, 2556.

SPIG 2024 PROGRAMME

Belgrade, Serbia, August 26 – 30, 2024

Monday 26 th	August 2024	
	Workshop	os estados est
2 nd SPGD Workshop LIBS4fusion Workshop		
09:20-09:30	Opening and Introduction: Saša Dujko	Opening: Milivoje Ivković
	Session 1, Hall A	Session 1, Hall B
09:30-10:00	Miloš Ranković (Czech Republic) Electron-induced processes in dielectric insulation gases	Volker Naulin (Denmark) Fusion: from science fiction to science fact
10:00-10:30	Jaime de Urquijo (Mexico) Three-body electron attachment processes in H2O, CO2, and their mixtures	Radomir Panek (Czech Republic) EUROfusion, the consortium coordinating European fusion research
10:30-11:00	Boya Zhang (China) Deriving Swarm Parameters from Ion Kinetics and Determining Collision Cross Sections through Data-Driven Methods for Eco- friendly Insulating Gase	Miloš Škorić (Serbia) to be confirmed Fusion related research at the University of Belgrade
11:00-11:30	Coffee break	
	Session 2, Hall A	Session 2, Hall B
11:30-12:00	Jacob Stephens (USA) Multi term Boltzmann models: Engineering Tools for the Pulsed Power Community	Corneliu Porosnicu (Romania) Plasma-wall interaction studies within the EUROfusion Consortium
12:00-12:30	Luca Vialetto (USA) Particle propagation and electron transport in gases and plasmas	V. Alimov (Russia) to be confirmed Diagnostics of the fusion reactor wall
12:30-13:00	Satoru Kawaguchi (Japan) Physics- informed neural networks for studies on electron swarms in gases	Violeta Lazić (Italy) Deployments of Laser Induced Breakdown Spectroscopy
13:00-15:00	Lunch break	
	Session 3, Hall A	Session 3, Hall B
15:00-15:30	Dale Muccignat (Australia) Advances in machine learning methods for the determination of electron scattering cross-section sets	Milivoje Ivković (Serbia) NOVA2LIBS4fusion
15:30-16:00	Greg Boyle (Australia) Analysis of current waveforms in the pulsed- Townsend Experiment	Dragan Ranković (Serbia) TEA CO2 laser LIBS 15:50 Biljana Stankov (Serbia) Stark
16:00-16:30	Nuno Pinhão (Portugal) Fitting of Electron Collision Cross Sections from Swarm Data using a Genetic Algorithm	parameters of beryllium spectral lines 16:10 Miroslav Kuzmanović (Serbia) Problem of LIBS surface and depth elemental analysis of PFC materials
16:30-17:00	Coffee break	
	Session 4, Hall A	Session 4, Hall B
17:00-17:30	17:00-17:30 Nathan Garland (Australia) Rapidly exploring and designing electron transport quantities in dielectric gas Ivan Traparić (Serbia) Hydrogen isotope retention diagnostics	

	insulator mixtures with approximation theories	17:20 Marijana Gavrilović Božović (Srbia)
17:30-18:00	Marnik Metting Van Rijn (Switzerland) Electron scattering cross sections of 1,1,1,2-Tetrafluoroethane (R134a)	17:40 Milivoje Ivković (Serbia) In-situ LIBS for fusion reactors surface diagnostics
18:00-20:00	SPIG 2024 Welcome Cocktail (Club of SASA)	18:00-18:30 Rounding table

Tuesday 27 th August 2024						
SPIG 2024						
	PL – Plenary lecture: 35+10 min TL – Topical lecture: 25+5 min PR – Progress Report: 15+5 min					
08:45-09:00	Opening, Chairs: Bratislav Obradović, Jova		nd Miroslav Kuzmanović			
	Plenary Session 1, Hall A, Chair: Dejan Mil					
09:00-09:45	Xiao-Min Tong (Japan) Theory on dynamic	s of atoms	in strong laser field			
09:45-10:30	Gerhard G. Paulus (Germany) Extreme UV	imaging v	with high harmonics			
10:30-11:00	Coffee Break					
	Plenary Session 2, Hall A, Chair: Miloš Ško					
11:00-11:45	Luca Volpe (Spain) Current situation and fu technology development, science and related	applicatio	ns			
11:45-12:30	Andreja Gomboc (Slovenia) How stars get	thorn apart	by supermassive black holes			
12:30-14:30	Lunch Break					
	Hall A - Parallel Session:		Parallel Session			
14:30-15:00	Chair: Bratislav Obradović		an Mančev pp (Slovakia) Ion induced reactions			
14:30-13:00	Paul Maguire (United Kingdom) Liquid microdroplets in a microplasma: phenomena and technological applications 3	in IMS st	udied by DFT 3			
15:00-15:30	Nevena Puač (Serbia) Diagnostics and		tanković Mališ (Serbia) Modeling			
	applications of atmospheric pressure		re interaction of cellulosic materials plasmas 2			
	plasmas for triggering of cell mechanisms 3	(15:00-15)				
			nić (Serbia): Interaction of ions with			
		graphene-insulator-graphene compos				
		systems 2				
		(15:20-15:40)				
15:30-16:00	Claudia Lazzaroni (France) Micro hollow					
	cathode discharges in Ar/N ₂ used for boron		rizing Ionization and Electron			
	nitride PECVD 3		s in Biological Materials: Theoretical			
			erical Insights into Pulsed Laser- Breakdown Processes 2			
		(15:40-16				
16:30-17:00	Coffee Break	(13.40-10				
10.30-17.00		11-11 D 1	Savallat Ossaina			
	Hall A - Parallel Session Chair: Joyan Cyetić		Parallel Session van Radović			
17:00-17:30	Chihir o Suzuki (Japan) Comprehensive Z		****			
17:00-17:30	dependence analysis of soft X-ray spectra					
	from highly charged heavy ions using	interest 4				
	magnetically confined high-temperature (17:00-17:20)					
17:30-18:00	plasmas 4 Sergei Ryzhkov (Russia) Magneto-inertial Matthias Werl (Austria) De-excitation		Worl (Austria) De avaitation			
		alculation for highly excited of				
	Tuoton una powerrar motamaton :	hollow atoms 1				
	(17:20-17:40)					
18:00-18:20	Blagoje Djordjevic (USA): Integrated					
	radiation-magneto-hydrodynamic simulations of magnetized burning plasmas	negative i	ionization fronts in strongly attaching			
	simulations of magnetized burning plasmas	(17:40-18	3:00)			
1		(177.00 10				

	Danijela Danilović (Serbia) Synchrotron radiation photoelectron spectroscopy study of the electronic structure of Ag-Bi-I rudorffite nanoparticles 1 (18:00-18:20)
18:30-20:00	Poster session 1 - SASA Gallery of Science and Technology (Chair: Nikola Cvetanović)

Wednesday 28th August SPIG 2024 (day 3) PL - Plenary lecture: 35+10 min TL - Topical lecture: 25+5 min PR - Progress Report: 15+5 min Plenary Session 3, Hall A, Chair: Igor Savić		es are given in the Central European Sumn	ner Time (CEST) zone.			
Plenary Session 3, Hall A, Chair: Igor Savić	Wednesday	y 28 th August				
Plenary Session 3, Hall A, Chair: Igor Savić	SPIG 2024	(day 3)				
09:00-09:45 Stephan Schlemmer (Germany) Missing ions in laboratory and space 09:45-10:30 Alicja Domaracka (France) Ion processing of molecular systems: a way to form complex systems in space 10:30-11:00 Coffee Break Plenary Session 4, Hall A, Chair: Dragana Marić 11:00-11:45 Jan van Dijk (Netherlands) LXCat 3 and Beyond – Fostering Reproducibility in Low-Temperature Plasma Science Hall A - Parallel Session Chair: Aleksandar Milosavljević Niuno Pinhão (Portugal): Description of electron swarms in an electric field: a finite elements computation including third-order transport parameters Narine Fournier (France): Photoelectron spectroscopy of solvated biological interest molecule in liquid-jet configuration 1 (12:15-12:35) 12:45-14:30 Lunch Break / SPIG Committee meeting Hall A - Parallel Session Chair: Sanja Tošić Hall B - Parallel Session Chair: Sanja Tošić Hall B - Parallel Session Chair: Vladimir Srecković Serbia): On the onditions for soliton formation in the galactic environment 4 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 15:20-15:40 Dana Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 16:00-16:20 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 1 16:00-16:20 16:00-16:20 16:00-16:20 16:00-16:20 16:00-16:20 16:00-16:						
09:45-10:30 Alicja Domaracka (France) Ion processing of molecular systems: a way to form complex systems in space		Plenary Session 3, Hall A, Chair: Igor Savi	ć			
10:30-11:00 Coffee Break	09:00-09:45	Stephan Schlemmer (Germany) Missing io	ns in laboratory and space			
Plenary Session 4, Hall A, Chair: Dragana Marić 11:00-11:45 Jan van Dijk (Netherlands) LXCat 3 and Beyond – Fostering Reproducibility in Low-Temperature Plasma Science Hall A - Parallel Session Chair: Aleksandar Milosavljević Nuno Pinhão (Portugal): Description of electron swarms in an electric field: a finite elements computation including third-order transport parameters 1 Marine Fournier (France): Photoelectron spectroscopy of solvated biological interest molecule in liquid-jet configuration 1 (12:15-12:35) Lunch Break / SPIG Committee meeting Hall A - Parallel Session Chair: Sanja Tošić Chair: Vladimir Srečković Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Comicions for soliton formation in the galactic environment 4 Chair Vladimir Stephonic Comicions for soliton formation in the	09:45-10:30	, , , ,	of molecular systems: a way to form			
11:00-11:45	10:30-11:00	Coffee Break				
Low-Temperature Plasma Science Hall A - Parallel Session Chair: Aleksandar Milosavljević Nikolai N. Bezuglov (Russia): Penning and photoionizations of cold Rydberg alkali metal elements computation including third-order transport parameters 1 12:15-12:45		Plenary Session 4, Hall A, Chair: Dragana	Marić			
Chair: Aleksandar Milosavljević Nuno Pinhão (Portugal): Description of electron swarms in an electric field: a finite elements computation including third-order transport parameters 1 12:15-12:45 Marine Fournier (France): Photoelectron spectroscopy of solvated biological interest molecule in liquid-jet configuration 1 (12:15-12:35) 12:45-14:30 Lunch Break / SPIG Committee meeting Hall A - Parallel Session Chair: Sanja Tošić 14:30-15:00 Helgi Hrodmar sson (France): VUV photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1	11:00-11:45	· · · · · · · · · · · · · · · · · · ·	eyond – Fostering Reproducibility in			
Nikolai N. Bezuglov (Russia): Penning and photoionizations of cold Rydberg alkali metal atoms under Förster resonance conditions 4 transport parameters 1						
electron swarms in an electric field: a finite elements computation including third-order transport parameters 1 12:15-12:45 Marine Fournier (France): Photoelectron spectroscopy of solvated biological interest molecule in liquid-jet configuration 1 (12:15-12:35) 12:45-14:30 Lunch Break / SPIG Committee meeting Hall A - Parallel Session Chair: Sanja Tošić 14:30-15:00 Helgi Hrodmarsson (France): VUV photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina Strong-field processes induced by tailored laser fields 1 15:20-15:40 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1	11:45-12:15	3	3			
spectroscopy of solvated biological interest molecule in liquid-jet configuration 1 (12:15-12:35) 12:45-14:30 Lunch Break / SPIG Committee meeting Hall A - Parallel Session Chair: Sanja Tošić 14:30-15:00 Helgi Hrodmar sson (France): VUV photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 Demilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 a dynamic environment 4 Adynamic environment 4 a dynamic environment 4 Ally B - Parallel Session Chair: Vladimir Srećković Chair: Vladimir Srećković (Serbia): On the conditions for soliton formation in the galactic environment 4 Nikola Veselinovic (Serbia): Fluctuations in the Flux of Energetic Protons in Heliosphere before and during Sudden Decreases in Galactic Cosmic Ray Intensity 4 Aleksandra Kolarski (Serbia): Properties of Earth's lower ionospheric plasma perturbed by solar flares 4 Vladimir Zeković (Serbia): SLAMS-enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4	11.43-12.13	electron swarms in an electric field: a finite elements computation including third-order	photoionizations of cold Rydberg alkali metal			
Hall A - Parallel Session Chair: Sanja Tošić 14:30-15:00 Helgi Hrodmarsson (France): VUV photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 15:20-15:40 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 Hall B - Parallel Session Chair: Vladimir Srečković Miroslava Vukčević (Serbia): On the conditions for soliton formation in the galactic environment 4 Nikola Veselinovic (Serbia): Fluctuations in the Flux of Energetic Protons in Heliosphere before and during Sudden Decreases in Galactic Cosmic Ray Intensity 4 Aleksandra Kolarski (Serbia): Properties of Earth's lower ionospheric plasma perturbed by solar flares 4 Vladimir Zeković (Serbia): SLAMS-enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4	12:15-12:45	spectroscopy of solvated biological interest molecule in liquid-jet configuration 1				
Chair: Sanja Tošić Chair: Vladimir Srečković 14:30-15:00 Helgi Hrodmarsson (France): VUV photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 15:20-15:40 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 16:00-16:00 Towards distant dependent inner-shell photoelectron circular dichroism 1 Towards distant dependent inn	12:45-14:30	Lunch Break / SPIG Committee meeting				
photoionization of interstellar molecules: Making sense of our beautifully mysterious Universe molecule by molecule 1 15:00-15:20 Dino Habibović (Bosnia and Herzegovina) Strong-field processes induced by tailored laser fields 1 Dian Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 Towards distant dependent inner-shell photoelectron circular dichroism 1 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 conditions for soliton formation in the galactic environment 4 Niklola Veselinovic (Serbia): Fluctuations in the Flux of Energetic Protons in Heliosphere before and during Sudden Decreases in Galactic Cosmic Ray Intensity 4 Aleksandra Kolarski (Serbia): Properties of Earth's lower ionospheric plasma perturbed by solar flares 4 Vladimir Zeković (Serbia): SLAMS-enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4						
Strong-field processes induced by tailored laser fields 1 15:20-15:40 Daan Boer (Netherlands) LoKI-B C++: An open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 15:40-16:00 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 the Flux of Energetic Protons in Heliosphere before and during Sudden Decreases in Galactic Cosmic Ray Intensity 4 Aleksandra Kolarski (Serbia): Properties of Earth's lower ionospheric plasma perturbed by solar flares 4 Vladimir Zeković (Serbia): SLAMS-enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4	14:30-15:00	photoionization of interstellar molecules: Making sense of our beautifully mysterious	conditions for soliton formation in the			
open-source Boltzmann solver for reproducible electron Boltzmann calculations 1 Emilia Jasmiina Heikura (Germany): Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 Earth's lower ionospheric plasma perturbed by solar flares 4 Vladimir Zeković (Serbia): SLAMS-enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4	15:00-15:20	Strong-field processes induced by tailored	the Flux of Energetic Protons in Heliosphere before and during Sudden Decreases in			
Towards distant dependent inner-shell photoelectron circular dichroism 1 16:00-16:20 Laura Pille (Germany): Exploring biomolecular properties in the gas phase by using advanced light sources 1 Towards distant dependent inner-shell enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink of a supernova 4 Petar Kostić (Serbia): Supernova remnants in clumpy medium: hydrodynamic and radio synchrotron evolution 4	15:20-15:40	open-source Boltzmann solver for reproducible electron Boltzmann	Earth's lower ionospheric plasma perturbed by			
biomolecular properties in the gas phase by using advanced light sources 1 clumpy medium: hydrodynamic and radio synchrotron evolution 4	15:40-16:00	Towards distant dependent inner-shell	enhanced particle acceleration at high-Mach number astrophysical shocks: TeV in a blink			
16:30 Mini excursion (info at registration desk): Belgrade underground tour	16:00-16:20	biomolecular properties in the gas phase by using advanced light sources	clumpy medium: hydrodynamic and radio			
	16:30	Mini excursion (info at registration desk):	Belgrade underground tour			

		entral European Sumn	ner Time	(CEST) zone.
•	29 th August 2024	1		
SPIG 2024				
PL – Plenary I	lecture: 35+10 min	TL – Topical lecture: 2	!5+5 min	PR – Progress Report: 15+5 min
	Plenary Session 5, Hall A, Chair: Nenad Simonović			
09:00-09:45	Carla Faria (United	d Kingdom) Exploring q	uantum ef	fects in the attosecond domain
09:45-10:30	Himadri Chakrabo molecules and fuller		troscopy a	nd chronoscopy of gas phase atoms,
10:30-11:00	Coffee Break			
	Plenary Session 6, I	Hall A, Chair: Dragana	Ilić	
11:00-11:45	Paola Marziani (Ita	aly) Super-Eddington Qu	ıasars: froi	m Atomic Physics to Cosmology
11:45-12:30	Satoshi Hamaguch science for atomic-l		and challe	enges in low-temperature plasma
12:30-14:00	Lunch Break			
	Hall A - Parallel Se			Parallel Session Iarko Ćosić
14:00-14:30	Chair: Vladimir Mil Marija Gorjanc (S	,		ena D. Christova (Bulgaria):
14.00 14.50		ile fibers for adhesion	Astrophy	rsical applications of Stark ng of spectral lines 4
14:30-15:00		erbia): Atmospheric processing of cellulose cleaning to tailored	importan	ovella (France): Exploring the ce of interstellar ions in the enigma e interstellar bands 4
15:00-15:30	Miran Mozetič (Slo viruses in water by	ovenia): Inactivation of plasma treatment 3		ob (Romania) Electron NS+ s in cold plasma 4 5:20)
15:30-16:00	Coffee Break			
	Hall A - Parallel Se Chair: Predrag Ran			Parallel Session Goran Poparić
16:00-16:30	Milan Radović (Sw Deposition and Adv	vitzerland) Pulse Laser vanced Spectroscopy: merging Properties in	Peter Ha	artmann (Hungary) Using dust as probes in low pressure gas 3
16:30-17:00	Violeta Lazić (Italy what we can measur	r) LIBS spectroscopy: re, and how? 3		avlović (Serbia) Thermal and acoustic s of cellulose fibrous materials 3 6:50)
17:00-17:20	Ivan Trapari ć (Ser Machine Learning a Intelligence in Plasr	and Artificial	dielectric	
17:20-17:40	Olga Stepanova (R Water Electrophysic and problems 3	ussia) Air-Plasma- cal System: prospects	modellin	
17:50-19:00	O Poster session 2 - SASA Gallery of Science and Technology (Chair: Miroslav Kuzmanović)			
20:00-24:00 Conference dinner and closing				

Friday 30 th August 2024		
SPIG 2024 10:00-17:00	(day 5) Excursions (optional, info at registration desk): Belgrade sightseeing cruise (10 – 13:30)	
17:00	Departure	

LIST OF POSTERS

No.	Section	Title	Authors
1	1.1.	Excitation of acetone induced by electron impact	Barbora Stachová, Juraj Országh and Štefan Matejčík
2	1.1.	Small molecules essential to astrophysics: collisional and radiative processes	S. Tošić, V. Srećković and V. Vujčić
3	1.1.	Investigation of elastic electron scattering from desflurane molecule at intermediate electron energy	J. Vukalović, J.B. Maljković, F. Blanco, G. Garcia and B.P. Marinković
4	1.1.	Ejected electron spectra of krypton studied by high and low energy electrons	B.P. Marinković, J.J. Jureta and L. Avaldi
5	1.1.	Electron scattering cross sections represented in Belgrade electron-atom/molecule database (beam)	B.P. Marinković and S.Đ. Ivanović
6	1.1.	Direct electron-liquid energy loss spectra measurements using a liquid micro-jet	D. L. Muccignat, D. B. Jones, J. R. Gascooke, G. J. Boyle, N. A. Garland and R. D. White
7	1.1.	Influence of catastrophes and hidden dynamical symmetries on ultrafast backscattered photoelectrons	T. Rook, L. Cruz Rodriguez and C. Figueira de Morisson Faria
8	1.1.	Dissociative electron attachment to CO ₂ in electric and magnetic fields	M. M. Vojnović, M. M. Ristić, V. V. Stanković-Mališ and G. B. Poparić
9	1.1	Investigation of Elastic Electron Scattering by Anaesthetic Molecules in Gaseous Phase	Jelena B. Maljović, Jelena Vukalović, Francisco Blanco, Gustavo Garcia and Bratislav P. Marinković
10	1.2.	Post-prior discrepancy in the CB1-4B method for single-electron capture in fast Li ³⁺ + He collisions	Nenad Milojević, Ivan Mančev, Danilo Delibašić and Miloš Milenković
11	1.3.	Diffusion coefficients of ${\rm H_2}^+$ ions in ${\rm H_2}$ gas	Ž. Nikitović and Z. Raspopović
12	1.3.	Transport properties of two-temperature SF ₆ and its alternative gases	G.Wang, B. Zhang and X.Li
13	1.3.	Monte Carlo simulation of electron swarms in pulsed Townsend experiment and validation of the swarm data derived from waveform analysis	M. Hao, G. Hagelaar, B. Zhang and X. Li
14	1.3.	An aliasing method for determination of transport data for exotic charged particles in crossed electric and magnetic fields	N. A. Garland, R. D. White, R. E. Robson and M. Hildebrandt

15	1.3.	Studies on electron swarms and streamer discharges in eco-friendly RPC gases	S. Dujko, I. Simonović, D. Bošnjaković, Z.Lj. Petrović and J. De Urquijo
16	1.3.	Electron transport in radio-frequency electric and magnetic fields in ultra-low GWP gases	S. Dujko, I. Simonović, D. Bošnjaković, J. Atić and Z. Lj. Petrović
17	1.3.	Studies on streamer discharges in ultra-low GWP gases	D. Bošnjaković, I. Simonović and S. Dujko
18	1.3.	Electron transport in simple liquid mixtures	G. J. Boyle, N. A. Garland, R. P. Mceachran and R. D. White
19	1.3	Three-dimensional streamer model in the AMREX environment	I. Simonović, D. Bošnjaković and S. Dujko
20	2.1.	Interaction of ions with drift-current biased supported graphene	A. Kalinić, I. Radović, L. Karbunar and Z. L. Mišković
21	2.1.	Rainbows in transmission of protons through thin silicon carbide crystal	N. Starčević and S. Petrović
22	2.1.	Low energy heavy ion rainbow scattering by graphene	M. Hadžijojić and M. Ćosić
23	2.2.	Forming nanocrystalline SnO ₂ films on silicon and silicon dioxide by laser-plasma deposition method	F. Komarov, O. Milchanin, M. V. Puzyrev and I. S. Rahavaya
24	2.3.	Equilibrium composition of plasma obtained by laser ablation of glass	M. Ristić, A. Šajić, J. Babić and M. Kuzmanović
25	2.3.	Semiquantum simulation of cellulosic materials interaction with CO ₂ plasmas	V. Stanković Mališ and Goran B. Poparić
26	2.3.	Properties of Cu/Zn oxide nanostructures formed by plasma-activated electrolysis	N. Tarasenko, V. Kornev, M. Nedelko, A. Radomtsev, N. Tarasenka, J. Ciganović, S. Živkovic and M. Momcilović
27	2.3.	Target selection for LIBS studies of hydrogen isotope retention	D. Ranković, B. Stankov, I. Traparić, M. Kuzmanović and M. Ivković
28	3.1.	Measurement of the velocity of the plasma jet appearing from a wall stabilized arc	L. Gavanski, N. Simić and S. Djurović
29	3.1.	The measurement of pulsed gas discharge parameters by means of Fe I lines in argon and argon-hydrogen mixture	J. Jovović
30	3.1.	Stark widths of several Te II spectral lines for a purpose in investigation of astrophysical spectra	Z. Majlinger, M.S. Dimitrijević and V. Srećković
31	3.1.	Stark width estimates for the most prominent Ce II spectral lines important for astrophysical investigations	Z. Majlinger
32	3.1.	Determination of unknow analyte concentration in glass samples using the LIBS method	A. Šajić, D. Ranković, M.Ristić and M. Kuzmanović
33	3.1.	Investigating the thermal profile of an atmospheric pressure argon plasma jet on a conductive and insulating mesh surface	J. Lalor and V. Milosavljević
34	3.1.	The use of thermoelectric radiation detectors for heat flux measurements in shock-tubes with gas ionization	S.A. Poniaev, P.A. Popov, N.A. Monakhov, T.A. Lapushkina and M.A. Kotov

35	3.1.	Detection of rhenium in tungsten using LIBS with additional fast pulse discharge	I. Traparic, B. Stankov and M. Ivković
36	3.1.	Estimation of nitrogen impurity level in helium atmospheric discharge via emission spectroscopy	N. Cvetanović, S.S. Ivković and B.M. Obradović
37	3.1.	The effect of acids on pig bone estimated by LIBS	M. Marković, D. Ranković and M. Kuzmanović
38	3.1.	Fast photography in the service of spatially and temporally resolved LIBS diagnostics of doped tungsten	B. Stankov, M. R. G. Božović, D. Ranković, J. Savović and M. Ivković
39	3.1.	Influence of the ablation angle change on spectral line intensities in LIBS experiments	I. Traparić, B. Stankov, N. Vujadinović, M. Vinić and M. Ivković
40	3.2.	Modelling of an icp discharge in oxygen with full kinetics scheme with newly calculated VV/VT rate constants	A. Kropotkin, A. Chukalovsky, A. Kurnosov, T. Rakhimova and A. Palov
41	3.2.	Influence of interelectrode distance on the characteristics of three-electrode pulsed sdbd	V. V. Voevodin, O. I. Korzhova, V. Yu. Khomich, V. A. Yamschikov, N. Yu. Lysov and A. V. Klubkov
42	3.2.	RF breakdown in argon at low-pressures: experiment and modelling	J. Marjanović, D. Marić, M. Puač, A. Đorđević and Z. Lj. Petrović
43	3.2.	Cathode sheath diagnostics by integral end-on optical emission spectroscopy in an analytical glow discharge source in argon	N. V. Nedić, N. V. Ivanović, I. R. Videnović, Dj. Spasojević and N. Konjević
44	3.3.	Luminescent analysis of e-beam induced transformation of phenol in the presence of humic substances	E. N. Bocharnikova, O. N. Tchaikovskaya, S. A. Chaykovsky, V. I. Solomonov, A. S. Makarova and I. V. Sokolova
45	3.3.	The formation of microneedles structures from silicon using plasma etching in SF ₆ /O ₂ mixture in inductively coupled plasma	V. Kuzmenko, A. Miakonkikh and K. Rudenko
46	3.3.	Fluorocarbon polymerizing plasmas etching processes for structures of microelectronics	A. Miakonkikh, V. Kuzmenko and K. Rudenko
47	3.3.	A&M datasets for LTP treatment of plants	V. Vujčić, V.A. Srećković, O. Kounchev and F. Iacob
48	3.3.	Low-temperature plasma and plasma-activated liquids in solving agricultural problems: experimental technique	E.M. Konchekov, N.G. Gusein- Zade, D.V. Yanykin, L.V. Kolik, Yu.K. Danileiko, V.I. Lukanin, K.F. Sergeichev, I.V. Moryakov, V.D. Borzosekov, V.V. Gudkova, M.E. Astashev and S.V. Gudkov
49	3.3.	Compact piezotransformer source of the cold atmospheric plasma with three types of discharges	N. N. Bogachev, A. S. Bakshaev, L. V. Kolik, E. M. Konchekov and A. S. Kon'kova
50	3.3.	Measurements of reactive oxygen and nitrogen species in plasma activated water by microwave discharge	D. Topalović, N. Babucić, N. Škoro and N. Puač
51	3.3.	Ionization of a plasma antenna channel in a dielectric gas-discharge tube	N. N. Bogachev, I. L. Bogdankevich, V. I. Zhukov, D. M. Karfidov, V. P. Stepin and N. G. Gusein-Zade

52	4.2.	Dataset for photodissociation of small molecular ions	V.A. Srećković, N. Pop, M.S. Dimitrijević, M.D. Christova and V. Vujčić
53	4.2.	Investigation of chemistry of hydrogen, helium and lithium molecular ions in the early Universe	V.A. Srećković, N. Pop, M.S. Dimitrijević and M.D. Christova
54	4.2.	New molecular data for confined molecular systems and astrochemical modelling	V.A. Srećković, N. Pop, and V. Vujčić
55	4.2.	The complex emitter inside dense plasma, continuation of a Coulomb cut-off approach, argon case	N.M. Sakan, Z. Simić, V.A. Srećković and M. Dechev
56	4.2.	Variability along the main sequence of quasars	E. Bon, P. Marziani and N. Bon
57	4.2.	Advanced nonlinear analysis for detecting binary quasars and transient events in the LSST era	A.B. Kovačević, D. Ilić, L.Č. Popović, M. Pavlović, A. Raju, M. Tošić and Iva Čvorović-Hajdinjak
58	4.2	Two-Component Model of Fe II Lines in Spectra of Active Galactic Nuclei	Jelena Kovačević-Dojčinović, Ivan Dojčinovć and Luka Č. Popović

Book of Abstracts

POSMOL 2021

at-present:

XXII International Symposium on Electron-Molecule Collisions and Swarms

Virtual Meeting July 29-30, 2021

FOREWORD

Due to the restrictions on travel during the Covid-19 pandemic, the POSMOL 2021 at the University of Notre Dame, USA, could not be organized this year. Nevertheless, the Electron International Advisory Committee decided to hold a virtual meeting on Electron-Molecule Collisions and Swarms (EMS). The meeting will be held on July 29-30, 2021, with ten invited (incl. one plenary) speakers and other virtual events (e.g., poster session) presenting via Zoom. We believe that the shorter form and virtual platform of our meeting will be more accessible for participants across many different time zones. The forum will have the excellent speakers and allow for discussions about recent research findings of our community in the form of poster presentations and short "Hot Topics" talks to foster the growth of our scientific network.

The POSMOL will continue in 2023 as a joint meeting of the International Workshop on Low-Energy Positron and Positronium Physics and the International Symposium on Electron-Molecule Collisions and Swarms, a satellite meeting of the International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC).

We would like to express many thanks to the Electron International Advisory Committee members chaired by Prof. Paulo Limao-Vieira for their work and dedication on the scientific content of the conference and the Organizing Committee members, particularly Dr. Dipayan Chakraborty, for their assistance with logistics for this meeting. Finally, we are grateful to all of the participants in this meeting who have contributed so much to the continued success of our scientific community.

Sylwia Ptasinska, Chair *University of Notre Dame*

Daniel Slaugther, Co-Chair Lawrence Berkeley National Laboratory

ELECTRON INTERNATIONAL ADVISORY COMMITTEE

Paulo Limao-Vieira, *Universidade NOVA de Lisboa, Portugal*, Chair Michael J. Brunger, *Flinders University, Australia*Roman Curik, *J. Heyrovsky Institute of Physical Chemistry, Czech Republic*Romarly da Costa, *Federal University of ABC, Brazil*Jimena Gorfinkiel, *Open University, United Kingdom*Janina Kopyra, *University of Siedlce, Poland*Dragana Maric, *Institute of Physics Belgrade, Serbia*Sylwia Ptasinska, *University of Notre Dame, USA*Hajime Tanuma, *Tokyo Metropolitan University, Japan*Ronald D. White, *James Cook University, Australia*

TABLE OF CONTENTS

Foreword	2
Electron International Advisory Committee	3
Program	10
Abstracts of Oral Presentations Note: presenting author's name is <u>underlined</u>	
Plenary Lecture	
Electronic excitation of molecules by electron impact: the experimental and theoretical situation Marco A.P. Lima	n 13
Invited Lectures	
Anisotropic scattering in rotational collisions of electrons with CO molecules <u>L.L. Alves</u> , L. Vialetto	14
Ionization of electron transport investigations with a scanning drift tube Zoltan Donko	15
Recent progress in the frame transformation theory of dissociative recombination Chris H. Greene , David Hvizdos, Roman Curik	16
Isotope effect observed in collision cross sections by low-energy electron impact M. Hoshino and A. Yodo	17
High angular resolution electron scattering from H ₂ O near 0° R. Kadokura, A. Loreti, A. Kover, A. Faure, J. Tennyson, G. Laricchia	18
On-the-fly nonadiabatic dynamics of electron-induced reactions <u>F. Kossoski</u> , M. T. do N. Varella, and M. Barbatti	19
Electrical breakdown in vapours of liquids Jelena Marjanovic, <u>Dragana Maric</u> , Gordana Malovic, Nikola Skoro, Zoran Lj. Petrovic	20

	Role of low energy (0-20 eV) electrons in Radiobiology and Radiotherapy <u>Leon Sanche</u>	21
	Related role of low-energy electrons in novel metal oxocluster EUVL resists and FEBID precursors Radiotherapy M. Rohdenburg, N. Thakur, S. Castellanos, P. Martinovic, A. Butrymowicz, I. Szymanska, P. Swiderek	22
Н	ot Topics	
	Electron interactions with the coenzyme Q ₀ : molecular anion observation and its subsequent fragmentation reactions <u>J. Ameixa, E. Arthur-Baidoo, J. Pereira-da-Silva, M. Oncak, M. K. Beyer, J.C. Ruivo, T. do N. Varella, F. Ferreira da Silva, S. Denifl</u>	M. 23
	Total electron detachment cross section and induced cationic fragmentation in oxygen anion collision with benzene <u>Carlos Guerra</u> , Sarvesh Kumar, Fernando Aguilar-Galindo, Sergio Diaz-Tendero, Ana Lozano, Monica Mendes, Paulo Limao-Vieira, Gustavo Garcia	I. 24
	Dissociative σ^* states in electron-molecule collisions and their interpretation <u>Zdenek Masin</u> , J. Benda, J. D. Gorfinkiel, K. Houfek	25
	Effect of π^* - σ^* coupling on the angular distribution of Cl ⁻ fragments produced via dissociative electron attachment to four unsaturated chlorohydrocarbons Pamir Nag, Michal Tarana, Juraj Fedor	26
	Structure and dynamics of negative ion resonance in H ₂ , D ₂ and HD at 10 eV <u>S. Swain</u> , E. Krishnakumar, V.S. Prabhudesai	27
	Fragmentation of tyrosine under low-energy electron impact <u>Jelena Tamuliene</u> , Liudmila Romanova, Vasyl Vukstich, Alexander Snegursky	28
	Theoretical study of electron-impact vibrational excitation of isocyanic acid HNCO using two dimensional nonlocal model <u>Jiri Trnka</u> , Karel Houfek, Martin Cizek	29
Abstr	racts of Poster Presentations	
1.	Elastic electron and positron scattering by glycolic acid Cesar A. Amaral, Alessandra S. Barbosa, Sergio D. Almeida	30
2.	Electron-molecule scattering calculations with Quantemol-EC H. B. Ambalampitiya, B. Cooper, M. Tudorovskaya, S. Mohr, M. Hanicinec, M.A.P.	

	Turner, A. Dzarasova, J. Tennyson	31
3.	Dissociative fragmentations in the 2-deoxy-2-fluoro-D-glucose molecule induced low-energy electrons <u>Eugene Arthur-Baidoo</u> , Milan Oncak, Stephan Denifl	by 32
4.	Anion structures with non-covalent bonds in dissociative electron attachment to sor brominated aromatic compounds N.L. Asfandiarov, J. Fedor, J. Kocisek, T.F.M. Luxford, A.V. Markova, M.V.	ne
	Muftakhov, S.A. Pshenichnyuk, R.G. Rakhmeev	33
5.	Effects due to the degree of coherence of the projectile beam in collisions again molecules T.A. Guarda, R.O. Barrachina, F. Navarrete, M.F. Ciappina	nst 34
_		
6.	Absolute measurements of mass loss during low-energy electron irradiation of thymi and thymidine films	ne
	Pierre-Olivier Lahaie, Andrew D. Bass, Leon Sanche, Michael A. Huels	35
7.	Electron scattering by molecules relevant to plasma processing Pedro A. S. Randi, Giseli M. Moreira, <u>Marcio H. F. Bettega</u>	36
8.	Ionization of some amino acid molecules A Zavilopulo, <u>A Bulhakova</u> , S Demes, E Remeta	37
9.	Reminder on e-N ₂ resonant excitation of $A^3\Sigma_u^+$ state <u>Iztok Cadez</u>	38
10.	Resonant Σ-states of CH: possible routes to dissociative recombination of CH+ Kalyan Chakrabarti, R. Ghosh, B. S. Choudhury, J.Zs. Mezeiand I. F. Schneider	39
	Electron impact cross section of two C ₅ H ₁₀ isomers <u>Irabati Chakraborty</u> , Nidhi Sinha, Bobby Antony	40
12.	Cross-sectional study for electron collision with rhodamine $(C_3H_3NOS_2)$ and cyanoaced acid $(C_3H_3NO_2)$ <u>Dhaval Chauhan</u> , Chetan Limbachiya	tic 41
10		71
13.	On implementation of PO formalism into R-matrix calculations M.Cizek, Z. Masin, J. Benda	42
14.	Shape resonance spectra of 1,4-C ₆ H ₄ X ₂ (X = F, Cl, Br, I) <u>Luiz Vitorino dos Santos Dalagno</u> , Giseli Maria Moreira, Marcio Henrique Franco Bettega	43
15.	Electron scattering by phosgene (COCl ₂) <u>Luiz Vitorino dos Santos Dalagno</u> , Giseli Maria Moreira, Marcio Henrique Franco Bettega	44

16.	Dynamics of dissociative electron attachment to ethanol Sukanta Das, Suvasis Swain, Vaibhav S. Prabhudesai	45
17.	Electron-induced chemistry of 2,5-norboornadiene <u>Daly Davis</u> , K.G. Bhushan	46
18.	£ methods for resonances: a critical comparison Jeremy U. Davis, Evan Thompson, Thomas Sommerfeld	47
19.	Multidimensional vibrational dynamics of e ⁻ +CO ₂ collisions within the nonloc approach and its comparison with new experimental results <u>Jan Dvorak</u> , Karel Houfek, Roman Curík, Milos Rankovic, Juraj Fedor, Martin Cizek	
20.	Dissociative electron attachment to N-methylacetamide Lauren Eckermann, Dipayan Chakraborty, Ian Carmichael, Sylwia Ptasinska	49
21.	Electronic excitation of benzene molecule by low energy electron impact Alan Guilherme Falkowski, Romarly F. da Costa, Fabris Kossoski, Michael J. Brunger Marco A. P. Lima	r, 50
22.	Low-Energy Dissociative Recombination of CH ⁺ <u>J. Forer</u> , X. Jiang, C.H. Yuen, I.F. Schneider, J. Zs. Mezei, M. Ayouz, V. Kokoouline	51
23.	Photoionization of benzene molecules in gas phase Milton Massumi Fujimoto, Mylena Hortz Ribas, Manoel Gustavo Petrucelli Homem	52
24.	Femtosecond events in radiobiology: isolated and cluster DNA damage induced by initications and non-ionizing secondary electrons <u>Yingxia Gao, Yanfang Dong, Yi Zheng, Léon Sanche</u>	al 53
25.	Experimental and simulated transmitted intensity of magnetically confined electron through gaseous THF and benzene <u>A. Garcia-Abenza</u> , L. Alvarez, F. Costa, A.I. Lozano, F. Blanco, P. Limao-Vieira, G. García	ns 54
26.	Absorption of atomic and molecular hydrogen and nitrogen in tungsten. Dissociative recombination of molecular NH ₃ Sergio Beneitez, Jorge Garcia Gallardo, <u>Juana L. Gervasoni</u>	ve 55
27.	On the description of polarization in R-matrix calculations of electron and positro collisions with highly polarizable targets <u>Vincent Graves</u> , Jimena D. Gorfinkiel	on 56
28.	X-ray irradiation of DNA in the presence gold nanoparticles promotes low energelectron induced DNA damage: LC-MS/MS study <u>Alaa Huwaidi</u> , Brigitte Guerin, J. Richard Wagner, Leon Sanche	gy 57
29.	Theoretical electron impact cross-sections for thiazole (C ₃ H ₃ NS)	51

	<u>Tejas Jani,</u> P.C. Vinodkumar, Chetan Limbachiya, Minaxi Vinodkumar	58
30.	Study of electron and positron impact scattering with atomic Mo, Ta and W Foram M. Joshi, Asha Chaudhari, Pooja Bhowmik, K.N. Joshipura	59
31.	Development of low energy electron sources as novel chemo-radio therapeutic (CR7 agents: in-vitro study of ⁶⁴ Cu/NOTA-terpyridine platinum in colorectal cancer cell Meysam Khosravifarsani, Samia Ait-mohand, Benoit Paquette, Leon Sanche, Brigitte Guerin	Γ) 60
32.	Microsolvation and bulk solvation effects upon transient anion states of 1-methyl-introimidazole Matheus B. Kiataki, Kaline R. Coutinho, Marcio T. do N. Varella	4- 61
33.	Scattering of low-energy electrons on oxaloacetic and citric acids <u>Janina Kopyra, Paulina Wierzbicka, Adrian Tulwin, Guillaume Thiam, Ilko Bald, Fran Rabilloud, Hassan Abdoul-Carime</u>	ck 62
34.	Size velocity slice imaging using improved energy resolution: Dissociative electro attachment to H_2 Akshay Kumar, Suvasis Swain, Vaibhav S. Prabhudesai	on 63
35.	Cl ₂ - formation mediated by steric hindrance upon electron transfer processes hexachlorobenzene and dichlorobenzene molecules <u>S. Kumar</u> , G. Gracia, P. Limao-Vieira	in 64
36.	Elastic positron scattering by 1,1-difluoroethylene Rafael O. Lima, Giseli M. Moreira, Marcio H. F. Bettega, Alessandra S. Barbosa, Serg d'A. Sanchez	io 66
37.	Electron-induced reactivity of tetrazoles: associative and dissociative electron attachmen Thomas F.M. Luxford, Juraj Fedor, Jaroslav Kocisek	it 67
38.	Electron scattering from molecular ions with an analytic static potential approach Dibyendu Mahato, Lalita Sharma, Rajesh Srivastava	68
39.	Elastic electron collisions with the benzoic acid molecule Giseli M. Moreira, Luiz V.S. Dalagnol, Maricio H.F. Bettega	69
40.	Inelastic processes for electron scattering with deuterated compounds Smruti Parikh , Chetan Limbachiya	70
41.	Electron impact low energy study for alanine D. Prajapati , T. Jani, P.C. Vinodkumar, M. Vinodkumar	71
42.	Elastic and electronically inelastic differential cross sections for the scattering of lo energy electrons by formic acid Pedro A. S. Randi, Giseli M. Moreira, Marcio H. F. Bettega	w 72

	43. Resonances in nitrobenzene probed by the electron attachment to neutral and by t photodetachment from anion	he
	Milos Rankovic, Pamir Nag, Cate S. Anstoeter, Golda, Mensa-Bonsu, Ragesh Kumar P., Jan R. R. Verlet, Juraj Fedor	T. 73
	44. Periodic response of the average electron velocity vector of an electron swarm in constant-collision-frequency model gas under AC electric and DC magnetic field crossed at arbitrary angles	
	Hirotake Sugawara, Yuya Nakata	74
	45. Dissociative electron attachment dynamics in biological building blocks <u>Dan Slaughter</u> , Yosuke Kuriyama, Yoshiro Azuma, C William McCurdy, Thomas Rescigno, Ann Orel, Samantha Fonseca dos Santos	75
	46. Experimental and theoretical studies on low energy electron interactions with titaniu tetrachloride (TiCl ₄)	ım
	Sylwia Stefanowska-Tur, <u>Natalia Tanska</u> , Czeslaw Szmytkowski, Elzbieta Ptasinska- Denga, Pawel Mozejko	76
	47. Electron impact ionization processes for fluoronitrile gases Nirav Thakkar , Chetan Limbachiya	77
	48. Excitation of L-valine molecules by electrons and photons A Zavilopulo, Yu Bandurin, A Bulhakova	78
Par	rticipant List	79

POSMOL 2021: XXII INTERNATIONAL SYMPOSIUM ON ELECTRON-MOLECULE COLLISIONS AND SWARMS

July 29-30, 2021

Virtual Meeting

Note: All times in Eastern Daylight Time (EDT)

PROGRAM

Thursday, July 29

7:45 a.m. Welcome words

Sylwia Ptasinska, Dan Slaughter, and Paulo Limao-Vieira

SESSION I: Invited talks

Janina Kopyra, Chair

8:00 a.m.	Isotope Effect observed in collision cross sections by low-energy electron impact Masamitsu Hoshino , <i>Sophia University</i>
8:30 a.m.	Related role of low-energy electrons in novel metal oxocluster EUVL resists and FEBID precursors Petra Swiderek , <i>University of Bremen</i>
9:00 a.m.	Electron Transport investigations with a scanning drift tube Zoltan Donko , <i>Wigner Research Center for Physics</i>

9:30 a.m. Anisotropic scattering in rotational collisions of electrons with CO molecules **Luis Alves**, *University of Lisbon*

10:00 a.m. Role of low energy (0-20 eV) electrons in radiobiology and radiotherapy **Leon Sanche**, *University of Sherbrooke*

SESSION II: Hot topics

Romarly da Costa, Chair

10:30 a.m. Structure and dynamics of negative ion resonance in H₂, D₂ and HD at 10 eV **Suvasis Swain**, *Tata Institute of Fundamental Research*

Dissociative σ^* states in electron-molecule collisions and their interpretation

Zdenek Masin, Charles University

Effect of π^* - σ^* coupling on the angular distribution of Cl⁻ fragments produced via dissociative electron attachment to four unsaturated chlorohydrocarbons **Pamir Nag**, *Heyrovsky Institute of Physical Chemistry*

Theoretical study of electron-impact vibrational excitation of isocyanic acid HNCO using two dimensional nonlocal model **Jiri Trnka**, *Charles University*

Total electron detachment cross section and induced cationic fragmentation in oxygen anion collision with benzene

Carlos Guerra, Consejo Superior de Investigaciones Científicas

11:30 a.m. Posters

Friday, July 30

7:00 a.m.	Posters
	SESSION III: Plenary talk Paulo Limao-Vieira, Chair
8:00 a.m.	Electronic excitation of molecules by electron impact: the experimental and theoretical situation Marco Lima, University of Campinas
8:45 a.m.	Coffee/Tea break
	SESSION IV: Invited talks Jimena Gorfinkiel, Chair
9:00 a.m.	On-the-fly nonadiabatic dynamics of electron-induced reactions Fabris Kossoski , <i>University of Toulouse</i>
9:30 a.m.	High angular resolution electron scattering from H ₂ O near 0° Rina Kodokura , <i>University College London</i>
10:00 a.m.	Electrical breakdown in vapours and liquids Dragana Maric, Institute of Physics Belgrade
10:30 a.m.	Recent progress in the frame transformation theory of dissociative recombination Chris Greene , <i>Purdue University</i>
	SESSION V: Hot topics Romarly da Costa, Chair
11:00 a.m.	Fragmentation of tyrosine under low-energy electron impact Jelena Tamuliene , <i>Vilnius University</i>
	Electron interactions with the coenzyme Q ₀ : molecular anion observation and its subsequent fragmentation reactions Joao Ameixa, Universidade NOVA de Lisboa and Universität Innsbruck
11:25 a.m.	Closing remarks Sylwia Ptasinska and Dragana Maric

Electrical breakdown in vapors of liquids

Jelena Marjanović¹, <u>Dragana Marić</u>¹, Gordana Malović¹, Nikola Škoro¹, Zoran Lj. Petrović^{2,3}

¹Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

²School of Engineering, Ulster University, Jordanstown, Co. Antrim BT37 0QB, UK

³Serbian Academy for Sciences and Arts, Knez Mihailova 35, 11001 Belgrade, Serbia

dragana.maric@ipb.ac.rs

Discharges in vapors of liquids, in contact with liquids and in liquids themselves, have re-ignited the attention of the plasma community in the past decade, mainly because of significantly growing possibilities in a vast domain of applications. Understanding, development and optimization of new devices show a pressing need in acquiring data on elementary processes. Certainly, environments, such as the interface between gas and liquid and pure liquid, require new theories of transport properties, e.g. a cluster formation in saturated vapors near the gas-liquid interface, the role of solvated species in liquids, mechanisms of achieving breakdown etc. [1]. Swarm data and swarm-based models have proven to be a critical source of data for modeling complex plasmas [2]. In that sense, our study of breakdown in vapors of liquids is focused on providing transport coefficients and sensitive tests of the validity of discharge models, with a goal of extending these data to plasmas in dense vapors and liquids.

In this talk, we will present an overview of experimental breakdown data for selected vapors of liquids (Figure 1), along with swarm-based analysis of results and recommendations for future work in this field.

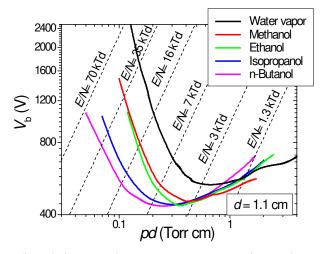


Figure 1. Paschen curves (breakdown voltage vs. pressure \times electrode gap) for vapors of selected liquids. Values of reduced electric field (E/N) are indicated by dashed lines.

References:

[1] P. J. Bruggeman, M. Kushner, B. Locke, H. Gardeniers, B. Graham, D. Graves, R. Hofman-Caris, D. Marić, J. Reid, et al, Plasma Sources Sci. Technol. 25, 053002 (2016)

[2] Z. Lj. Petrović, S. Dujko, D. Marić, G. Malović, Ž. Nikitović, O. Šašić, J. Jovanović, V. Stojanović, and M. Radmilović-Rađenović, J. Phys. D: Appl. Phys. 42, 194002 (2009)

Deriving the Breakdown Voltage from Relaxation Oscillations in Low-Current Discharge

J. Marjanović¹, D. Marić¹, Z. Lj. Petrović^{2,3}

¹Institute of Physics Belgrade, University of Belgrade; Pregrevica 118, 11080, Belgrade, Serbia sivosj@ipb.ac.rs

² Serbian Academy for Sciences and Arts; Knez Mihailova 35, 11001 Belgrade, Serbia zoran@ipb.ac.rs

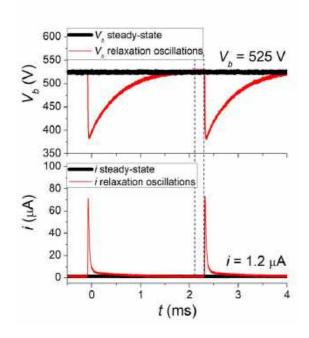
³ School of Engineering, Ulster University; Jordanstown, County Antrim BT37 0QB, United Kingdom

Breakdown, as the initial step in generation of plasmas, is of interest, not only from a fundamental point of view, studying elementary processes and phenomenology, but also for the development of numerous applications. Ever growing range of modern plasma applications result in increasing data needs for modeling of plasmas that operate in complex environments (e.g. plasma-liquid interface), in new classes of gases (e.g. ultra-low global warming potential gases), or in complex geometries. In experimental breakdown studies directed to provide data under such conditions, we are facing problems with achieving stability of the discharge close to the breakdown conditions. Under those conditions it appears to be impossible to determine the breakdown voltage and Volt-Ampere characteristics that are the most basic data for analysis of discharges at low current. In this work, we are focused on oscillations that are caused by high negative differential resistivity, typically at higher pressures (low E/N) and in the right-hand branch of the Paschen curve [1,2]. We will present a technique that can be used to obtain breakdown potentials even when the discharge breaks down in an oscillatory regime. Our aim is to extend the range of measurements for the gases that are prone to instabilities.

In our experiment, the breakdown voltage is obtained by igniting a discharge in a low-current regime and extrapolating the Volt-Ampere characteristic to the zero-current [1-3]. Oscillations of voltage and current are expected in a low current range, due to the negative differential resistivity. They can, generally, be suppressed by adjusting the circuit elements up to a limit beyond which it is not possible to control the discharge [1-3]. On the other hand, the time-resolved measurements of discharge emission profiles revealed that throughout the relaxation oscillations, the discharge rapidly goes through the high-current mode and then slowly relaxes to the low-current Townsend discharge (Fig. 1). The breakdown voltage can be estimated (quite accurately) from the voltage waveform, in the zero-current limit. Discharge in water vapor is chosen solely as an illustrative example [5].

When applying the presented method, one must be careful to distinguish between relaxation oscillations that can be used in breakdown measurements, and free-running oscillations, where discharge does not pass through the low-current limit. Fig. 2 shows voltage-current traces in time for three different modes of oscillations, against the steady-state *V-I* characteristics. Only the waveform represented by the red solid line can provide information on the breakdown.

Finally, the technique that we present here is supported by fast imaging of the discharge. Recording of the space-time-resolved emission profiles throughout oscillations is certainly valuable here, to confirm that the discharge is indeed in a near-breakdown regime. Moreover, space-time-resolved emission profiles reveal information on excitation and ionization processes.



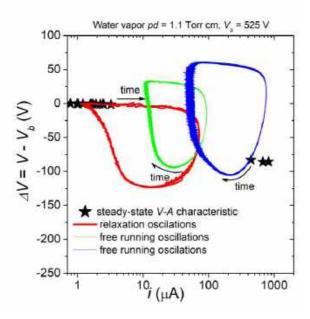


Fig. 1: Estimation of breakdown voltage from relaxation oscillations in water vapour.

Fig. 2: Dynamic *V-I* traces of different oscillation modes vs. steady state *V-I* characteristics.

Acknowledgements: This research was supported by the MESTD of Serbia and Science Fund of the Republic of Serbia, Grant No. 7749560, Exploring ultra-low global warming potential gases for insulation in high-voltage technology: Experiments and modelling – EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

- [1] Z. Lj. Petrović and A. V. Phelps, Phys. Rev. E, 47, 2806 (1993).
- [2] A. V. Phelps, Z. Lj. Petrović, and B M Jelenković, Phys. Rev. E, 47, 2825 (1993).
- [3] D. Marić, M. Savić, J. Sivoš, N. Škoro, M. Radmilović-Radjenović, G. Malović, Z. Lj. Petrović, Eur. Phys. J. D **68**, 155 (2014).
- [4] D. Marić, G. Malović, and Z. Lj. Petrović, Plasma Sources Sci. Technol. **18**, 034009 (2009).
- [5] J. Sivoš, N. Škoro, D. Marić, G. Malović, and Z. Lj. Petrović, J. Phys. D: Appl. Phys. 48, 424011 (2015).



The 14th EU-Japan Joint Symposium on Plasma Processing JSPP-14

Poster Sessions



====== Tuesday, April 18, 2023 ======

Poster Sessions Day1 (16:00-18:00)

<Auditorium Lobby>

[P-1] Yudai Kotani (Osaka University, Japan)

"Development of machine-learning-based interatomic potentials for sputtering simulation of silicon and silicon dioxide"

[P-2] Fadilla Zennifa (Kyushu University, Japan)

"Interlock Event Prediction on Gyrotron Operation by Using Supervised Machine Learning"

[P-3] Toby James (UKAEA, UK)

"MAST-U Data Management with ADIOS"

[P-4] Norbert Podhorszki (Oak Ridge National Laboratory, USA)

"The Benefits of Data Reduction for Fusion Datasets"

[P-5] Fran Jurinec (University of Helsinki, Finland)

"Feature storage framework for accelerating machine learning workflows on fusion data"

[P-6] Semin Joung (University of Wisconsin-Madison, USA)

"Real-time ELM onset prediction based on the BES system using deep neural networks in DIII-D"

[P-7] Kenji Imadera (Kyoto University, Japan)

"Inference of differential equations governing global plasma dynamics"

[P-8] Masayuki Yokoyama (National Institutes of Natiral Sciences, Japan)

"Plausible model creation by means of data assimilation \sim an example: on the thermal transport of fusion plasmas \sim "

[P-9] Christoph Eberle (LMU Munich, Germany)

"Multi-Objective Multi-Fidelity Bayesian Optimization of Neural Network Architectures and Laser-Plasma Experiments"

[P-10] Charlotte Rogerson (University of Warwick, UK)

"Framework for optimizing free parameters in ICF hydrodynamic simulations using Gaussian Process surrogate models."

[P-11] Enrico Crovini (Imperial College London, UK)

"Automatic JOREK Calibration via Batch Bayesian Optimization"

[P-12] Aaro Järvinen (VTT Technical Research Centre of Finland, Finland)

"Representation Learning Algorithms for Inferring Machine Independent Latent Features in Pedestal Plasmas in JET and AUG"

[P-14] Saša Dujko (University of Belgrade, Serbia)

"Effects of anisotropic scattering and ionization energy partitioning on the electron transport in argon"

[P-15] Allen Vincent Catapang (Doshisha University, Japan)

"Measurement of positive and negative ion energy of Ar-water vapor plasma in a DC reactive magnetron sputtering"

[P-16] Kenzo Ibano (Osaka University, Japan)

"Plasma-enhanced pulsed laser deposition of metal oxide thin films"

[P-17] Joy Kristelle De Mata (University of the Philippines Diliman, Philippines)

"Low energy fs-PLA of Nd:YAG target in high-pressure oxygen and nitrogen background gas"

[P-18] Katrinne Clea Pinca (University of the Philippines Diliman, Philippines)

"Sputter-deposited titanium-based coatings for surgical tool applications"

[P-19] Junya Matsuno (Ritsumeikan University, Japan)

"Reproduction of the early solar system materials by radio frequency thermal plasma with consideration of hydrogen addition"

[P-20] Elif Muslu (Suleyman Demirel University, Turkey)

"Preparation of Sandwich-like Silicon-Based Thin Film Anode via Radio Frequency Magnetron Sputtering Technique for Lithium-Ion Battery Application"

[P-21] Zoran Petrović (Serbian Academy for Sciences and Arts, Serbia)

"Deriving the Breakdown Voltage from Relaxation Oscillations in Low-Current Discharge"

[P-22] Kazuhiro Karahashi (Osaka University, Japan)

"Etching reactions by polyatomic ion bombardment"

[P-23] Sarah Alamri (Osaka University, Japan)

"Numerical simulation of radio-frequency (RF) capacitively coupled plasmas (CCPs) of argon and comparison with experimental observations"

[P-24] Jomar U. Tercero (Osaka University, Japan)

"Surface-reaction analyses of multi-step plasma-enhanced atomic layer etching for SiN with molecular dynamics simulation"

[P-25] Fatima Jenina Arellano (Osaka University, Japan)

"First-principles simulation of optical emission spectra for low-pressure argon plasmas and its experimental validation"

[P-26] Yi-Fan Zhang (Dalian University of Technology, China)

"Fluid study on uniformity in capacitively coupled silane mixture discharges"

[P-27] Po-Chun Huang (National Yang Ming Chiao Tung University, Taiwan)

"Comparing the Effects of Different Dielectric Materials on Atmospheric Pressure Plasma Jet by Experiments and Simulations"

[P-28] Susumu Kato (AIST, Japan)

"Kinetic analysis of a flowing nitrogen post discharge at near-atmospheric-pressure"

[P-42] Xinyu Wei (University of Science and Technology of China, China)

"The boron catalytic graphitization of carbon fiber using microwave plasma"

====== Thursday, April 20, 2023 =======

Poster Sessions Day2 (15:30-17:30)

< Auditorium Lobby>

[P-29] Cheol Woong Kim (Pusan National University, Korea)

"Datasets using truncated SVD for predictive potential distribution machine learning model"

[P-30] Jarl Tynan Collado (Osaka University, Japan)

"Deep neural network surrogate model for predicting 2D plasma profiles"

[P-31] Yugo Isobe (The University of Tokyo, Japan)

"Data-driven study on occurrence condition of detached plasmas in a magnetic-confinement-fusion device"

[P-32] Gregor Decristoforo (UiT The Arctic University of Norway, Norway)

"Scrape-off layer profiles prediction using a data driven stochastic model for filament transport"

[P-33] Grégoire Clarté (University of Helsinki, Finland)

"Maximizing Pedestal Pressure Height through Bayesian Optimisation"

[P-34] Andreas Gillgren (Chalmers University of Technology, Sweden)

"Interpretable machine learning based approach to identify coupled pedestal density dependencies at JET"

[P-35] Stefan Dasbach (Forschungszentrum Jülich GmbH, Germany)

"Neural networks for fast tokamak scrape-off layer models"

[P-36] George Holt (Science and Technology Facilities Council, UK)

"Divertor Modelling Emulation and Detachment Control for the MAST-U Tokamak"

[P-37] Adriano Agnello (STFC Hartree Centre, UK)

"Phase space transport and emulators in ITG Turbulence"

[P-38] Nicola Amorisco (STFC Hartree Centre, UK)

"Machine Learning for Plasma Shape Control on MAST-U"

[P-39] Yoeri Poels (Eindhoven University of Technology, the Netherlands)

"Fast Divertor Plasma Simulation using Deep Learning-based Surrogate Modeling"

[P-40] Jonathan Citrin (DIFFER, the Netherlands)

"Fast transport simulations with higher-fidelity surrogate models for ITER"

[P-41] Yao-Li Liu (National Cheng Kung University, Taiwan)

"Machine learning for laser-driven ion beam via radiation pressure acceleration"

[P-43] Jong Woo Hong (Sungkyunkwan University, Korea)

"Indium Tin Oxide Etch Characteristics using $CxH_2x+_2(x=1,2,3)/Ar$ "

[P-44] Hong Seong Gil (Sungkyunkwan University, Korea)

"Isotropic Etching of SiO2 using NF3/H2 Remote Plasma and Methanol Gas"

[P-45] Charisse Marie Donato Cagomoc (Osaka University, Japan)

"Molecular Dynamics Simulation of SiO₂ Etching by CF₃⁺ and Cl⁺"

[P-46] Shameem Ahmed (Kyushu University, Japan)

"Growth Characteristics of Plant by Irradiation on Seed and Leaf with Active Oxygen Species"

[P-47] Anjar Anggraini Harumningtyas (Osaka University, Japan)

"Thermal and Plasma-enhanced Atomic Layer Deposition of Strontium Oxide on Artificial Spinal Cages"

8th International Conference on Advanced Plasma Technologies 3rd Workshop on Plasma Applications for Smart and Sustainable Agriculture



14th to 18th May 2023, Gozd Martuljek, Slovenia

© Plasmadis Ltd., 2023 All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publisher.

No responsibility is assumed by the publisher for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any method, products, instructions or ideas contained in the material herein. This abstract book is only available for the participants of the 8th International Conference on Advanced Plasma Technologies, 16th to 18th May, 2023, and 3rd Workshop on Plasma Applications for Smart and Sustainable Agriculture, 14th to 16th May, 2023, and is not for sale.

Publisher: Plasmadis Ltd., Teslova ulica 30, 1000 Ljubljana, Slovenia, on electronic media

(USB key in PDF format), 55 copies

Editor: Gregor Primc

CIP - Kataložni zapis o publikaciji Narodna in univerzitetna knjižnica, Ljubljana

66.088:631.147(082)

INTERNATIONAL Conference on Advanced Plasma Technologies (8; 2023; Gozd Martuljek)

8th International Conference on Advanced Plasma Technologies [Elektronski vir]; 3rd Workshop on Plasma Applications for Smart and Sustainable Agriculture: 14th to 18th May, 2023, Gozd Martuljek, Slovenia / [editor Gregor Primc]. - Ljubljana: Plasmadis, 2023

ISBN 978-961-94716-2-3 COBISS.SI-ID 151555587

Dear Colleagues,

on behalf of the International Scientific Committee and the Organizing Committee, we are pleased to welcome you to Gozd Martuljek (Slovenia) between 16th and 18th May 2023 at the Eighth International Conference on Advanced Plasma Technologies – ICAPT-8. The conference is the first after the virus restrictions, following the previous event in Hue (Vietnam) from 24th February to 1st March 2019. The scope of this conference is gathering renowned scientists and users of plasma technologies. The invited speakers will present recent advances in plasma technologies and stimulate participants to discuss the scientific and technological challenges. Plasma scientists and technologies are facing the transformation of plasma-assisted technologies according to Industry 4.0. The major challenge is pathing the way to smart production lines capable of self-adjusting the plasma parameters according to the prescribed values. Optimizing plasma technologies according to high environmental standards is another challenge, and developing innovative techniques capable of solving crucial issues according to the green transition is perhaps the major challenge for plasma scientists and technologists. All these challenges will be addressed at the conference. Ample time is allocated for formal and informal discussion. The conference is organized just after the annual Workshop of the EU COST Action "CA19110 Plasma applications for smart and sustainable agriculture" between 14th and 16th May 2023. The workshop is a topical meeting specialized in advances in the scientific niche of plasma agriculture, one of the major orientations of future activities in plasma technologies. We wish you all a pleasant stay in Gozd Martuljek.

With best regards, Gregor Prime, Miran Mozetič, and Nevena Puač

Ljubljana, May 2023

3rd Workshop on Plasma Applications for Smart and Sustainable Agriculture

Organizer

COST Action PlAgri (CA19110) "Plasma Applications for Smart and Sustainable Agriculture"







Co-organizer

PLASMADIS LTD.

International Scientific Committee

- Henrike Burst, Leibniz Institute for Plasma Science and Technology (Germany)
- Wolfgang Gernjak, ICRA Catalan Institute for Water Research (Spain)
- Matteo Gherardi, University of Bologna (Italy)
- Indrek Jõgi, University of Tartu (Estonia)
- Frantisek Krčma, Brno University of Technology, Faculty of Chemistry (Czech Republic)
- Kinga Kutasi, Wigner Research Centre for Physics (Hungary)
- Zdenko Machala, Comenius University in Bratislava (Slovakia)
- Monica Magureanu, National Institute for Laser, Plasma and Radiation Physics (Romania)

- Miran Mozetič (chair), Jozef Stefan Institute (Slovenia)
- Anton Nikiforov, Ghent University (Belgium)
- Tomislava Vukušić Pavičić, University of Zagreb (Croatia)
- Joanna Pawlat, Lublin University of Technology (Poland)
- Gregor Primc, Jozef Stefan Institute (Slovenia)
- Nevena Puač, Institute of Physics Belgrade (Serbia)
- Oliver Schlüter, Leibniz Institute for Agricultural Engineering and Bioeconomy (Germany)
- Augusto Stancampiano, GREMI (France)
- Jana Šimečkova, Mendel University in Brno (Czech Republic)

Organizing Committee

- Marian Lehocky, Tomas Bata University in Zlín, Centre of Polymer Systems
- Slobodan Milošević, Institute of Physics in Zagreb
- Domen Paul, Jozef Stefan Institute
- Gregor Primc (chair), Jozef Stefan Institute
- Nevena Puač, Institute of Physics Belgrade
- Pia Starič, Jozef Stefan Institute
- Petr Špatenka, Czech Technical University in Prague
- Mark Zver, Jozef Stefan Institute

8th International Conference on Advanced Plasma Technologies

Organizer

Slovenian Society for Vacuum Technique



Co-organizer and sponsor

PLASMADIS LTD.

International Scientific Committee

- Hong Young Chang KAIST, (Korea)
- Masaru Hori, University of Nagoya (Japan)
- Holger Kersten, University of Kiel (Germany)
- Marian Lehocky, Tomas Bata University in Zlín (Czech Republic)
- Slobodan Milošević, Institute of Physics (Croatia)
- Miran Mozetič (chair), Jozef Stefan Institute (Slovenia)
- Zoran Petrović, Serbian Academy of Sciences and Arts (Serbia)
- Nevena Puač, Institute of Physics Belgrade (Serbia)
- Mahendra Sunkara, University of Louisville (USA)

Organizing Committee

- Arijana Filipić, National Institute of Biology
- Matjaž Godec, Institute of Metals and Technology
- Marija Gorjanc, University of Ljubljana
- Peter Gselman, Interkorn Ltd.
- Gregor Primc (chair), Jozef Stefan Institute
- Nevena Puač, Institute of Physics Belgrade
- Alenka Vesel, Jozef Stefan Institute

Program of the 3^{rd} Workshop on Plasma Applications for Smart and Sustainable Agriculture

Sunday, 14th May

16:30	Registration
18:30	Welcome cocktail
19:00	Dinner break

Monday, 15th May

8:30	Registration
8:50	Opening of the workshop
	Session Chairs: Nevena Puač, František Krčma
9:00	Nikola Škoro (Serbia) ; Properties of plasma-treated liquids used in agricultural and water purification applications; Invited
9:30	Mario Janda (Slovakia); Tuning plasma activated water composition generated by transient spark with electrospray; Invited
10:00	Rasa Žukiene (Lithuania); Cold plasma-induced effects in Stevia rebaudiana Bertoni in different experimental models; Invited
10:30	Coffee break
	Session chair: Kinga Kutasi
11:00	Dawid Zarzeczny (Poland) ; Influence of low-temperature plasma on the properties of beetroot seeds; STSM
11:15	Ludmila Čechová (Czech Republic); Study of the different plasma sources for water and seed treatment; STSM
11:30	Piotr Terebun (Poland) ; Impact of plasma activated water prepared by different systems on the selected soil properties; STSM
11:45	Klaas De Baerdemaeker (Belgium); The decontamination of bioaerosols using an in-house rotating dielectric barrier discharge (RDBD) plasma source; STSM
12:00	Lunch break
	Session chair: Romolo Laurita
14:00	Clemencia Chaves-López (Italy); Antifungal Efficacy of SDBD cold plasma on dried tomatoes and mechanisms of action; Invited
14:30	James Walsh (UK) ; Perspectives on the in-line decontamination of food-processing surfaces using cold atmospheric pressure air plasma; Invited
15:00	Fabio Palumbo (Italy); Plasma deposition as a possible innovative technology in plasma agriculture; Invited
15:30	Coffee break

	Session chair: Monica Magureanu
16:00	Tom Field (UK) ; A method to control the energy of free electrons in atmospheric pressure plasma discharges; STSM
16:15	Thomas Vazquez (Slovakia); Real scale treatment of indoor air by cold atmospheric plasma and photocatalysis; Oral
16:30	Mia Ivanov (Croatia); Degradability improvement of the olive mill wastewater by high voltage electrical discharge plasma (HVED); Oral
16:45	Domenico Aceto (Italy) ; The effect of PAW on the growth and gene activation of healthy and tomato-mottle-mosaic-virus inoculated tomato seedlings; Oral
17:00	Olivera Jovanović (Serbia); Argon plasma pin-type jet for water treatment and biological applications; Oral
17:15–17:30	Zdenko Machala (Slovakia); Future agriculture with green fertilizers produced by non-thermal plasma-activated water technology; Oral
18:30	Dinner break
20:00	PlAgri networking and discussions / Poster session

Tuesday, 16th May

	Session chair: Zdenko Machala	
9:00	Tomoyuki Murakami (Japan); Numerical simulation and chemical network analysis of plasma-treated water; Invited	
9:30	Anna Dzimitrowicz (Poland); Plasma-based technologies for the efficient and economic removal of pharmaceuticals from contaminated water; Invited	
10:00	Vit Jirašek (Czech Republic); Direct and imprinted chemical reactivity of plasma-treated solutions; Invited	
10:30	Coffee break	
	Session chair: Joanna Pawlat	
11:00	Živko Čurčić (Serbia); Plasma in agriculture from agronomist perspective; Invited	
11:30	Liutauras Marcinauskas (Lithuania); Extraction of valuable compounds from microalgae using plasma and pulsed electric field treatment; Oral	
11:45	Mark Zver (Slovenia); Low-pressure plasma irradiation for water disinfection; Oral	
12:00	Lunch break	
	Session chair: Tomislava Vukušić Pavičić	
14:00	Changtao Chen (Belgium); Degradation of micropollutants in secondary wastewater effluent using nonthermal plasma-based AOPs; Oral	

14:15	Paolo Ambrico (Italy); On the effectiveness of dielectric barrier discharge treatment against phytopathogenic fungi; Oral
14:30	Palma Rosa Rotondo (Italy); Low-temperature plasma and plasma- activated water as alternative novel technologies for postharvest disease control; Oral
14:45	Iokeswari Ramireddy (Ireland) ; Influence of cold plasma on agriculture applications of selected multi-species grass sward; Oral
15:00	Cristina Muja (France); Low-pressure microwave air plasma for spices decontamination; Oral
15:15	František Krčma (Czech Republic); The effect of plasma activated water long term application on physical chemical soil properties; Oral
15:30	Coffee break
	Session chairs: Nevena Puač/František Krčma
16:00	Alexandra Lavrikova (Slovakia); Inactivation of Escherichia coli and Staphylococcus aureus by cold plasma for disinfection of surfaces in food industry; Oral
16:15	Danyang Liu (Belgium) ; Impact of non-thermal plasma on lipid oxidation: identification of key reactive species; Oral
16:30–17:15	WG2-WG5 meeting and discussion
18:30	Dinner break

Program of the 8^{th} International Conference on Advanced Plasma Technologies

Wednesday, 17th May

8:30	Registration
8:50	Opening
	Session Chair: Miran Mozetič
9:00	Rajdeep Singh Rawat (Singapore); Low-temperature plasma processing modulation using external means for electrocatalytic electrode surface manipulation; Invited
9:30	Kinga Kutasi (Hungary); Plasma-assisted modification of colloidal nanoparticles; Invited
10:00	Jan Hanuš (Czech Republic); Plasma-based synthesis of titania nanostructures; Invited
10:30	Coffee break
11:15	František Lofaj (Slovakia) ; Analysis of reactive sputtering in DC magnetron sputtered and High Target Utilization Sputtered TiNbVTaZrHf-xN coatings; Invited

11:45	Tomoyuki Murakami (Japan); Integrated numerical modelling of cell fate determination in response to plasma-induced reactive species; Invited
12:15	Vit Jirašek (Czech Republic); Nitrogen fixation in sub-micrometer-size water aerosol using micro-hollow surface DBD reactor; Invited
12:45	Lunch break
14:30	Tom Field (UK); Underwater plasma initiation; Oral
14:50	Liutauras Marcinauskas (Lithuania); Synthesis of molybdenum doped diamond-like carbon films by magnetron sputtering; Oral
15:10	Changtao Chen (Belgium); Degradation of micropollutants in secondary wastewater effluent using nonthermal plasma-based AOPs; Oral
15:30–17:00	Guided discussion on plasma technologies in industry
19:00	Dinner break

Thursday, 18th May

	Session Chair: Miran Mozetič
9:00	Zdenko Machala (Slovakia); Various plasma-liquid discharge regimes determine the plasma-activated water properties and applications; Invited
9:30	Nikola Škoro (Serbia); Regeneration of clinoptilolite saturated with ciprofloxacin by using atmospheric pressure plasma; Invited
10:00	Mark Zver (Slovenia); Waterborne virus inactivation using various low- pressure plasma radiation wavelengths and ambient gases; Invited
10:30	Zoran Petrović (Slovenia) ; Breakdown and volt-ampere characteristics of low-current discharges in water vapour; Invited
11:00	Miran Mozetič (Slovenia); Plasma technology in industry 4.0; Invited
11:30	Guided discussions on plasma technologies for the environment
12:30	Conference closing
12:15	Lunch break and departures

All contributions are in alphabetical order regarding the first or corresponding author for each section (invited, contribution, oral, poster).

Breakdown and volt-ampere characteristics of low-current discharges in water vapour

Zoran Lj. Petrović (1, 2), Jelena Marjanović (3), Gordana Malović (3) and Dragana Marić (3)

- (1) Serbian Academy for Sciences and Arts, Knez Mihailova 35, 11001 Belgrade, Serbia
- (2) School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom
- (3) Institute of Physics Belgrade, University of Belgrade, Pregrevica 118, 11080, Belgrade, Serbia

Water vapour is necessarily a constituent of living organisms and often the primary environment for growth and reproduction. In addition, it is always present in the air but in interfaces to liquids its density varies and so do the abundances of the related reactive species. Thus, studies of the breakdown in water vapour are of interest for a broad range of plasma applications and novel fundamental issues. Measurements of the breakdown voltage provide information on the dielectric properties of the vapour and its mixtures, ionization coefficient and have a basic albeit simplified relationship to the secondary electron yield processes. More profound understanding of the secondary yields and also of the basis for normalizing the crosssection sets may be obtained from the low current limit of the Volt-Ampere characteristics. However, in case of water vapour it proved difficult to extend those measurements due to high negative differential resistance resulting in relaxation oscillations. As our measurement of the breakdown voltage consists of measurements at low currents extrapolated to the zero current, we had to develop a procedure to obtain the Volt-Ampere characteristics even in case of such oscillations and the results will be presented in this review. In addition, observing spatial emission profiles allows us to determine the effective electron density growth coefficient that may be reduced to the ionization coefficient in the high normalized field limit. The same data provide observation of the growth of the fast neutral excitation presumably due to fast hydrogen atoms released in the discharge. Measurements were made at pd = 1.1 Torr cm (p-pressure, dinterelectrode distance). For the range of conditions where we could obtain data with both a stable dc discharge and an oscillating discharge procedure provided a very good consistency between the two sets of results.

This research was supported by the MSTD of Serbia and Science Fund of the Republic of Serbia, Grant No. 7749560, Exploring ultra-low global warming potential gases for insulation in high-voltage technology: Experiments and modelling – EGWIn. Z. Lj. P. is grateful to the SASA project F155.



Welcome to the EPS Plasma Conference 2023!

The conference will be organized in person, July 3rd to July 7 2023

Venue information (https://epsplasma2023.eu/?p=59,15)

The 49th European Conference on Plasma Physics (2023) will be held as an in-person meeting from July 3 to July 7 2023. This annual conference covers the wide field of plasma physics including magnetic confinement fusion, beam plasma and inertial fusion, low temperature plasmas, and basic, space and astrophysical plasmas. We are now accepting registrations for the conference. Please go to the Registration page.

Call for propositions for oral presentations and posters

On behalf of the Scientific Program committee and Local Organization committee, abstract submission for Oral Talks and posters for the European Plasma Physics Conference 2023 (EPS 2023) is now open.

Topics

- Magnetic Confinement Fusion Plasma
- Beam Plasmas & Inertial Fusion
- Low Temperature and Dusty Plasmas
- Basic, Space & Astrophysical Plasmas

We are accepting registrations for the conference now. Please go to the Registration page. Please find:

- information on the venue here (https://epsplasma2023.eu/?p=59,15).
- the complete list of plenary and invited speakers here (https://epsplasma2023.eu/?p=56,15).

• information on the 2022 conference (https://epsplasma2020.eu/).

Looking forward to welcoming you in our online conference environment.

The Organizing Committee

CEA CESTA(I)

UMR CELIA (Centre Lasers Intenses et Applications)

GPR Light UB (Bordeaux University)



Partners



@ 2023 TEAMRESA (HTTP://TEAMRESA.COM) ALL RIGHTS RESERVED

Breakdown measurements in low GWP gases

J. Marjanović¹, D. Marić¹ and Z. Lj. Petrović^{2,3}

 $^{1}\ Institute\ of\ Physics\ Belgrade,\ University\ of\ Belgrade,\ Belgrade,\ Serbia$

² Serbian Academy for Sciences and Arts, Belgrade, Serbia

³ School of Engineering, Ulster University, Jordanstown, United Kingdom

In past decades several technological breakthroughs were based on the use of fluorocarbon gases. The most important impacts were achieved in plasma etching for microchip fabrication, plasma-based nanotechnologies, particle detection, refrigeration, and gas insulation. With all the benefits of new technologies, environmental issues related to global warming arose. Consequently, the research in the field of low-temperature plasmas was shifted in direction of finding eco-friendly solutions – gases with low global warming potential (GWP) and low ozone depletion potential (ODP), that would sustain or improve the efficiency of applications.

Our work is focused on studies of elementary processes in fluorocarbon gases that can be used in the modelling of real-life applications of gas discharges. We compare breakdown data for 1,1,1,2-Tetrafluoroethane (R134a, C₂H₂F₄) and its replacement gas 2,3,3,3-Tetrafluoropropene (HFO-1234yf, C₃H₂F₄). The analysis is based on measurements of breakdown voltages, critical fields, spatially and spectrally resolved emission distributions of the discharge, effective ionization coefficients and available cross-section data [1,2].

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

- [1] D. Marić, M. Savić, J. Sivoš, N. Škoro, M. Radmilović-Radjenović, G. Malović, Z. Lj. Petrović, Eur. Phys. J. D 68 (2014) 155
- [2] Z. Lj. Petrović, D. Marić, M. Savić, S. Marjanović, S. Dujko, G. Malović, Plasma Processes and Polymers 14 (2017) 1600124

	Poster Session III					
Page	Poster ID	Author	Title	Affiliation		
1	Th_MCF1	CHLUM J.	Tokamak GOLEM for fusion education - chapter 14	FNSPE/CTU Prague	CZ	
2	Th_MCF2	MIRON G.	A new theoretical method for modes localisation	NILPRP	RO	
3	Th_MCF3	MOUSTAIZIS S.	Gain enhancement of the p -11B fusion process by energetic alpha injection	TU Crete	GR	
4	Th_MCF4	ESKEW J.	Fractional Laplacian Spectral Model of Anomalous Electron Diffusion in Magnetized Plasmas with Magnetic Islands and Stochastic Fields	Auburn U.	US	
6	Th_MCF5	MAURER D.A.	Detection of radiating magnetic islands in density limit disruptions of a current carrying stellarator	Auburn U.	US	
7	Th_MCF6	DE LA RIVA VILLÉN J.	Characteristic profiles of radial electric field and parallel velocity obtained in W7-X using charge exchange recombination spectroscopy	LNF, CIEMAT	ES	
8	Th_MCF7	ESTRADA T.	Impurity accumulation, radial electric field and turbulence in NBI heated plasmas in TJ-II	LNF, CIEMAT	ES	
9	Th_MCF8	GARCÍA CORTÉS I.	Enhanced confinement induced by multi-pellet injection into neutral beam injection heated plasmas in the stellarator TJ-II	LNF, CIEMAT	ES	
10	Th_MCF9	LÓPEZ-MIRANDA B.	Studying fast-ion losses induced by Alfvén Eigenmodes and by pellet injection in NBI heated plasmas of the stellarator TJ-II	LNF, CIEMAT	ES	
11	Th_MCF10	MEDINA ROQUE D.	TESPEL studies on the Z-dependence of impurity transport in different plasma scenarios in LHD	LNF, CIEMAT	ES	
12	Th_MCF11	PONS-VILLALONGA P.	Measurements of spatial periodicity and radial structure of NBI-driven Alfvén eigenmodes in the TJ-II stellarator	CIEMAT	ES	
13	Th_MCF13	SONG J.	Nonlinear saturation characteristics of ITG and TEM turbulence in a tokamak using nonlinear gyrokinetic simulations and a POD method	Hanyang U.	KR	
14	Th_MCF14	FANG J.G.	Suppression of the m/n=2/1 tearing mode by electron cyclotron resonance heating on J-TEXT	IFPP, HUST	CN	
15	Th_MCF15	MAO F.	The experimental and simulation studies on the linear plasma response to RMP on J-TEXT	HUST	CN	
16	Th_MCF16	SHEN C.	Predicting disruption in future tokamak with fewer data tokamaks by physics-guided approach	IFPP, HUST	CN	
17	Th_MCF17	WANG L.	Effects of fast ions on collisionless trapped electron mode turbulence and zonal flow generation	HUST	CN	
18	Th_MCF18	XU X.	Investigation of edge plasma parameters approaching the density limit in J-TEXT Tokamak limiter and divertor configurations	IFPP, HUST	CN	
19	Th_MCF19	YAN W.	Study of runaway current dissipation on J-TEXT tokamak	IFPP, HUST	CN	
20	Th_MCF20	ZHANG Q.	Roles of multiple modes during mode excitation by rotating RMP on J-TEXT	IFPP, HUST	CN	

21	Th_MCF21	HUA J.	Dynamic evolution of edge magnetic islands during the formation of island divertor configuration on J-TEXT	IFPP, HUST	CN
22	Th_MCF22	KULEY A.	Neural network assisted electrostatic global gyrokinetic toroidal code using cylindrical coordinates	IISc Bangalore	IN
23	Th_MCF23	RODRIGUES P.	GYRONIMO: an object-oriented library for gyromotion applications	IPFN, IST	PT
24	Th_MCF24	ASSUNÇÃO M.	Full Gyromotion versus Guiding-Centre in Fusion Devices	IPFN, IST	PT
25	Th_MCF25	VICENTE J.	Type-I ELM triggering mechanisms diagnosed on a synthetic framework	IPFN, IST	PT
26	Th_MCF26	HACHMEISTER D.	Inner scrape-off layer profiles in highly shaped plasma configurations	IPFN, IST	PT
27	Th_MCF27	GIANNONE L.	Magnetics only real-time equilibrium reconstruction on ASDEX Upgrade	IPP Garching	DE
28	Th_MCF28	OH S.	Tungsten Reflection Modelling for Raytracing Simulations	KFE	KR
29	Th_MCF29	CHOE W.	Argon seeded-detachment during ELM control by RMPs in KSTAR	KAIST	KR
30	Th_MCF30	BAK J.G.	Halo currents during downward vertical displacement events in the KSTAR tokamak	KFE	KR
31	Th_MCF31	BANG E.	New Langmuir Probe system in upgraded tungsten divertor of KSTAR	KFE	KR
32	Th_MCF32	JANG J.	Investigation of line-integrated effective charge (Zeff) in KSTAR plasmas	KFE	KR
33	Th_MCF33	LEE S.G.	Toroidal rotation and impurity dynamics in KSTAR	KFE	KR
34	Th_MCF34	OH D.K.	Probabilistic modeling of signal intensity on the spectrograms of microwave reflectometry for the plasma diagnostics of electron density profile	KFE	KR
35	Th_MCF35	SEO D.	The Visible Bremsstrahlung System for the calculation of the effective charge(Zeff) in KSTAR	KFE	KR
36	Th_MCF36	LEE J.	Edge Turbulence Dynamics during Pedestal Evolution and Collapse in KSTAR H-mode Plasmas	KFE	KR
37	Th_MCF37	CAI F.	EMC3-EIRENE simulation of the magnetic field ripple effect on edge impurity flows in Heliotron J	GSES, Kyoto U.	JP
38	Th_MCF38	FUKUYAMA A.	Two-dimension Kinetic full-wave analysis of cyclotron waves with the integral form of dielectric tensor	Kyoto U.	JP
39	Th_MCF39	HONDA M.	Collaborative approaches between numerical plasma simulations and machine learning techniques	Kyoto U.	JP
40	Th_MCF40	KADO S.	2D Imaging of Small Pellet Ablation Cloud Density in Heliotron J Based on High-speed Spectroscopy for Balmer-β Line Broadening	IAE, Kyoto U.	JP
41	Th_MCF41	MIYASHITA A.	Non-uniform Fluctuation Characteristics inside an Edge Magnetic Island Structure in Heliotron J	GSES, Kyoto U.	JP

42	Th_MCF42	MURAKAMI S.	Magnetic and electrostatic fluctuation effects on radial transport of ECH supra-thermal electrons and related toroidal torques in tokamak plasma	Kyoto U.	JP
13	Th_MCF43	MATSUTANI R.	Particle Transport Study for Solid-hydrogen Pellet Injected Plasma Using Event-triggered Thomson Scattering Measurement System on Heliotron J	GSES, Kyoto U.	JP
14	Th_MCF44	LÓPEZ-BRUNA D.	3D calculations of RF inductive coupling in the drivers of SPIDER: comparison with experimental data	LNF, CIEMAT	ES
15	Th_MCF45	BILATO R.	Multi-frequency ICRF simulations of NBI-heated plasma with TORIC-SSFPQL code	IPP Garching	DE
16	Th_MCF46	BOTTINO A.	Phase Space Zonal Structures and equilibrium distribution functions in ORB5	IPP Garching	DE
17	Th_MCF47	CANO MEGÍAS P.	Main and impurity ion heat transport studies at ASDEX Upgrade	IPP Garching	DE
18	Th_MCF48	GRENFELL G.	Edge turbulence characterization of the EDA H-mode in ASDEX Upgrade	IPP Garching	DE
19	Th_MCF49	CHEN L.	Characterisation of the divertor conditions with impurity seeding in reversed field H-mode discharges at ASDEX Upgrade	IPP Garching	DE
50	Th_MCF50	PUCHMAYR J.	Edge stability analysis and mode locking in 3D tokamak plasmas	IPP Garching	DE
51	Th_MCF51	RÄTH M.	Excitation of high frequency waves in non-linear fully kinetic Vlasov simulation	IPP Garching	DE
52	Th_MCF52	RETTINO B.	Gyrokinetic investigation of linear and non-linear excitation of energetic particle driven instabilities in ASDEX Upgrade with experimentally relevant distribution functions	IPP Garching	DE
53	Th_MCF53	SILVAGNI D.	The impact of divertor neutral pressure on confinement degradation of Advanced Tokamak Scenarios at ASDEX Upgrade	IPP Garching	DE
54	Th_MCF54	USOLTSEVA M.	Studies of tokamak edge density variation with the use of novel intensity refractometry diagnostic in ASDEX Upgrade	IPP Garching	DE
55	Th_MCF55	KALIS J.	Experimental Characterization of the Quasi-Coherent Mode in EDA H-Mode and QCE Scenarios at ASDEX Upgrade	IPP Garching & TU Munich	DE
56	Th_MCF56	BRIDA D.	Modelling of ion and electron heat fluxes and temperatures close to the separatrix and comparison to experiments	IPP Garching	DE
57	Th_MCF57	IGOCHINE V.	Influence of ICRH on runaway electron generation in ASDEX Upgrade: first experimental attempts	IPP Garching	DE
58	Th_MCF58	DUX R.	Tin concentrations in ASDEX Upgrade H-mode plasmas with a liquid tin divertor target	IPP Garching	DE
59	Th_MCF59	FABLE E.	Validation of theory-based core transport models against full discharges in ASDEX Upgrade	IPP Garching	DE
50	Th_MCF60	GRIENER M.	Characteristics of I-phase bursts and their identity to type-III ELMs	IPP Garching	DE
1	Th_MCF61	STOBER J.	Location and Quantification of non-absorbed EC-power in ITER	IPP Garching	DE
52	Th_MCF62	SUTTROP W.	Loss of ELM suppression with non-axisymmetric magnetic perturbations in ASDEX Upgrade helium plasmas	IPP Garching	DE

Th_MCF63	YU Q.	Numerical simulation of driven plasma rotation shear and fast magnetic reconnection caused by double tearing modes	IPP Garching	DE
Th_MCF64	GEIGER J.	Low-shear configurations to test MHD-stability in Wendelstein 7-X	IPP Garching	DE
Th_MCF65	HALLATSCHEK K.	Multi-fluid and gyrokinetic Landau collisions	IPP Garching	DE
Th_MCF66	ICHIGUCHI K.	MHD numerical analysis of global flow in 3D magnetic configurations	NIFS	JP
Th_MCF67	NISHIMURA S.	Non-ambipolar radial transport of tangentially injected NB-produced fast ions in quasi-axisymmetric stellarators	NIFS	JP
Th_MCF68	TOKUZAWA T.	GAM eigenmode observation by ECE Imaging diagnostics on LHD	NIFS	JP
Th_MCF69	VANOVAC B.	Pedestal properties of negative triangularity plasma with favorable/unfavorable ∇B drift direction in ASDEX Upgrade	e PSFC, MIT	US
Th_MCF70	LI J.	Experimental and Simulation Study on Nonlinear Coupling of Turbulence, GAM and Tearing Modes in HL-2A Edge Plasma	SUSTech	CN
Th_MCF71	YATOMI G.	Multi-field singular value decomposition for nonlinear quantities in turbulent plasmas	GUAS	JP
Th_MCF72	NAKAYAMA T.	Development of dynamically coupled simulation for global turbulent transport and profile formation	GUAS	JP
Th_MCF73	NASU T.	Observation of electron-scale turbulence threshold in LHD plasma	GUAS	JP
Th_MCF74	YANG L.	Study of neoclassical transport characteristics by Monte Carlo method in the CFQS quasi-axisymmetric stellarator	GUAS	JP
Th_MCF75	ISOBE Y.	Characterization of transition to detachment of magnetic confinement plasmas via data-driven approach	GSFS, Tokyo U.	JP
Th_MCF76	VARELA RODRIGUEZ J.	Optimization of the plasma heating efficiency in nuclear fusion devices using a Landau closure model: the gyro-fluid FAR3d code	UC3M	ES
Th_MCF77	FERNÁNDEZ-TORIJA DAZ	A G. FLIPEC: a free-plasma boundary solver for axisymmetric ideal MHD equilibria with flow	UC3M	ES
Th_MCF78	LOSADA J.M.	Filament structures, intermittent fluctuations and broad average profiles at the boundary of magnetically confined plasma	UiT	NC
Th_MCF79	GARCÍA GONZALO L.	Consequences of pellet injection on the turbulent transport in TJ-II	UC3M	ES
Th_MCF80	ORTIZ J.	Analysis of the AE activity in the TJII periphery using Landau closure model	UC3M	ES
Th_MCF81	TRIBALDOS V.	Three Dimensional effects on neoclassical particle transport of heavy impurities in ITER pedestal	UC3M	ES
Th_MCF83	LONG F.F.	Scrape-off-layer sheath model for effect of coherent mode on divertor particle and heat flux on EAST tokamak	USTC	CN
Th_MCF84	LIU J.	Reconstruction of Magnetic Fields via Field Neural Network	USTC	CN

85	Th_MCF85	ZHANG J.	Drift dynamics of a pellet-produced plasmoid in the presence of fast electrons	USTC	CN
86	Th_MCF86	BISWAS B.	Linear modelling of electron Bernstein current drive in STEP	York Plasma Institute	GB
87	Th_MCF87	ENTERS Y.W.	The hunt for zonal flows and the ExB staircase through velocity field measurements in MAST-U	CCFE & York Plasma Institute	GB
88	Th_MCF88	SCHUETT T.M.	Turbulence Dynamics in Confinement Transitions of Tokamak Plasmas	York Plasma Institute & CCFE	GB
89	Th_MCF89	THOMAS S.	First measurements of turbulence in L-mode super-X diverted plasmas on MAST-Upgrade with the upgraded beam emission spectroscopy diagnostic	York Plasma Institute	GB
90	Th_MCF90	VANN R.G.L.	Synthetic Aperture Microwave Imager mark 2 (SAMI-2) at MAST-U: design, hardware implementation and first results	York Plasma Institute	GB
91	Th_MCF91	LONIGRO N.	2D electron density measurements using Coherence Imaging Spectroscopy in the MAST-U divertor	York Plasma Institute & CCFE	GB
92	Th_MCF92	GREENHOUSE D.	Integrated Data Analysis Technique for Investigating Divertor Physics	York Plasma Institute & CCFE	GB
93	Th_MCF93	IMADA K.	Pedestal stability survey of MAST-U H-mode plasmas	GA & York Plasma Institute	US/G
94	Th_MCF94	BRAGLIA F.G.	Improved magnetic diagnostics on General Fusion Plasma Injectors: developments towards the Fusion Demonstration Program	General Fusion Inc.	CA
97	Th_MCF95	COOP S.	Design of a High-Temporal-Resolution Thomson Scattering System for a Magnetised Target Fusion Device	General Fusion Inc.	CA
98	Th_MCF97	ROHOLLAHI A.	An Overview of the Fusion Demonstration Program and Related Plasma Diagnostic Systems in General Fusion	General Fusion Inc.	CA
100	Th_MCF99	MORENO J.	Study on the effects of pulsed x-ray emitted from a plasma focus device on different types of cells of medical and radiological interest	P ² MC	CL
102	Th_MCF100	FLOM E.	Measurement of Radial and Poloidal Temperature and Density Profiles in the Island Divertor of Wendelstein 7-X via the Helium Beam Diagnostic	Wisconsin-Madison U. & Auburn U.	US
103	Th_MCF101	MICHAEL C.A.	Exploration of on and off-axis beam fast-ion confinement physics with active and passive FIDA on MAST-U	UCLA	US
104	Th_MCF102	KRASHENINNIKOV S.	On dimensionless parameters and the self-verification of edge plasma codes	UCSD	US
105	Th_MCF103	PRECHEL G.	Experimental Comparisons and Analysis of MAST-U Solid State Neutral Particle Analyzer Data with Synthetic Diagnostic Signals	UC Irvine	US
106	Th_MCF104	HEIDBRINK W.	A research program to measure spin polarized fusion reactions*	UC Irvine	US
107	Th_MCF105	CLAIRET F.	Pedestal instabilities during the L-H transition	CEA/IRFM	FR
108	Fr_MCF65	DUMÉRAT N.	Investigation of the coupling between zonal flow activity and multi-scale turbulent phenomena at the stellarator TJ-	IGVP, Stuttgart U.	DE
109	Fr_MCF70	WENDLER D.	High temporal resolution measurements of filamentary transport with the ASDEX Upgrade Thermal Helium Beam diagnostic	IPP Garching & TU Munich	DE

110	Fr_MCF100	KÖHN-SEEMANN A.	Numerical studies of coupling to electron Bernstein waves in MAST Upgrade	IGVP, Stuttgart U.	DE
111	Fr_MCF102	ERIKSSON B.	Observations of the T(T,n) ⁵ He resonance reaction in NBI heated fusion plasmas	Uppsala U.	FI
112	Fr_MCF104	MOISEENKO V.E.	RF plasma production at relatively low magnetic fields in the LHD	KIPT & NU V.N. Karazin Kharkiv & Uppsala U.	UA/SE
113	Fr_MCF105	MORDIJCK S.	Density peaking and particle transport in negative triangularity discharges on DIII-D	William & Mary College	US
L14	Fr_MCF106	LEVITT B.	The Sheared-Flow-Stabilized Z-Pinch Approach to Fusion Energy	Zap Energy Inc.	US
115	Th_BPIF1	TOMASSINI P.	Efficient 5 GeV e-beam generation with the upcoming 10PW line commissioning at ELI-NP	ELI-NP	RO
116	Th_BPIF2	FEDELI L.	Modeling a novel laser-driven electron acceleration scheme with Particle-In-Cell simulations on exascale-class supercomputers	LIDYL	FR
17	Th_BPIF3	GOLOVANOV A.	Acceleration of positrons in plasmas with high energy efficiency	WIS	IL
118	Th_BPIF4	BABJAK R.	Betatron resonance as a source of high charge electron bunches	GoLP/IPFN, IST	PT
L19	Th_BPIF5	PARDAL M.	Superradiant scattering of electrons in evanescent waves	GoLP/IPFN, IST	PT
120	Th_BPIF6	WILLIM C.	Multi-10-MeV proton beam with ultra-low divergence driven by twisted light	GoLP/IPFN, IST	PT
121	Th_BPIF7	MARGARONE D.	Recent achievements in high-intensity, high-power laser-matter interaction at the ELI Beamlines user facility	ELI Beamlines	CZ
122	Th_BPIF8	SCISCIÒ M.	Laser-Initiated $11B(p,\alpha)2\alpha$ fusion reactions in petawatt-scale, highrepetition- rate laser facilities	ENEA	IT
124	Th_BPIF9	ANTICI P.	Stable high repetition rate laser-driven proton beam production for applications in material science	INRS-EMT	CA
L25	Th_BPIF10	EHRET M.		CLPU	ES
126	Th_BPIF11	GOLOVKINA V.N.	SPECT3D, Imaging and Spectral Analysis Package	Prism Computational Sciences	US
127	Th_BPIF12	HUBERT S.	Absolute calibration of X-ray cameras over the 0.1-9 keV enery range for MégaJoule Laser requirements by means of monochromatic X-ray generators	CEA/CESTA	FR
128	Th_BPIF14	TAKAGI Y.	Statistical analysis of electron flux characteristics generated by kinetic laser absorption processes for lasers with intensities of 10 ¹⁴⁻¹⁶ W/cm ²	GSS, Osaka U.	JP
129	Th_BPIF15	BELL A.R.	Weibel filamentation of heat flow in laser-plasmas	CLF, STFC RAL	GB
130	Th_BPIF16	XIAO C.	k-space theory of stimulated Raman and Brillouin side scattering	Hunan U.	CN
L31	Th_BPIF17	ROZMUS W.	Theory and observation of hydrodynamic shocks in a plasma flowing across randomized ICF scale laser beams	Alberta U.	CA

32	Th_BPIF18	BUDRIGA O.	Modeling the interaction of a 10 ²³ W/cm ² laser pulse with a micro-cone target	NILPRP	RO
3	Th_BPIF19	GRASSI A.	Generation of intense magnetic fields with Ultra-High Intensity lasers	LULI	FR
	Th_BPIF20	FOSTER T.	-	QUB	GB
	Th_BPIF21	GERSTMAYR E.	Inference of laser intensity in laser-electron collisions using the emission profile	QUB	GB
1	Th_BPIF22	VLACHOS C.	Laser-driven quasi-static magnetic fields for magnetized high energy-density experiments	CELIA	FR
3	Th_BPIF23	LI K.	The Application of Nuclear Reactions in Non-thermal Equilibrium Plasma	CAPT & Peking U.	CN
9	Th_BPIF24	KOENIG M.	Magnetized Radiative shocks: their role in global evolution of interstellar medium	LULI	FR
)	Th_BPIF25	HUDEC L.	Hybrid ablation-expansion model for laser interaction with low-density foams	FNSPE/CTU Prague	CZ
1	Th_BPIF26	CALVIN L.	Laser Driven Muon Production For Materials Inspection and Imaging	QUB	GB
2	Th_BPIF27	FLORIDO R.	Unfolding signatures of magnetic field compression from the Ar K-shell emission recorded in OMEGA direct-drive cylindrical implosions	iUNAT, ULPGC	ES
3	Th_BPIF28	KULKARNI S.	cymianea impiesions	Prism Computational Sciences	US
4	Th_BPIF29	LOISEAU P.	Investigating thermal transport in gas jets using Thomson scattering	CEA/DIF	FR
5	Th_LTPD1	DJIENBEKOV N.E.	Simulation of Shear Flows in 2D Dipole Systems	IASIT & IETP, KNU Al-Farabi	KZ
6	Th_LTPD2	ORAZBAYEV S.A.	Synthesis of carbon nanoparticles and their application	IASIT & NNLOT, KNU Al-Farabi	KZ
7	Th_LTPD3	MOHR D.P.	COMPACT – the future complex plasma facility for the ISS	Greifswald U.	DE
8	Th_LTPD4	SHIN D.H.	Development of combining plasma and catalyst hybrid type scrubber for large capacity PFCs gas	KFE	KR
9	Th_LTPD5	UVAROVA I.	State changing collisions of H+ ₃ with H ₂	Charles U. Prague	CZ
0	Th_LTPD6	TUREK Z.	Probe Diagnostics of Titanium Nitride Plasma in Hollow Cathode Jet at Low Pressure	Charles U. Prague	CZ
1	Th_LTPD7	PAGAUD F.	Plasma potential control in a magnetized plasma: modeling and challenges	LPENSL	FR
2	Th_LTPD9	MARJANOVIC J.	Breakdown measurements in low GWP gases	Belgrade U.	RS
3	Th_LTPD10	DE OLIVEIRA COELHO H. Jr	Low-Cost High-Frequency Power Supply for Cold Atmospheric Plasma Sterilization	UnB-FGA	BR

157	Th_LTPD11	WILLIAMS S.	Filamentation Morphology in Capacitively Coupled Highly Magnetized Plasmas	Auburn U.	US
158	Th_LTPD12	SHOJAA C.	Time-resolved spectroscopy of discharges in Cscl solutions	QUB	GB
159	Th_LTPD13	MUN J.H.	The importance of ion temperature profile in collisional sheath modelling	PIIM & Saskatchewan U.	FR/CA
160	Th_LTPD14	MORENO J.	Laser Induced florescence study of a plasma immersion ion implantation system	Saskatchewan U.	CA
L61	Fr-LTPD2	VAGKIDIS C.	Full-wave investigation of microwave propagation through plasma density inhomogeneities	IGVP, Stuttgart U.	DE
L62	Th_BSAP1	AL-NASERI H.	Radiation reaction effects in relativistic plasmas	Umeå U.	SE
164	Th_BSAP3	BENDID-KALACHE K.	Non local transport theory in relativistic plasmas	USTHB	DZ
165	Th_BSAP4	GRANIER C.	Investigation of the collisionless plasmoid instability based on gyrofluid and gyrokinetic integrated approach	LAGRANGE	FR
166	Th_BSAP5	GUEROULT R.	Image rotation in rotating magnetised plasmas?	LAPLACE	FR
L67	Th_BSAP6	GUPTA S .	Study of E x B electron drift instability in Hall-thruster simulations using XOOPIC code	IPR	IN
168	Th_BSAP7	GYERGYE T.	Three-fluid model of potential formation in front of a negative electrode	Ljubljana U.	SI
169	Th_BSAP8	KHAMARU S.	Ion-driven electron cloud dynamics in a non-axisymmetric torus: A 3D3V Particle-in-Cell study	IPR & HBNI	IN
.70	Th_BSAP9	KOLMES E.J.	Rearrangement and Free Energy for Understanding Plasma Stability	Princeton U.	US
L71	Th_BSAP10	LANGLOIS J.	Inertial corrections to polarization drag in rotating plasmas	LAPLACE	FR
172	Th_BSAP11	MAERO G.	Dynamics and precise control of fluid V-states using an electron plasma	UNIMIB & INFN	IT
173	Th_BSAP12	NASTAC M.L.	Irreversible stochastic heating via phase-space entropy cascade in nearly collisionless plasma turbulence	Rudolf Peierls Centre for Theoretical Physics, Oxford U.	GB
175	Th_BSAP13	OUAZENE M.	Dissipative structures in dusty plasma with Cairns-Gurevich distributed ions	Bab-Ezzouar U.	DZ
176	Th_BSAP14	KUMAR PANDEY S.	Dynamics of electron Langmuir waves in the presence of inhomogeneous kinetic ions	IPR & HBNI	IN
178	Th_BSAP15	PAUL A.	Vlasov simulations of whistler destabilization by electron beams having anisotropic velocity distribution	IPR & HBNI	IN
179	Th_BSAP16	RATHEE N.	Charged-Particle Acceleration by ElectrostaticWaves Propagating across Magnetic Field	IPR & HBNI	IN
L80	Th_BSAP17	SKIFF F.	Determining wave fields from particle orbits	Iowa U.	US

181



POSMOL 2023

XXI International Workshop on Low-Energy Positron and Positronium Physics

&

XXIII International Symposium on Electron-Molecule Collisions and Swarms

August 3-6, 2023, University of Notre Dame, IN, USA

TABLE OF CONTENTS

Foreword	3
Positron and Electron International Advisory Committees	5
Founders and Sponsors	7
Abstracts of Oral Presentations Note: presenting author's name is <u>underlined</u>	
Plenary Lectures	
Calculation of electron and positron collisions with light atoms and molecules M. Charlton, H. Ambalampitiya, I. Fabrikant, I. Kalinkin, D. Fursa, A. Kadyrov, M. Zammit, L. Scarlett, <u>I. Bray</u>	19
Testing Fundamental Physics with Antihydrogen S. Eriksson	20
Electron and positron scattering from CO ₂ and H ₂ O: still open questions G. Garcia	21
Many-body theory of positron-molecule interactions <u>D. G. Green</u>	22
Electron and positron transport processes in gaseous and liquid systems: theory, experiment and self-consistent cross-section sets using machine learning D. Muccignat, G. Boyle, N. Garland, P. Stokes, R.P. McEachran, J. P. Sullivan, S. Dujko, Z. Lj. Petrovic, G. Garcia, M. J. Brunger, R. D. White	23
Invited Lectures	
Positron scattering by molecules: recent advances and applications of the Schwinger multichannel method A. S. Barbosa	27
Electron transport and streamer propagation in modeling of resistive plate chambers <u>D. Bošnjaković</u> , Z.Lj. Petrović, S. Dujko	28
Bound-state methods for electronic resonances K. Bravaya	29

	Pulsed beams of cold antihydrogen and positronium for inertial experiments at the AEgIS experiment R. Caravita	20
		30
200000000000000000000000000000000000000	GBAR experiment: first antihydrogen production and beyond P. Comini	31
- 8	Precision measurement of Lamb shift in muonium G. Janka, B. Ohayon I, I. Cortinovis, Z. Burkley, L. de Sousa Borges, E. Depero, A. Golovizin, X. Ni, Z. Salman, A. Suter, T. Prokscha, P. Crivelli	32
- 8	The decay of temporary negative ions formed upon electron attachment to biologically relevant molecules S. Denifl	33
1	Multidimensional vibronic dynamics in collisions of molecules with slow electrons J. Dvořák, M. Ranković, K. Houfek, P. Nag, R. Čurík, J. Fedor, M. Čížek	34
1	Ionization and DEA experiments on laser-desorbed molecules S. Eden, D. Bou Debes, J. Bockova, A. Rebelo, K. Nixon, JC. Poully	35
	Positronium collisions with atoms and molecules I. I. Fabrikant, R. S. Wilde	36
J	Electron collisions with liquid microjets: spectroscopy and reactivity Fedor	37
E	Electron interaction with boron containing molecules F. Ferreira da Silva, J. Pereira-da-Silva, R. Rodrigues, M. Mendes, L. Cornetta	38
5	/ibrational Excitation and Dissociation of Polyatomic Molecules 5. Fonseca dos Santos Douguet	39
E	extraction of Ps-formation cross-sections from single-centre positron scattering	
C	A. Mori, L. H. Scarlett, I. Bray, <u>D. V. Fursa</u>	40
	Electron-neutral collision cross sections for H ₂ O M. Budde, T.C. Dias, L. Vialetto, N. Pinhão, <u>V. Guerra</u> , T. Silva	41
P C	ositronium emission from Ge(100) at high temperature L. Hugenschmidt, B. Rienäcker	42
<u>S</u>	Data-driven discovery of electron continuity equations in electron swarm maps . Kawaguchi, K. Takahashi, K. Satoh	43
	ositronium emission from semiconductor surfaces . Kawasuso, K. Wada, A. Miyashita, M. Maekawa, A. Ishida, Y. Nagashima	44

Dynamics of negative ions in H ₂ O and D ₂ O observed through dissociative electron transfer experiments	
S. Kumar, M. Hoshino, B. Kerkeni, G. García, P. Limão-Vieira	45
Electron contribution to photon-induced desorption in molecular ices D. Torres-Díaz, R. Basalgète, A. Hacquard, JH. Fillion, X. Michaut, L. Philippe, G. Feraud, L. Amiaud, M. Bertin, A. Lafosse	46
Positron scattering from atoms J. R. Machacek	47
Theoretical description of electron induced processes in DNA building blocks S. Matsika	48
Descriptors for positron binding to atoms and molecules P. H. R. Amaral, M. F. A. R. Senra, J. R. Mohallem	49
First positronium imaging of humans using modular J-PET scanner P. Moskal	50
Progress in research using slow positron beams at Tokyo University of Science Y. Nagashima	51
Gravitational and spectroscopic studies of antihydrogen in the ALPHA experiment J. Nauta	52
Electron Collisions with Complex Molecules: Hole transfer, Dissociative Ionization, Dissociative Attachment and Spin Effects S. Kundu, M. Schaible, <u>T. M. Orlando</u>	53
Auto-detachment of anions in excited states V. C. Schmidt, R. Čurík, M. Ončák	54
E. Stenson	
Electrons in a Surko trap – low energy electron scattering from pyridine J. P. Sullivan, D. Stevens, T. J. Babij, J. R. Machacek	55
Quantum Monte Carlo study on positron binding to atomic anion dimers S. Ito, D. Yoshida, Y. Kita, T Shimazaki, M. Tachikawa	56
Electron-atom Compton scattering: a new and unique tool for imaging intramolecular atomic motion M. Takahashi	57
Mobility of molecular and cluster hydrogen ions in cooled hydrogen gas	

T. Yamashita, Y. Kino, E. Hiyama, S. Jonsell, P. Froelich	58
Study of antihydrogen-positronium reactions by a four-body coupled-rearrangement channel calculation R. Ui, S. Imaizumi, T. Ito, <u>H. Tanuma</u>	t- 59
Study on laser cooling of positronium using a chirped train of laser pulses K. Yoshioka	60
Development of an antimatter chemistry network M. C. Zammit, C. Baker, S. Jonsell, S. Eriksson, F. Robicheaux, M. Charlton	61
Abstracts of Poster presentations Note: presenting author's name is <u>underlined</u>	
1. Positron annihilation and binding in aromatic and substituted ring molecules E. Arthur-Baidoo, J. R. Danielson, D. R. Witteman, S. Ghosh, C. M. Surko	65
 Sequential QM/MM Study of hydrated positronium annihilation rates <u>M. Bergami</u>, J. Charry, A. Reyes, K. Coutinho, M. T. do N. Varella 	66
 Solvent effects on positron attachment to hydrated amino acids <u>M. Bergami</u>, J. Charry, A. Reyes, K. Coutinho, M. T. do N. Varella 	67
 AMReX based axisymmetric fluid model Simonović, <u>D. Bošnjaković</u>, S. Dujko 	68
 Simulations of streamers in C₃F₈ and its mixtures with N₂, CO₂ and SF₆ Dujko, I. Simonović, <u>D. Bošnjaković</u> 	69
 A new DEA / EI apparatus to study thermally labile isolated molecules or molecule clusters in supersonic beams Bou Debes, J. Bockova, A. Rebelo, K. Nixon, JC. Poully, S. Eden 	es/ 70
7. Dissociative electron attachment studies of gas phase acetic acid using velocity maimaging technique	
D. Chakraborty, G. Kharchilava, I. Carmichael, S. Ptasinska	71
 Extracting elemental information from the topmost atomic layer to the bulk of the sample using Doppler broadened annihilation gamma spectroscopy V. A. Chirayath, S. Lotfimarangloo, R. W. Gladen, J. Driscoll, M. Chrysler, A. J. Fairchild, P. A. Sterne, I. Makkonen, B. Barbiellini, A. R. Koymen, A. H. Weiss 	72
 Theory for resonant autodetachment lifetimes of simple anions <u>R. Čurík</u>, M. Ončák, V.C. Schmidt, O. Novotný, A. Wolf 	73
 Positron-helium elastic scattering using a one-electron model helium potential <u>C. M. DeMars</u>, S. J. Ward, P. Van Reeth 	74

11. Near-threshold collisional dynamics in the e ⁻ e ⁺ p system H. B. Ambalampitiya, J Stallbaumer, <u>I. I. Fabrikant</u> , I. Kalinkin, D. V. Fursa, A. S. Kadyrov, I. Bray	75
12. A theoretical and experimental investigation of electronic excitation of benzene	
by electron impact A. G. Falkowski, R. F. da Costa, A. de A. Cadena, R. Pocoroba, M. A. Khakoo, M. A. P. Lima, F. Kossoski	76
13. An iterative negative imaginary potential applied to the Schwinger multichannel method to model ionization effects A. G. Falkowski, R. F. da Costa, F. Kossoski, M. A. P. Lima	77
14. Uniform treatment of direct and indirect mechanisms in low-energy dissociative recombination of CF ⁺ and CH ⁺	
J. Forer, D. Hvizdos, X. Jiang, C. H. Greene, J. Boffelli, I. F. Schneider, Z. J. Mezei, M. Ayouz, V. Kokoouline	78
15. Positron scattering from CH ₄ , C ₂ H ₄ and C ₂ H ₂ with the Schwinger multichannel method implemented with a model potential <u>F. F. Frighetto</u> , A. S. Barbosa, S. d'A. Sanchez	79
16. Resonances in electron scattering from SO ₂ P. S. Bingham, <u>J. D. Gorfinkiel</u>	80
17. R-Matrix investigations of low-energy positron scattering from biomolecules V. Graves, J. D Gorfinkiel	81
18. Dissociative electron attachment to acetic acid: experimental study of bond specific dissociation	
M. Hasan, T. Weber, M. Centurion, D. S. Slaughter	82
19. Electron impact excitation of the lowest-lying state in ammonia from near threshold high-intermediate energy	
A. Yodo, M. Hoshino, P. Limão-Vieira, H. Tanaka	83
20. Dissociative electron attachment cross sections of NX ₃ (X = H and D) molecules by energy electron impact	
K. Maruyama, M. Hoshino	84
21. Coherent spin exchange scattering of low-energy electrons by Ni ²⁺ ions in antiferromagnetic crystal NiO M. Hoshino, M. Endo, J. Ishikawa, H. Tanaka	85
22. Studying CH ⁺ with the R-matrix method: scattering processes and potential curves	
D. Hvizdoš, C. H. Greene, V. Kokoouline, J. Forer	86

conditions and the composition of FEBID deposits from the same

23. Comparison of electron induced fragmentation of [(CH₃)₂AuCl]₂ under single collision

E. Bilgilisoy, A. Kamali, A. Wolfram, T. Gentner, G. Ballmann, S. Harder, H. Marbach, O. Ingólfsson	87
24. Comparative study if dissociative ionization of (CH ₃)AuP(CH ₃) ₃ in the gas phase and its electron unduced deposition at surfaces A. Kamali, E. Bilgilisoy, A. Wolfram, T. Gentner, G. Ballmann, S. Harder, H. Marbach, O. Ingólfsson	, 88
25. Dissociative electron attachment and dissociative ionization of the potential extreme ultraviolet resist material component 2-(trifluoro-methyl) acrylic acid R. Tafrishi, D. Torres-Diaz, L. Amiaud, A. Lafosse, O. Ingólfsson	89
26. Development of a pulsed variable-energy positron beam for defect studies A. Jones, R. Greaves, F. A. Selim	90
27. Low-lying negative ion states probed in potassium – ethanol collisions A. I. Lozano, S. Kumar, P. J. S. Pereira, B. Kerkeni, G. García, <u>P. Limão-Vieira</u>	91
28. Impact of surface-formed positronium on the Identification of surface elemental content using Doppler Broadened Annihilation Gamma Spectroscopy (DBAS) S. Lotfimaranglooa, V. A. Chirayatha, P. A. Sterneb, J. Driscolla, A. R. Koymena, A. H. Weissa	92
29. DC Breakdown Measurements in Low GWP Gases J. Marjanović, D. Marić, Z. Lj. Petrović	93
30. An electron momentum spectroscopic study of benzonitrile D. G. Matalon, D. B. Jones, K. L. Nixon	94
31. Novell results for the low energy electron-induced reactivity of molecular cations J. Zs. Mezei, A. Orbán, J. Boffelli, R. Hassaine, N. Pop, F. Iacob, M. Ayouz, V. Kokoouline, J. Tennyson, I. F. Schneider	95
32. Measurements of transmittance of positronium through graphene films R. Mikami, Y. Nagata, Y. Nagashima	96
33. Electron-positronium elastic scattering and the photodetachment of the positronium negative ion W. Mitchell, S. J. Ward	97
34. Nuclear dynamics on metastable states S. Mondal, K. Bravaya	98
35. Dissociative electron attachment to small molecules using a velocity map imaging spectrometer P. Nag , J. Fedor	99
36. Distant symmetry control in electron-induced bond cleavage in pyrrole P. Nag, T. P. R. Kumar, M. Ranković, T. F. M. Luxford, J. Kočišek, Z. Mašín, J. Fedor	100

3/. Effect of π*-σ* coupling on the angular distribution of Cl ⁻ fragments produced via dissociative electron attachment to four unsaturated chlorohydrocarbons	
P. Nag, M. Tarana, J. Fedor	101
38. Dissociative electron attachment dynamics of carbon disulfide and violation of axial recoil approximation A. Paul, D. Nandi	102
	102
 Excitation and fragmentation of the dielectric gas C₄F₇N M. Ranković, T. Ovad, M. Sapunar, Š. Sršeň, P. Slaviček, Z. Mašín, N. C. Jones, S. V. Hoffmann, J. Fedor 	103
 Vibronic coupling through the continuum in the e+CO₂ system M. Ranković, J. Dvořák, K. Houfek, P. Nag, R. Čurík, J. Fedor, M. Čížek 	104
41. Low energy electron interactions with 2-cyanonaphthalene: PAH indentified in the interstellar medium	
R. Rodrigues, M. Mendes, L. Cornetta, F. Ferreira da Silva	105
42. Improving the experimental precision of ortho-positronium decay rate in vacuum with the J-PET detector	
S. Sharma, K. Dulski, P. Moskal	106
43. Photoionization, Rayleigh, and Raman scattering cross sections for the ground and evibrational levels of H ₂ ⁺	excited
A. Singor, L. H. Scarlett, I. Bray, D. V. Fursa	107
44. Dynamics of dissociative attachment of electrons to carboxylic acids	
M. Hasan, T. Weber, M. Centurion, D. S. Slaughter	108
45. Theoretical study on positron binding and annihilation properties of hydrogen bondo binary molecular clusters	ed
D. Yoshida, Y. Kita, T. Shimazaki, M. Tachikawa	109
46. Ionization of glucose and ribose molecules by electrons	
A. N. Zavilopulo, S. S. Demes, E. Yu. Remeta	110

DC Breakdown Measurements in Low GWP Gases

Jelena Marjanović1, Dragana Marić1 and Zoran Lj. Petrović2.3

¹ Institute of Physics Belgrade, University of Belgrade, Belgrade, Serbia

² Serbian Academy for Sciences and Arts, Belgrade, Serbia

³ School of Engineering, Ulster University, Jordanstown, United Kingdom draganam@ipb.ac.rs

Modern lifestyle and technology rely heavily on the use of fluorocarbon gases. These gases are an inseparable part of refrigeration and cooling systems, big data storage devices, microchips where these gases play an important part in plasma etching processes [1], implantable devices and interlayer dielectric films for integrated circuits that are obtained using polymerized fluorocarbon (FC) films [2]. They are also used in particle detection devices (RPC detectors) [3], and gas insulation applications, medium and high voltage technologies [4]. However, these gases have a negative impact on the environment and contribute significantly to global warming and ozone depletion. Fluorocarbons are not biodegradable and can persist in the environment for a long time. As a result, there is a global race to find and develop new eco-friendly replacement fluorocarbons with low global warming potential (GWP) and ozone depletion potential (ODP).

Our work is focused on studying the fundamental processes that occur in fluorocarbon gases when they are subjected to electric fields. These processes determine the characteristics and behavior of breakdown itself and gas discharges and can be used in modeling various gas discharge applications. We compare breakdown data for 1,1,1,2tetrafluoroethane (R134a, C2H2F4) and its replacement gas 2,3,3,3-tetrafluoropropene (HFO-1234yf, C₃H₂F₄). The analysis included measurements of breakdown voltages, critical electrical fields, spatially and spectrally resolved distribution of discharge emission, and effective ionization coefficients. We also use the available cross-section data to analyze the collisional processes that take place in these gasses. Furthermore, obtained effective ionization coefficients, as one of the transport coefficients, can be used for normalizing existing ionization cross-sections [5,6] for electron scattering on gases.

Acknowledgements

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

- [1] N. Hiwasa et al. Appl. Phys. Express 15, 106002 (2022)
- [2] LI Wei et al. Plasma Sci. Technol.109(1), 74 (2008)
- [3] Bianchi, A. et al. Jour. of Instrum. 14(11), P11014 (2019)
- [4] Koch, M., Franck, C. IEEE Trans. on Dielec. and Elect. Insul. 22(6), 3260-3268 (2015)
- [5] Petrović, Z.Lj. et al. Eur. Phys. J. D 76, 25 (2022)
- [6] Marić D., Savić M., Sivoš J., Škoro N., Radmilović-Radjenović M., Malović G., Petrović Z. Lj., Eur. Phys. J. D 68, 155 (2014)



PROGRAM ABSTRACTS

TWENTY-THIRD INTERNATIONAL SUMMER SCHOOL ON VACUUM, ELECTRON AND ION TECHNOLOGIES



18 - 22 September 2023 SOZOPOL, BULGARIA

Jointly organized by the Institute of Electronics of the Bulgarian Academy of Sciences and the Dutch Institute for Fundamental Energy Research, The Netherlands



Dedicated to the 60th Anniversary of the Bulgarian organizer of the event

WENTY-THIRD INTERNATIONAL SUMMER SCHOOL ON VACUUM, ELECTRON AND ION TECHNOLOGIES



18 - 22 September 2023 SOZOPOL, BULGARIA

PROGRAM ABSTRACTS

Editors: M. Dimitrova, Ch. Ghelev, B. Georgieva and E. Vasileva



TWENTY-THIRD INTERNATIONAL SUMMER SCHOOL ON VACUUM, ELECTRON AND ION TECHNOLOGIES

18 - 22 September 2023, Sozopol, Bulgaria

ORGANIZED BY

INSTITUTE OF ELECTRONICS

BULGARIAN ACADEMY OF SCIENCES, SOFIA, BULGARIA

DUTCH INSTITUTE FOR FUNDAMENTAL ENERGY RESEARCH

EINDHOVEN, THE NETHERLANDS

CO-FINANCED by the: MINISTRY OF EDUCATION AND SCIENCE OF REPUBLIC OF BULGARIA, BULGARIAN NATIONAL SCIENCE FUND,

Project № KP-06-MNF/5/19.05.2023







Young Researcher Attendance Grant

Bulgarian Academy of Sciences

Union of the Physicists in Bulgaria

CHAIRS OF THE SCHOOL

M. Dimitrova, Institute of Electronics, Bulgarian Academy of Sciences, Sofia, Bulgaria M.C.M. van de Sanden, Dutch Institute for Fundamental Energy Research, Eindhoven, The Netherlands

INTERNATIONAL ADVISORY COMMITTEE

N. Nedyalkov Bulgarian Academy of Sciences, Sofia, Bulgaria

M. Dimitrova
R. Panek
Czech Academy of Sciences, Prague, Czech Republic
Czech Academy of Sciences, Prague, Czech Republic

Th. Czerwiec Institut Jean Lamour (IJL), Ecole des Mines de Nancy, Nancy, France

H. Kersten
D. Mataras
University of Kiel, Kiel, Germany
University of Patras, Patras, Greece

V. Guerra Instituto Superior Técnico, Lisboa, Portugal

G. Dinescu National Institute for Laser, Plasma and Radiation Physics,

Magurele Bucharest, Romania

Z. Petrovic Institute of Physics, Belgrade, Serbia

M. Mozetic "Jozef Stefan" Institute, Ljubljana, Slovenia

I. Katardjiev Uppsala University, Uppsala, Sweden

M.C.M. (Richard) van Dutch Institute for Fundamental Energy Research (DIFFER),

de Sanden Eindhoven, The Netherlands

G. J. van Rooij Dutch Institute for Fundamental Energy Research (DIFFER),

Eindhoven, The Netherlands

M. Ürgen Istanbul Technical University, Istanbul, Turkey
A. Ehiasarian Sheffield Hallam University, Sheffield, UK
I. Petrov University of Illinois, Urbana, IL, USA

LOCAL ORGANIZING COMMITTEE

Ch. Angelov, I. Balchev, M. Dimitrova (Chair), B. Georgieva, Ch. Ghelev, P. Ivanova, E. Taskova, E. Vasileva

TL-5

PHYSICS OF NON-EQUILIBRIUM COLLISIONAL PLASMAS: KINETIC PHENOMENA AND THEIR EFFECT ON REAL-WORLD APPLICATIONS

Z.Lj. Petrović^{1,2}, D. Marić³, S. Dujko³, N. Selaković³, J. Marjanović³, J. Atić³, D. Bošnjaković³, I. Simonović³

Serbian Academy for Sciences and Arts, Knez Mihailova 35, 11000 Belgrade, Serbia ²School of Engineering, Ulster University, Jordanstown, Co. Antrim BT37 0QB, UK ³Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

Low-temperature plasmas have been the basis of a wide range of applications. While thermal plasmas have been the basis of a number of productive and wide-spread applications in the last 150 years, non-equilibrium low-temperature plasmas have become the front of development of the new generations of high-tech applications ranging from nano electronics, micro light sources, to medical plasma applications. The basis of most applications is to employ some set of circumstances that produce a non-equilibrium distribution of plasma constituents favoring specific actions. Such situations may be named kinetic phenomena that have been defined in the physics of non-equilibrium plasmas as the manifestation of their non-equilibrium nature. In this talk, we shall illustrate how several kinetic phenomena may be explained and, based on those explanations, may be optimized and controlled. We shall illustrate the close coupling of fundamental research with subsequent development of new technologies by discussing:

- -the reactive ion and fast neutral etching in nano electronics;
- -control of the electron energy distribution function by selecting gas mixtures components and the resulting plasma chemical kinetics;
- -optimization of gas dielectrics and gas breakdown conditions;
- modelling of positron emission tomography;
- -plasma medical applications and applications in agriculture.

This work was supported by Ministry of Science, Technological Development and Innovations of Republic of Serbia grant no. 7749560, project EGWIn. Z.Lj. P. is grateful to SANU F155 project for partial support.

76th Annual Gaseous Electronics Conference Michigan League, Ann

Arbor, Michigan

https://www.apsgec.org/gec2023/

Monday, October 9, 2023 9:00 AM - 5:30 PM

Session DM1: Alternative Propellants for Electric Propulsion Michigan League, Hussey - Benjamin Jorns, University of Michigan

9:00AM DM1.00001: Theoretical and Experimental Studies on Water Discharges for Electric Propulsion [Invited] ELAINE M PETRO (Presenter), Cornell University — This talk presents a review of the scientific literature on the use of water plasmas for space propulsion applications. Water plasmas have been proposed for use in electric propulsion because of the availability, ease of storage, and non-toxicity of water. A wide range of work over several decades is surveyed in this review, including both experimental and numerical studies. Discharges considered for use in water-based electric propulsion span a range of operating pressures and design parameters (geometry, RF frequency, magnetic field properties). This talk considers the various successes and obstacles in published approaches with respect to propulsion-relevant objectives such as maximizing energy efficiency and sustaining long-duration operation. Additionally, challenges in the system integration of a water plasma for space propulsion (e.g. storage, spacecraft plume interactions, cathode considerations) will be discussed.

9:45AM DM1.0002: lodine as a propellant for electric propulsion systems: Current state-of-the-art and remaining challenges [Invited] TREVOR LAFLEUR (Presenter), UNSW Canberra, LUI HABL, ELENA ZORZOLI ROSSI, DMYTRO RAFALSKYI, ThrustMe, ANNE BOURDON, PASCAL CHABERT, Ecole Polytechnique, BENJAMIN ESTEVES, Safran Spacecraft Propulsion, OLIVER JIA-RICHARDS, University of Michigan, JAVIER MARTINEZ MARTINEZ, Private — High-performance electric propulsion systems have historically used xenon as a propellant because of its relatively high atomic mass and its chemical inertness. However, xenon is rare and global production is both limited and susceptible to strong market fluctuations: particularly in recent years due to several geopolitical events. Furthermore, given the rapid growth of the space industry, demand for xenon may anyway soon outpace production. An emerging alternative propellant is iodine, which despite having been proposed for electric propulsion as early as 1961, has only recently been demonstrated in space in 2020. Iodine is almost 100x cheaper than xenon and global production output is about 500x higher. In addition, iodine can be stored unpressurized as a solid, allowing a significant decrease in the mass and volume of storage tanks. But the strong electron affinity and unique properties and chemistry of iodine creates several challenges associated with material compatibility, propellant flow control, and plasma discharge physics. Here, we present an overview of iodine electric propulsion and discuss the current state-of-the-art, while also highlighting remaining technical barriers to widespread adoption and future research needs.

10:30AM DM1.00003: Coffee Break —

11:00AM DM1.00004: Overview, Opportunities, and Challenges of Air-Breathing Electric Propulsion* [Invited] THOMAS C UNDERWOOD (Presenter), University of Texas at Austin — This talk details open research questions and impacts of air-breathing electric propulsion (ABEP). We identify a roadmap to enabling ABEP technologies and describe applications of self-refueling thrust architectures. These include details of mission designs, performance characterization, and the impact of sustained satellite operation in very low Earth orbit (VLEO). We give an overview of current performance thresholds of air-breathing thrusters and identify how far this performance must go to sustain altitudes in VLEO. We highlight the needed scientific advancements to realize these technologies including innovations at the intersection of plasma physics, gas dynamics, air chemistry, and material science. Finally, we describe specific scientific and technological challenges ranging from the collection of air as a propellant to its impact on thruster longevity. These include the harvesting and compression of air, plasma generation, power requirements to sustain orbit, material passivation, and the effects of air chemistry.

11:45AM DM1.0005: Use of Metal Propellants for Spacecraft Plasma Propulsion [Invited] JAMES SZABO (Presenter), Hall Thrusters — This talk will consider the use of metal propellants in Hall Effect Thrusters and other kinds of electric rockets that use plasma for reaction mass. The goal is to present the advantages, challenges in implementation, our understanding of the physics, the state of the art in technology, and thoughts on future engineering and physics-based efforts. What factors make one metal more attractive than another? Emphasis will be placed upon metals that have proven to be feasible in Hall thrusters, such as bismuth, zinc, and magnesium. These substances are typically stored in the solid phase and converted to vapor before ionization and acceleration. The talk will also consider the use of mercury, lithium, cesium, and other metals. The talk will include a discussion of spacecraft interactions, touching upon past measurements taken on the ground and in space, as well as mitigation measures. The talk will also consider in situ resource utilization, and multi-mode propellant applications, with a focus on the potential for magnesium.

12:30PM DM1.00006: Lunch —

^{*}This research is supported by the U.S. Air Force Office of Scientific Research Young Investigator Program award number FA9550-21-1-0255 with Dr. Mitat Birkan as Program Manager.

IW5.00008: Reducing Starting Current of Smith-Purcell Radiation with a Two-Layer Grating Structure* MD ARIFUZZAMAN FAISAL (Presenter), PENG ZHANG, Michigan State University — Smith-Purcell radiation (SPR) is generated when an electron beam passes near a periodic structure [1]. Two-layer gratings are proposed to enhance SPR by improving electromagnetic coupling [2] [3]. Using particle-in-cell (PIC) simulations [4], two-layer gratings have been shown to enhance SPR growth rates and reduce Smith-Purcell backward wave oscillators' start currents.

This study presents a novel approach to enhance the coupling of evanescent waves with an electron beam in SPR by utilizing a two-layer grating structure. The operating frequency of SPR with the two-layer grating is determined through the derivation of a cold-tube dispersion relation, which is further validated by CST and PIC simulations [4]. PIC simulations reveal that the two-layer gratings exhibit significantly higher radiation intensity. Moreover, the two-layer metallic gratings demonstrate the generation of coherent SPR with a reduced beam starting current [3]. This reduction in beam current yields several advantageous effects for particle accelerators, such as minimizing beam loss, prolonging cathode lifetime, and mitigating the heating of beam-carrying components.

REFERENCE

- [1] S. J. Smith and E. M. Purcell, Phys. Rev. 92, 1069 (1953).
- [2] J. Shu, P. Zhang, M. Liang, S.-P. Yang, S.-M. Wang, and Y.-B. Gong, Chin. Phys. B 31, 044103 (2022).
- [3] M. Arifuzzaman Faisal and P. Zhang, IEEE Trans. Electron Devices 70, 2860 (2023).
- [4] J. P. Verboncoeur, A. B. Langdon, and N. T. Gladd, Comput. Phys. Commun. 87, 199 (1995).

IW5.0009: Beam density modulation during emission under RF and laser fields* LAN JIN (Presenter), YANG ZHOU, PENG ZHANG, Michigan State University — Free-electron beam-based devices are vital in numerous applications, such as telecommunication systems, satellite-based transmitters, radar, communication data links, and electronic countermeasures. These devices utilize the collective interaction between an electron beam and a circuit structure, to convert the energy of the electron beam into electromagnetic radiation. If we can generate an electron beam with direct density modulation during its emission, rather than modifying a continuous beam in an RF interaction region to achieve beam modulation, the performance of the devices for power amplification can be significantly enhanced [D.R. Whaley, et al, IEEE Trans. Plasma Sci. 30(3), 998–1008 (2002].

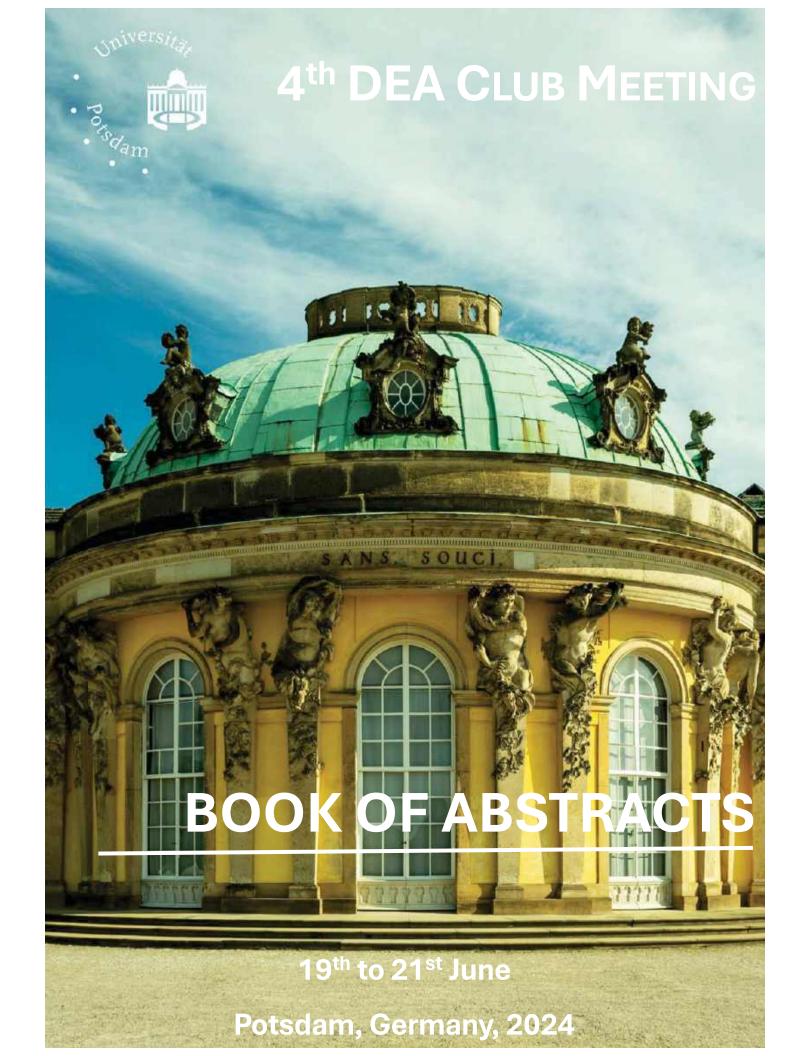
This work demonstrates various pulse shapes of pre-bunched electron beams emitted from a radio frequency (RF) cold cathode under different combinations of RF field and optical field (continuous-wave or pulsed), using an exact quantum model for photo-/field- emission [Y. Zhou and P. Zhang, J. Appl. Phys. 130(6), 064902 (2021)]. The profile of the produced emission current can be modulated by varying RF field (amplitude and frequency) and optical field (laser wavelength, laser intensity, pulse length). The emission current pulse amplitude, beam width, electron numbers per pulse, as well as the harmonic spectrum of the current pulse, are investigated in detail under various combinations of RF and optical fields.

IW5.00010: Measurements of DC breakdown in hydrofluoroolefine C₃H₂F₄* JELENA MARJANOVIC, Serbian Academy for Sciences and Arts, Belgrade, Serbia, DRAGANA MARIC, Institute of Physics Belgrade, University of Belgrade, Belgrade, Serbia, ZORAN L PETROVIC (Presenter), Serbian Academy of Sciences and Arts — Hydrofluoroolefin C₃H₂F₄ belongs to a new class of refrigerants and gaining attention, especially in the automotive industry where it is used as a replacement for R-134a. This novel gas is also considered a promising alternative in gaseous particle detectors (RPC systems) and high-voltage insulation devices due to its low global warming potential. In this study, we present the results obtained from our Steady-State Townsend experiment (SST). The discharge was ignited in a plan-parallel electrode system placed inside a tight quartz tube with electrodes spaced 1.1 cm apart. The diameter (2r) of the electrodes was 5.4 cm. The design of the electrical circuit enabled the stable operation of the discharge near the breakdown conditions. These measurements yielded breakdown voltages (Paschen curve), critical electrical fields, spatially and spectrally resolved distribution of discharge emission, and effective ionization coefficients. Our research aims to understand the fundamental processes that occur in fluorocarbon gases when they are subjected to electric fields. These processes determine the characteristics and behavior of breakdown itself and gas discharges and can be used in modeling various gas discharge applications. The available cross-section data were used to analyze the collisional processes occurring in this gas. Additionally, we obtained effective ionization coefficients as transport coefficients that can be used for normalizing existing ionization cross-sections for electron scattering on all gases, including the HFO-1234yf.

^{*}This work was supported by the Air Force Office of Scientific Research (AFOSR) YIP Grant No. FA9550-18-1-0061, the Office of Naval Research (ONR) YIP Grant No. N00014-20-1-2681, the Air Force Office of Scientific Research (AFOSR) Grant No. FA9550-20-1-0409, and Grant No. FA9550-22-1-0523.

^{*}This work was supported by ONR YIP Grant No. N00014-20-1-2681, and AFOSR Grant Nos. FA9550-20-1-0409 and FA9550-22-1-0523.

^{*}This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.





4th DEA Club Meeting



BOOK OF ABSTRACTS

19th to 21st June Potsdam, Germany, 2024

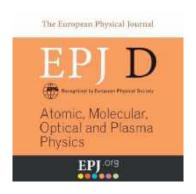
Local Organizers

- João Ameixa
- Daniela Höpfner
- Ilko Bald

Cover Editing & Photography

• Sibylle Rüstig

Sponsor



General Information

Welcome to the 4th DEA Club Meeting! We are thrilled to extend our warm invitation to researchers in the field of electron-molecule collisions to join us for this prestigious conference. The 4th DEA Club Meeting serves as a pivotal platform for both experimentalists and theoreticians to convene, exchange ideas, and present groundbreaking research in dissociative electron attachment.

Date and Venue:

The conference will be held from June 19th to June 21st, 2024, at the MAXX Hotel Sanssouci Potsdam. Situated in the heart of Potsdam, Germany, this venue offers a tranquil yet centrally located setting conducive to productive discussions and networking.

Conference Focus:

The 4th DEA Club Meeting is dedicated to exploring the latest advancements in electron-molecule collision research, with a specific emphasis on dissociative electron attachment. Attendees will have the opportunity to engage with cutting-edge research findings, participate in stimulating discussions, and forge collaborations that transcend geographical boundaries.

Conference Program

Wednesday - Day 1 - Morning Sessions- 19.06.2024

08:45-09:00 Welcome Address and Opening Remarks

Session 1	Electron-Induced Che	emistry and Charge Transfer Dy	ynamics Chair: João Ameixa
09:00-09:30	Keynote Lecture	Paulo Limão-Vieira	NOVA University Lisbon, Portugal
	"Current trends in nega	ative ion formation from charge tra	ansfer experiments"
09:30-09:50	Lecture	Oddur Ingólfsson	University of Iceland, Iceland
	"Electron induced ga	s phase fragmentation and d	leposit formation from Au(I) FEBID
	precursors. Role of sec	condary and tertiary reactions in e	electron beam induced deposition."
09:50-10:10	Lecture	Mónica Mendes	NOVA University Lisbon, Portugal
	"Electron-induced che	emistry in EUVL photoresist	materials: study on perfluorophenyl
	trifluoromethanesulfona	ate"	
10:10-10:30	Lecture	Lisa Mc-Elwee White University	ty of Florida, USA
	"Electron-Induced Che	mistry of π-Facial Ligand Comple	exes: From Cp to Methyl Acrylate"
10:30-11:00	Coffee Break	-	

Session 2	Electron-driven molecular diss	ociation dynamics	Chair: Juraj Fedor
11:00-11:30	Keynote Lecture	Sang Kyu Kim	Korea Advanced Institute of Science and Technology, South Korea
	"Dynamics of the Nonvalence Bo	ound State of the Anior	n: the Doorway Role into Chemical
11:30-12:00	Lecture & EPJD Sponsorship	Sylwia Ptasinska	University of Notre Dame, USA
	"Advances in Instrumentation for Dynamics Triggered by Electrons		nderstanding Molecular Dissociation
12:00-12:15	Lightning Talk	Charlotte Titeca	KU Leuven, Belgium
	"Theoretical prediction of dissocia and Berlin's binding function"	ntive electron attachment	tusing electron localization functions
12:15-12:30	Open Discussion	Nigel Mason	University of Kent, UK
	"Whitepapers on Sustaining and	Advancing Foundational	Sciences"
12:30-14:00	Lunch		

Wednesday - Day 1 - Afternoon Sessions - 19.06.2024

Session 3	Surface Insights: Exploring the	e Effect of Electrons	Chair: Oddur Ingólfsson
14:00-14:20	Lecture	Lionel Amiaud	Université Paris-Saclay, France
	"Non-thermal desorption from n	nolecular ices: Quantifyir	ng the contribution of electrons and
	photons"		
14:20-14:40	Lecture	Petra Swiderek	University of Bremen, Germany
	"Beyond DEA: Mechanisms of E	lectron-Induced Synthese	es in Molecular Ices"
44.40 44.55	Linktoine Talle	/_#:_ "#!:_ -	Leibniz-Institut für
14:40-14:55	Lightning Talk	Katja Höflich	Höchstfrequenztechnik, Berlin
	"Area Selective Chemical Vapor	Deposition of Gold by Ele	ectron Beam Seeding"

Session 4	DEA Club Awards		Chair: Nigel Mason
			J. Heyrovsky Institute of Physical
15:00-15:20	Lecture "DEA Club Award"	Pamir Nag	Chemistry, Czechia
	"Electron-induced processes in liquid mi	icro-jets"	
45.00 45.50			University of Nebraska, Lincoln,
15:20-15:50	Lecture "DEA Club Lifetime Award"	Ilya Fabrikant	Nebraska, United States
	"Electron and positronium attachment to	molecules"	
15:50-16:10	Coffee Break		

Session 5	Plasmonic-mediated processes	S	Chair: Ilko Bald
16:10-16:30	Lecture	Andrei Stefancu	Ludwig Maximilian University of Munich, Germany
	"Charge and energy transfer at th	ne plasmonic metal – mo	olecule interface"
16:30-16:50	Lecture	Anushree Dutra	University of Potsdam, Germany
	"Unlocking Chemical Reactivity	in Plasmonic System	ms: Role of Dissociative Electron
	Attachment"		
16:50-17:10	Lecture	Janina Kopyra	Sieldce University, Poland
	"Electron driven fragmentation of analogues of nucleobases"		
17:10-17:30	Lecture	Sérgio Kogikoski Jr.	University of Potsdam, Germany
	"Low-Energy Electron-Induced De	ecomposition of DNA Nu	cleobase Derivatives by Dissociative
	Electron Attachment Processes"		
17:30-19:00	Poster session		

Thursday - Day 2 - Morning Sessions - 20.06.2024

12:30-14:00

Lunch

Session 6	Electron Dynamics:	From Interstellar Clouds to	Chair: Mónica Mendes
09:00-09:30	Keynote Lecture	Ann Orel	University of California Davis, USA
	"DEA as a Possible S	Source for CN- in Interstellar Cl	ouds"
09:30-09:50	Lecture	Kate Nixon	The Open University, UK
	"Electron momentum	spectroscopy of benzonitrile"	
09:50-10:10	Lecture	Daly Davis	Somaiya Vidyavihar University, Mumbai, India
	"Low Energy Electron	n-Induced Chemistry: Insights i	
10:10-10:30	Lecture	Simone Taioli	European Centre for Theoretical Studies in Nuclear Physics and Related Areas (ECT), Fondazione Bruno Kessler - Trento (Italy)
	"Electron collisions: F	From materials science to astro	physics"
10:30-11:00	Coffee Break		
Session 7	Exploring Electron Interactions with Gaseous Chair:		Chair: Dhananjay Nandi
			Tata Institute of Fundamental Research,
11:00-11:30	Keynote Lecture	Vaibhav S. Prabhudesai	India
	"Electron attachment	to overlapping resonances"	
11:30-11:50	Lecture	Jelena Maljkovic	Institute of Physics Belgrade, Serbia
	"Electron interaction	with anaesthetic molecules in t	
11:50-12:10	Lecture	Shanxi Tian	University of Science and Technology of China, China
	"Dissociative electron	attachment of molecular CO ₂	
12:10-12:30	Lecture	Gustavo García	Consejo Superior de Investigaciones Científicas (CSIC), Spain
			77 1

Thursday - Day 2 - Afternoon Sessions - 20.06.2024

Session 8	Electron Dynamics Acro	ss Solvation and Bio-molecular	Chair: Sylwia Ptasisnka
	Systems		Citali. Sylwia Ptasisiika
14:00-14:30	Keynote Lecture	Jan Verlet	University of Durham, UK
	"Electron spectroscopy wit	th photons: Probing effect of solvation	on on resonances"
14:30-14:50	Lecture	lunci Fodor	J. Heyrovsky Institute of
14.30-14.30	Lecture	Juraj Fedor	Physical Chemistry, Czechia
	"What do we learn from the	e electron detachment channel?"	Laurence Dankelau National
14:50-15:10	Lecture	Daniel S. Slaughter	Lawrence Berkeley National Laboratory, USA
	"Dynamics of electronic Fe	eshbach resonances in small carbox	ylic acids and amides"
15:10-15:30	Lecture	Stephan Denifl	University of Innsbruck, Austria
	"The dissociation of temp	orary negative ions formed upon e	electron attachment to biologically
	relevant molecules"		
15:30-16:00	Keynote Lecture Online	Léon Sanche	Université de Sherbrooke, Canada
	"DEA to condensed-phase	biomolecules: From O2 to plasmid	DNA"
16:00-16:30	Coffee Break		
16:30-17:00	Break		
17:00-19:00	Guided City-Tour		
	caraon ony i oni		
19:00	Conference Dinner		

Friday – Day 3 – 21.06.2024

Session 9	Advancements in Mod	deling and Experimental Studies	Chair: Jan Verlet
09:00-09:30	Keynote Lecture	Thomas Jagau	KU Leuven, Belgium
	"Modeling dissociative	electron attachment using complex-	energy methods"
09:30-09:50	Lecture	Greg Armstrong	Quantemol, UK
	"Estimation of dissociat	ive electron attachment cross section	ons for arbitrary molecules"
09:50-10:10	Lecture	Peter Papp	Cormenius University, Slovakia
	"Ion induced reactions	of various thiophenes"	
10:10-10:25	Lightning Talk	Marnik Metting van Rijn	ETH Zurich, Switzerland
	"Absolute Attachment (Cross Sections in Hydrofluorocarbor	าร"
10:25-10:45	Lecture	Dragana Maric	University of Belgrade, Serbia
	"Breakdown in fluoroca	rbon gases"	
10:45-11:10	Coffee Break		

Session 10	Innovative Approaches	s to investigate DEA	Chair: Petra Swiderek	
11:10-11:30	Lecture	Dhananjay Nandi	Indian Institute of Science Education and Research Kolkata, India	
	"Novel experimental app	proaches to study dissociative elec	tron attachment and ion pair	
	dissociation"			
11:30-11:50	Lecture	Stefan Matejcik	Cormenius University, Slovakia	
	"Electron induced fluore	scence studies to O2 and N2"		
11:50-12:10	Perspective Lecture	Nigel Mason	University of Kent, UK	
	"Electron scattering studies - the next ten years. Renaissance or Revolution?"			
12:10-12:30	Lecture	Andrew Cassidy	Aarhus University, Denmark	
	"Spontaneous electric fi	elds in molecular films"		
12:30-12:50	Lecture	Martin Čižek	Charles University, Czechia	
	"Vibronic coupling of res	onances in electron molecule colli	isions"	
12:50-13:00	Closing remarks			
13:00	Lunch			

Breakdown in fluorocarbon gases

Dragana Marić^{1,*}, Jelena Marjanović¹, Zoran Petrović^{2,3}

¹ Institute of Physics Belgrade, University of Belgrade, Serbia

² Serbian Academy of Sciences and Arts, Belgrade, Serbia

³ School of Engineering, Ulster University, UK

*[dragana.maric@ipb.ac.rs]

Fluorocarbon gases underpin various modern technologies, including plasma etching for microchip fabrication, plasma-based nanotechnologies, particle detection, refrigeration, and gas insulation. In response to growing environmental issues with this class of gases, significant attention in the field is directed towards finding eco-friendly solutions – gases with low global warming potential (GWP) and low ozone depletion potential (ODP) that would sustain or improve the efficiency of applications.

Many applications operate at moderate and high electrical fields, making it crucial to gather data for those conditions. Our work is focused on studies of elementary processes, based on breakdown data and emission properties of gases relevant to medium and high-voltage technologies. DC breakdown curves represent a sensitive balance between processes of gain and loss of charged particles in the gas phase and on surfaces, while spatial emission profiles reveal the kinetics of charged particles and fast neutrals^{1,2}.

Our measurements were made in the low-current steady-state Townsend's regime of discharge, under swarm conditions. Thus, in addition to breakdown voltages and spatially and spectrally resolved emission profiles, we were also able to determine effective ionization coefficients and secondary electron yields. The emphasis of this study was on newer generation low GWP gas – hydrofluoroolefin C₃H₂F₄ (CH2=CFCF3)³, in comparison with fluorocarbons that have been phased out or banned recently, such as CHClF₂ (R22), C₂H₂F₄ (R134a).

Acknowledgements This research was supported by MSTD the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

¹ Marić D., Savić M., Sivoš J., Škoro N., Radmilović-Radjenović M., Malović G., Petrović Z. Lj. (2014). Gas breakdown and secondary electron yield. *Eur. Phys. J. D* 68, 155. doi:10.1140/epjd/e2014-50090-x

² Petrović Z. Lj., Marić D., Savić M., Marjanović S., Dujko S., Malović G. (2017) Using Swarm Models as an Exact Representation of Ionized Gases, *Plasma Processes and Polymers 14*, 1600124. doi:10.1002/ppap.201600124

³ Marjanović J., Marić D., Petrović Z. Lj. (2024) Reduced ionization coefficients in low-current dc discharge in freons of a new generation, *Eur. Phys. J. D* 78, 14. doi: 10.1140/epjd/s10053-024-00808-8



ESCAMPIG 2024

9-13 JULY 2024, BRNO, CZECH REPUBLIC

26th Europhysics Conference on Atomic and Molecular Physics of Ionized Gases

BOOK OF ABSTRACTS







ESCAMPIG 2024 organized by

Department of Plasma Physics and Technology and CEPLANT Faculty of Science Masaryk University

In collaboration with Jednota českých matematiků a fyziků

Local Organizing Committee Realization/Support

Chairman: Zdeněk Bonaventura (MUNI) Eliška Vrzalová (MUNI)

Co-chairman: Tomáš Hoder (MUNI)

Anežka Winklerová (MUNI)

Bohumila Tesaříková (MUNI) Pavel Kunovský (MUNI)

František Krčma (BUT) Monika Stupavská (MUNI)

Ondřej Jašek (MUNI) Tereza Schmidtová (MUNI)

Pavel Dvořák (MUNI) Radka Kunovská (MUNI)

Jan Vondra (JČMF)

International Scientific Committee

Chairman: Carlos Pintassilgo (Portugal) Nikola Škoro (Serbia)

Ronny Brandenburg (Germany) Tiberiu Minea (France)

Claudiu Costin (Romania) Eugen Stamate (Denmark)

Aranka Derszi (Hungary) Francesco Taccogna (Italy)

Anatoly Filippov (Russia) František Krčma (Czech Republic)

Victor Herrero (Spain) Erik Wagenaars (United Kingdom)

Edited by Ondřej Jašek

Postconference edition, 26.8. 2024, Brno

escampig2024.physics.muni.cz

POSTER SESSION 2, Thursday, July 11, 14:30-16:30

- **P2-T1-01 S. Kawaguchi**; Y. Iwabe; K. Takahashi; K. Satoh; *Electron collision cross section set of O_2*
- **P2-T1-02 V. J. Herrero**; R. J. Pelaez; M. Jimenez-Redondo; I. Tanarro; *Ion chemistry in C* $_2H_2$: N_2 :Ar cold plasmas: Anions of astrophysical interest
- **P2-T1-03 W. Graef**; E. Carbone; L. Vialetto; M. Hopkins; L. L. Alves; *The 2024 status report on the LXCat project*
- **P2-T3-04 L. Kuijpers**; C.F.A.M van Deursen; E.J. Devid; W.A. Bongers; M.C.M. van de Sanden; *Experimental investigation of the complex chemistry in dry reforming microwave discharges*
- **P2-T3-05 N. Babucic**; K.Kutasi; N.Skoro; N.Puac; *Characterization of Microwave Surface-Wave Launchers operating at Atmospheric pressure for Water Treatment*
- **P2-T3-06** V. Ilbeigi; **P. Kumari**; S. Matejcik; *Study plasma-chemical processes of alkanes in atmospheric pressure corona discharge by ion mobility spectrometry-mass spectrometry (IMS-MS)*
- **P2-T3-07** S. Lazarova; Ts. Paunska; V. Vasilev; **St. Kolev**; *CO₂ Conversion in a Gliding Arc Discharges with Different Electrode Materials and Magnetic Field Configurations*
- **P2-T4-08 F. J. Morales-Calero**; A. Cobos-Luque; J. Munoz; R Rincon; A. M. Raya; J. A. Alcuson; N. Y. Mendoza-Gonzalez; M. D. Calzada; *Fundamental study of atmospheric pressure Ar-N₂ postdischarges and their application for metallic surfaces cleaning and activation*
- **P2-T4-09 G. Cartry**; R. MaGee; J. Broude; T. Gans; J. Dedrick; M-A Pinault-Thaury; M. Sasao; Jocelyn Archard; J.M. Layet; *Surface production of negative-ions in hydrogen plasmas: comparative analysis of different surface materials*
- **P2-T4-10** L. Zajickova; M. Janusova; D. Necas; M. Elias; D. Hegemann; P. Navascues; L. Janu; Insight into plasma polymerization with the significant contribution of ions towards deposition and etching balance
- **P2-T4-11 R. Masheyeva**; P. Hartmann; L.-Y. Luo; K. Dzhumagulova; Y.-X. Liu; J. Schulze; Z. Donko; On the in-situ determination of the effective secondary electron emission coefficient in low pressure capacitively coupled radio frequency discharges based on the electrical asymmetry effect
- **P2-T4-12 T. Nonaka**; K. Takahashi; A. Uchida; O. Tsuji; *Deposition rates and chemical compositions of C* $_4$ F $_8$ *plasma polymerization films on trench sidewalls*
- **P2-T4-13 V. Mazankova**; D. Trunec; *Kinetics of ozone production by surface processes*
- P2-T4-14 A. Siby; D. Stefas; Y. Agha; L. Invernizzi; C.Y. Duluard; K.. Gazeli; G Lombardi; K. Hassouni; S. Prasanna; Usefulness of ps-TALIF to measure gas temperature and collisional cross-sections
- **P2-T4-15 P. Viegas**; J. Afonso; J. Silveira; T. C. Dias; L. Vialetto; A. S. Morillo-Candas; V. Guerra; *Surface recombination in Pyrex in oxygen DC glow discharges*
- **P2-T5-16 N. Selakovic**; D. Maletic; N. Puac; G. Malovic; Z. Lj Petrovic; *Time-resolved images* and detection of positive and negative ion species of atmospheric pressure plasma jet with spiral electrodes

- **P2-T5-17 G. LaCombe**; J. Wang; J. Rouxel; M. S. Simeni; *New Coherent Techniques for Ultrafast Diagnostics in Plasmas*
- **P2-T5-18 M. Pazderka**; A.P. Jovanovic; M. Cernak; M.M. Becker; T. Hoder; *Sub-nanosecond development of electrical current in argon barrier discharge at atmospheric pressure*
- **P2-T5-19** L. Beving; **M. Hopkins**; G. Severn; *Sheath Expansion around Langmuir Probes in Flowing Plasmas*
- **P2-T5-20 M. Mrkvickova**; P. Dvorak; B. Stadlerova; J. Kratzer; *Atomizers of tin hydride studied by laser-induced fluorescence*
- **P2-T5-21 D. Prokop**; M. Mrkvickova; J. Tungli; P. Dvorak; S. Kadlec; T. Hoder; *Electrical charge relaxation on a dielectric surface*
- **P2-T5-22 O. Jovanovic**; F. Krcma; L. Dostal; N. Puac; N. Skoro; *Time evolution of emission profiles and spatial structure of a plasma jet streamer discharge in contact with liquid*
- **P2-T5-23 P. Skopal**; P. Dvorak; *The ignition of low-pressure capacitively coupled discharge*
- **P2-T5-24 K. Polaskova**; P. Drexler; M. Klima; J. Machac; D. Necas; M. Svanda; L. Zajickova; Antenna measurement of electric field and higher harmonics in atmospheric plasma jets interacting with different targets
- **P2-T5-25 R. Labenski**; D. Steuer; H. van Impel; M. Boeke; V. Schulz-von der Gathen; J. Golda; *Surface charge tailoring for plasma catalysis*
- **P2-T5-26** F. Enescu; A. Gobarev; G. Rotaru; C. Ionita; **R. Schrittwieser**; *Spectral investigation on two spherical cathode discharges*
- **P2-T5-27 K. Sasaki**; K. Takada; S. Nishiyama; *Estimation of sheath electric field based on Dopper broadened absorption spectrum of hydrogen Balmer-alpha line*
- **P2-T5-28** P. Bilek; G. Arora; P. Hoffer; V. Prukner; T.C. Dias; V. Guerra and **M. Simek**; Advanced analysis of overlapping emission spectra induced by highly transient discharges
- **P2-T5-29 Y. Yamashita**; K. Doi; T. Kiyota; S. Watanabe; K. Shimatani; W. Kikuchi; Y. Ye; A. Nezu; H. Akatsuka; *Electron temperature diagnosis of CF₄ O₂ plasma based on fluorine atomic corona model by tomographic optical emission spectroscopic measurement*
- **P2-T5-30 Z. Navratil**; L. Kusyn; Z. Bonaventura; T. Hoder; On the line intensity ratio for electric field measurement in dielectric barrier discharge in argon at atmospheric pressure
- **P2-T5-31 Z. Shu**; N.A. Popov; S.M. Starikovskaia; *Absolute calibration of Xe/O cross-section ratio for TALIF in nanosecond capillary discharge: optimization of the discharge parameters*
- **P2-T6-32 D. F. N. Santos**; O. Ojeda Mena; M. Lisnyak; M. S. Benilov; *Exploring arcing phenomena in low-voltage contactors: a comprehensive study through numerical modelling and experiment*
- **P2-T6-33 P. G. C. Almeida**; G. V. Naidis; and M. S. Benilov; *Theory of stability of self-sustaining DC discharges at inception with application to negative corona*

- **P2-T6-34 J. Tungli**; Z. Bonaventura; D. Prokop; L. Kuthanova; T. Hoder; J. Fedor; M. Rankovic; M. Horky; S. Kadlec; *Determination of photoionization properties of* $C_4F_7N N_2$ mixture and their application in streamer simulation
- **P2-T6-35 J. Jansky**; R. Janalizadeh; V. P. Pasko; *Investigating of ignition of positive corona discharge in air using a time dependent fluid model*
- **P2-T6-36 K. Tomankova**; K. Mrozek; A. Obrusnik; A. Fromm; F. Burmeister; *Sensitivity* analysis of various physics processes in industrial HiPIMS: A global plasma modelling perspective
- **P2-T6-37 L.Y. Luo**; P. Hartmann; Z. Donko; H.P. Li; *Argon metastable atom quenching in low pressure Ar O₂ CCPs*
- **P2-T6-38 Y. Liu**; T. Silva; T. C. Dias; P. Viegas; X. Zhao; Y. Du; J. He; V. Guerra; *Kinetic study of gas heating in low pressure CO₂ plasmas*
- **P2-T6-39 S. Van Rompaey**; M. Gromov; E. Morais; A. Bogaerts; R. Morent; *Diagnostic characterisation and oD modelling study of ns-pulsed plasma-assisted methane pyrolysis*
- **P2-T6-40 U. Ebert**; D. Bouwman; J. Teunissen; *Macroscopic parameterization of positive streamers in air: velocity, radius, field etc.*
- **P2-T6-41 M. M. Becker**; A.P. Jovanovic; L. Kusyn; T. Hoder; *Influence of voltage waveform and repetition frequency on atmospheric-pressure barrier discharges in argon*
- **P2-T6-42 N. G. C. Ferreira**; P. G. C. Almeida; A. E. Taher; G. V. Naidis; M. S. Benilov; Numerical investigation of stability of low-current point-to-plane negative corona in air
- **P2-T6-43 E. Calvo**; T. Santos; J. Henriques; M. J. Pinheiro; P. Sa; *Three-Dimensional Charged Particle Tracing of ExB Plasma Discharge in Hall Thrusters*
- **P2-T6-44 P. Burda**; N. Corthouts; G. May; Z. Bonaventura; T. Magin; *Solving steady and unsteady multi-physics problems using a hybridized discontinuous Galerkin solver*
- **P2-T6-45** K. Koehn; D. Krueger; L. Vogelhuber; D. Eremin; L. Xu; **R.P. Brinkmann**; *The electric potential in high power magnetron discharges: A toy model*
- **P2-T6-46 R. Almeida**; P. Almeida; H. Kaufmann; M. Benilov; Fast Calculation Tool for Breakdown Voltage in a setup with a Dielectric Surface
- **P2-T6-47 R. Brunovsky**; A. Obrusnik; Z. Bonaventura; G. D. Stancu; *Multi-physics simulation of microwave capillary discharge in Argon: towards comprehensive power balance*
- **P2-T6-48 S. J. Doyle**; R. W. Boswell; C. Charles; J. P. Dedrick; *Magnetic Enhancement of the Electrical Asymmetry Effect in Capacitively Coupled Plasmas*
- **P2-T6-49 Q. Shen**; A. Pikalev; J. Gans; and R. van de Sanden; *Understanding NO formation and destruction by non-thermal effect in the quenching process of microwave air plasma*
- **P2-T6-50 M. Stastny**; K. Mrozek; K. Jurik; L. Havlicek; M. Novotny; A. Obrusnik; *Numerical simulation of a low-pressure electrodeless ion source intended for air-breathing electric propulsion*
- **P2-T6-51** A.Tejero del Caz; D. Simoes; T. C. Dias; V. Guerra; M. Lino da Silva; L. Marques; N. Pinhao; C. D. Pintassilgo; **L. L. Alves**; *The LisbOn KInetics LoKi-B+C simulation tool*

- **P2-T6-52 Z. Belkaid**; E. Morel; A. Revel; T. Minea; *Plasma model for high power impulse magnetron sputtering (HiPIMS) with helium*
- **P2-T6-53 F. Zmeko**; E. Mullerova; Z. Bonaventura; *Macroscopic Model of Non-thermal Plasma Filament Based on Probabilistic Approach*
- **P2-T7-54** S.S. Ussenkhan; A.T. Zhunisbekov; Y. Yerlanuly; A.U. Utegenov; S.A. Orazbayev; T.S. Ramazanov; L. Boufendi; H.Vach; *Obtaining of silicon nanoclusters by the PECVD method*
- **P2-T8-55 F. Krcma**; Z. Kozakova; F. Zbytek; M. Moravcik; *Influence of discharge kind on processes in Titan like atmosphere*
- **P2-T8-56 M. Moravcik**; F. Krcma; Influence of water vapor on electrical discharge-initiated processes in prebiotic atmospheres
- **P2-T8-57 F. J. Pérez-Invernón**; J. F. Ripoll; F. J. Gordillo-Vázquez; P. Camino-Faillace; T. Neubert; O. Chanrion; N. Ostgaard; *A Comprehensive Analysis of Optical Emissions in Exposed Lightning Channels*
- **P2-T9-58** S. J. Doyle; **M. J. Kushner**; Toroidal Plasma Sources for Remote and Isotropic Processing
- **P2-T9-59 J. Marjanovic**; D. Maric; Z. Lj Petrovic; *Emission properties of low-pressure low-current DC discharge in freons of new generation*
- **P2-T9-60 V. Orlandi**; M. Dion; J. Brochie; A. Paillet; M. L. Kahn; L. Stafford; R. Clergereaux; Effects of argon pulsed injection on a surface-wave plasma column at low pressures
- **P2-T9-61 V. Wolf**; R. Friedl; U. Fantz; *Ammonia production in a low- to mid-pressure microwave discharge*
- **P2-T10-62 T. Bogdanov**; E. Benova; P. Marinova; *Novel microwave plasma source for wastewater treatment and prevention of chemical pollution in the environment*
- **P2-T10-63 J. Thiel**; S. Kreuznacht; M. Boeke; A. von Keudell; *Iron oxide reduction in a high-performance argon-hydrogen plasma*
- **P2-T10-64 L. Silberer**; S. Soldatov; G. Link; A. Navarrete; R. Dittmeyer; J. Jelonnek; Investigation of emission spectra of atmospheric CO₂ plasmas sustained with microwave pulsation in a high Q resonator
- **P2-T10-65** S. Soldatov; **L. Silberer**; G. Link; A. Navarrete; R. Dittmeyer; J. Jelonnek; Optimization of gas quenching of atmospheric CO₂-plasma sustained in microwave reactor by application of water-cooled nozzles
- **P2-T10-66 M. Khasenov**; S. Samarkhanov; E. Batyrbekov; Yu. Gordienko; Yu. Ponkratov; V. Bochkov; E. Saparbek; A. Sluyanov; S. Tolmachev; *Reaction of lithium-6 with thermal neutrons as a source of nuclear-induced plasmas of gas mixtures*
- **P2-T10-67** E. Bizeray; A. Belinger; S. Dap; F. Fanelli; **N. Naude**; *Synthesis of metal polymer nanocomposite thin film through interaction of a gold salt solution aerosol with a Dielectric Barrier Discharge*
- **P2-T10-68 N. Skoro**; O. Jovanovic; G. Malovic; N. Puac; *Characterization and optimization of 3-pin atmospheric pressure plasma jet system for water treatment*
- **P2-T10-69 P. Marinova**; T. Bogdanov; E. Benova; M. Kirilova; Y. Todorova; I. Yotinov; I. Schneidern; Y. Topalova; *Non-thermal plasma treatment of landfill leachate for detoxification of hazardous pollutants*

- **P2-T10-70** G. Regodon; H. Acosta-Rivera; R. Alvarez; V. Rico; A. Palmero; **M. C. Garcia**; *Modifying atmospheric pressure surface-wave-sustained plasmas with silicon plates for discharge stability*
- **P2-T10-71** T. Ohara; S. Kinoshita; **K. Takahashi**; *Inactivating C.sphaerospermum and its mechanism in atmospheric pressure plasmas with water mist*
- **P2-T11-72 O. Jašek**; J. Toman; P. Sťahel; J. Jurmanová; M. Stupavská; *Tunable stability of microwave plasma synthesized few-layer graphene dispersion in water*
- P2-T11-73 F. J. Morales-Calero; A. Cobos-Luque; J. M. Blázquez-Moreno; A.M. Raya; R. Rincón; J. Muñoz; A. Benítez; N. Y. Mendoza-González; J.A. Alcusón; A. Caballero; M. D. Calzada; Experimental Evidence of TIAGO Torch Plasma as a Surface Wave Discharge and Identification of the Radiation Zone: Improving Graphene Synthesis
- **P2-T11-74 A. Obrusnik**; M. Mrkvickova; W. Khan; N. Boulouki; T. Medek; M. Svoboda; J. Kratzer; J. Dedina; P. Dvorak; *Simulation of plasma; chemistry; and flow dynamics in flame-based and plasma-based hydride atomizers*
- **P2-T11-75 R. Vertongen**; G. De Felice; H. van den Bogaard; F. Gallucci; A. Bogaerts; S. Li; *A different take on DRM in DBD: combining sorbents and plasma for single-stage CCU*
- **P2-T11-76** V. Lafaurie; Z. Shu; M. Sadauskaite; P. Vidal; **S. M. Starikovkaia**; *Nanosecond plasmas generation of a chemical gradient for detonation initiation: O-TALIF and OES characterisation*

Emission properties of low-pressure low-current DC discharge in freons of new generation

<u>J Marjanović</u>^{(*)1}, D Marić¹, Z Lj Petrović^{2,3}

¹ Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia
² Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia
³ School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom

(*)sivosj@ipb.ac.rs

Fluorocarbons, widely used in plasma-based technologies, find applications in the semiconductor industry for etching, cleaning, surface functionalization, deposition of fluorocarbon films, and carbon nanostructures [1,2]. Notably, tetrafluoroethane (HFC-134a) and its low Global Warming Potential (GWP) and low Ozone Depletion Potential (ODP) substitute gas, tetrafluoropropene (HFO-1234yf), serve not only as refrigerants in vehicles and household appliances but also in radiation particle detectors, high and medium voltage gas insulation systems, and polymer film deposition [3,4]. Understanding the electrical characteristics of these fluorocarbons when exposed to electric fields is crucial for developing new applications and enhancing existing ones. Our research focuses on acquiring data on fundamental processes that influence breakdown and gas discharge behavior in fluorocarbon gases under electric fields, aiding in the modeling of gas discharge applications. In our steady-state Townsend experiment (SST), we ignite discharges within a system consisting of two plan-parallel electrodes housed in a quartz tube. The electrodes, with a diameter of 5.4 cm, are positioned 1.1 cm apart. Here, we present a comparison of the results of our DC breakdown measurements for HFC-134a and HFO-1234yf. These results include optical emission spectra, spatially and spectrally resolved distribution of discharge emission, and Paschen curves, providing breakdown voltage and data that could be the basis for modelling and understanding the operation of the discharge.

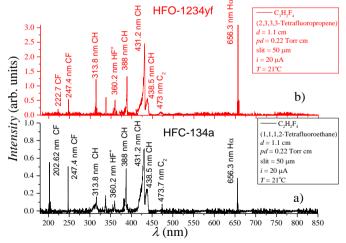


Fig. 1: Optical emission spectra of discharges in a) HFC-134a and b) HFO-1234yf obtained at pd=0.22 Torr cm (pressure times electrode distance) and d=1.1 cm. The width of the spectrograph slit was 50 μ m.

Optical emission spectra of discharges in HFC-134a and HFO-1234yf (as shown in Fig. 1a) and b)) were recorded at low current in the Townsend regime within the 200-900 nm spectral range. Detected emissions include CF, CH, HF $^+$, C₂, and H $_\alpha$. These emissions likely arise from excited species resulting from dissociative excitation of the parent molecules [5,6]. Analyzing emission spectra allows identification of possible excited species and proper selection of optical filters for spectrally resolved recordings of axial emission profiles (examples shown in Fig. 2a) and b)). The recorded data includes spatial profiles of total emission within the entire visible spectral range and the spatial distribution of

emission in narrow wavelength intervals centered around the most intense lines (at 431 nm and 656 nm). Axial emission profiles, obtained for different pd values, illustrate how changes in E/N (pd) impact the discharge structure and basic processes. Despite operating in the low-current Townsend regime, where space charge density is negligible and the electric field between electrodes is nearly uniform [7], spatial emission peaks in front of the cathode for both freons. This phenomenon is primarily attributed to heavy-particle excitation near the cathode [8]. Additionally, the CH emission (dashed lines in Fig. 2a) and b)) follows the integrated profiles (solid lines), while H_{α} emission (open circles in Fig. 2a) and b)) exhibits a distinct shape with a more pronounced peak in front of the anode (at these E/N). Axial profiles of emitted light in these two freons highlight the substantial contribution of heavy particles to breakdown across a wide range of pd values (i.e., the corresponding E/N values). In addition to the axial emission profiles, we present the Paschen curves (Fig. 2c)) measured for discharges in HFC-134a and HFO-1234yf, covering a range from 0.05 Torr cm to 1.2 Torr cm. HFO-1234yf has significantly higher breakdown voltages at the same pd as compared to HFC-134a.

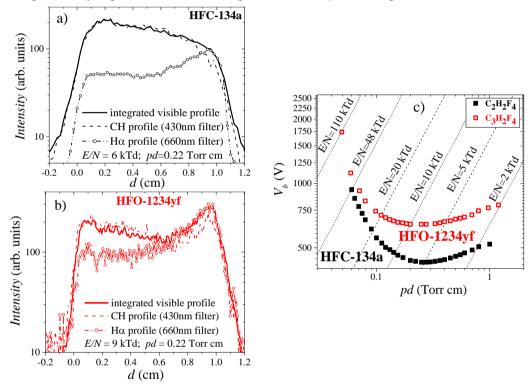


Fig. 2: Axial profiles of emission from discharges in a) HFC-134a and b) HFO-1234yf recorded at pd=0.22 Torr cm and d=1.1 cm; c) Paschen curves for discharges in HFC-134a and HFO-1234yf at d=1.1 cm, at various reduced electric field (E/N) indicated by dashed lines [1Td=10⁻²¹ Vm² and 1Torr=133.32 Pa].

Our experimental studies on low-pressure DC discharges in these two freons, combined with optical measurements, enable the identification of elementary processes and provide a complete set of breakdown data. Gaining a better understanding of these processes through data collection and analysis is important for modeling gas plasmas, which can effectively reduce pollutant densities.

This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

- [1] S. Vizireanu, M.D. Ionita, G. Dinescu et al., Plasma Processes Polym. 9 (2012) 363-370.
- [2] S. Guruvenket, G. R. S. Iyer et al., Applied Surface Science, 254(18) (2008) 5722-5726.
- [3] M. Abbrescia, Nucl. Phys. B Proc. Suppl. 293 (2008) 177-178.
- [4] M. Koch and C. M. Franck, IEEE Trans. Dielec. and Elect. Insula. 22(6) (2015) 3260-3268.
- [5] J. Pereira-da-Silva, et al., Jour. Amer. Soc. for Mass Spect. 32(6) (2021) 1459-1468.
- [6] V.S.A. Bonfim, L. Baptista, D.A.B Oliveira, et al., J. Mol. Model. 28 (2022) 309.
- [7] S. Živanov et al., Eur. Phys. J. Appl. Phys. 11 (2000) 59–69.
- [8] Z. Lj. Petrović, B. M. Jelenković, A. V. Phelps, Phys. Rev. Lett. 68 (1992) 325.

The 2024 Collisions Physics and Chemistry and their Applications Conference

and

A Workshop of the COST Action 20129: Multiscale Irradiation and Chemistry Driven Processes and Related Technologies

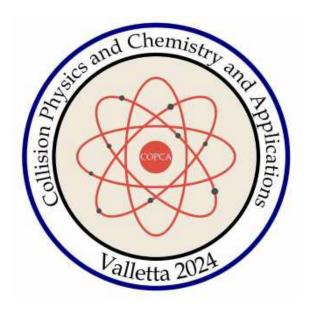


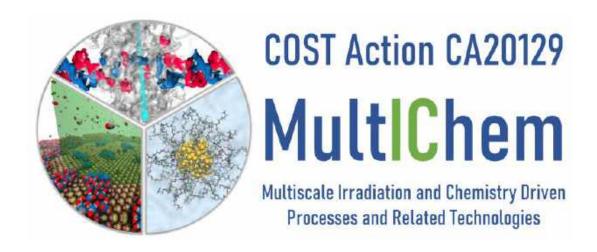
COPCA-MultIChem 2024

 $15^{th}-18^{th}\ October\ 2024$

Aula Magna, University of Malta, Valletta, Malta

ABSTRACT BOOKLET





ORGANISING COMMITTEE



Prof. Nigel J. Mason, OBE School of Physics and Astronomy, University of Kent, Canterbury CT2 7NH, United Kingdom Email: n.j.mason@kent.ac.uk



Dr Duncan V. MifsudHUN-REN Institute for Nuclear Research,
Debrecen H-4026, Hungary
Email: mifsud.duncan@atomki.hu



Rebekah Attard-Trevisan School of Chemistry and Forensic Science, University of Kent, Canterbury CT2 7NH, United Kingdom Email: ra627@kent.ac.uk



Dr Alexey V. VerkhovtsevMBN Research Centre,
Frankfurt-am-Main 60438, Germany
Email: verkhovtsev@mbnexplorer.com

CONFERENCE WEBPAGE

The conference webpage may be found at: https://copcaconference.wixsite.com/copca2024

CONFERENCE PROGRAMME

Tuesday, 15th October 2024

Conference Day One (MultIChem Sessions)

09.00	Registration at Conference Venue
09.30	Opening Remarks: The COPCA Conference Series
	Duncan V. Mifsud (HUN-REN Institute for Nuclear Research, Hungary)
09.45	Open Remarks: Multiscale Irradiation and Chemistry-Driven Processes and Related
	Technologies
	Alexey V. Verkhovtsev (MBN Research Centre, Germany)
Session 1:	Modelling as a Tool for Understanding Multiscale Chemical Systems and
	Irradiation-Driven Processes
	Chair: Juraj Országh (Comenius University Bratislava, Slovakia)
10.00	Progress in Multiscale Computational Modelling of Meso-Bio-Nano Systems Exposed
	to Radiation
	Andrey V. Solov'yov (MBN Research Centre, Germany)
10.30	Applications of Multiscale Modelling in Astrochemistry and Nanofabrication
	Felipe Fantuzzi (University of Kent, United Kingdom)
11.00	Understanding the Spin States in Coordination Complexes
	Matija Zlatar (University of Belgrade, Serbia)
11.30	Coffee Break
12.00	Modelling Collision Processes in Complex Molecular Systems Using VIKING
	Ilia A. Solov'yov (University of Oldenburg, Germany)
12.30	Radiation-Induced Phenomena in Molecules and Atomic Clusters Studied with MBN
	Explorer and MBN Studio
	Alexey V. Verkhovtsev (MBN Research Centre, Germany)
13:00	Lunch Break

Session 2: Applications of High-Energy Science: Synchrotrons and Plasma

Chair: Alexey V. Verkhovtsev (MBN Research Centre, Germany)

14.00	Atmospheric Pressure Low-Temperature Plasma for Application in Agriculture and Food Processing Veronika Medvecká (Comenius University Bratislava, Slovakia)
14.30	Exploring Electrical Breakdown in Ultra-Low Global Warming Potential Gases for Insulation in Medium and High-Voltage Technology Dragana Marić (Institute of Physics Belgrade, Serbia)
15.00	Computational Studies of Redox-Active Transition Metal Compounds Furio Corà (University College London, United Kingdom)
15.30	Advancing the Performance of Li-Ion Batteries Using X-Rays Maria Alfredsson (University of Kent, United Kingdom)
16.00	Coffee Break
Session 3:	Early Career Researcher Presentations Chair: Rebekah Attard-Trevisan (University of Kent, United Kingdom)
Presentation 1:	Formation of Polyynes in 1 keV Electron Irradiated Interstellar Ice Analogues Lars Borchert (University of Aarhus, Denmark)
Presentation 2:	Dissociative Ionisation Pathways for the Radiosensitiser Mentronidazole Daniel Bou Debes (Open University, United Kingdom)
Presentation 3:	Ice Mantle Formation in the Interstellar Medium: The Deposition Rate Problem Matthew D. Dickers (University of Kent, United Kingdom)
Presentation 4:	Electron Momentum Spectroscopy of Propylene Oxide David Matalon (Open University, United Kingdom)
Presentation 5:	Electron-Induced Ionisation and Absolute Dissociative Electron Attachment Cross- Section Study of Trans-1,3,3,3-Tetrafluoropropene (HFO1234ze) Anirban Paul (J. Heyrevoský Institute of Physical Chemistry, Czechia)
Presentation 6:	Sulphur Implantation in Astrochemical Conditions: Implications for the Jovian System Ragav Ramachandran (Physical Research Laboratory, India)
Presentation 7:	Metal Deposition at Room Temperature: Theoretical Investigation of Precursors for Photoassisted Chemical Vapour Deposition Cauê Souza (University of Kent, United Kingdom)

Wednesday, 16th October 2024

Conference Day Two (MultIChem Sessions)

Session 4:	Electron Interactions with Molecules Chair: Nigel J. Mason (University of Kent, United Kingdom)
09.00	Electron-Induced Processes in Gas and Liquid Phase Molecules Pamir Nag (J. Heyrovský Institute of Physical Chemistry, Czechia)
09.30	Electron and Ion Induced Reactions with Thiophenes Studied by MS, IMS-MS, and DFT Peter Papp (Comenius University Bratislava, Slovakia)
10.00	Electron-Induced Decomposition of Nucleobase Derivatives by Dissociative Electron Attachment Processes Janina Kopyra (University of Siedlee, Poland)
10.30	Electron Collision-Induced Reactions in Isolated and Clustered Interstellar Molecules Sam Eden (Open University, United Kingdom)
11.00	Coffee Break
11.30	Emission Spectroscopy of Electron-Molecule Collisions Juraj Országh (Comenius University Bratislava, Slovakia)
12.00	Electron-Induced Fragmentation of Biologically Relevant Molecules in the Gas Phase Stephan Denifl (University of Innsbruck, Austria)
12.30	Electron-Molecule Collisions in the Gas Phase Jelena Maljković (Institute of Physics Belgrade, Serbia)
13.00	Experimental and Theoretical Momentum Distributions of Molecules with Astrochemical Relevance **Kate Nixon (Open University, United Kingdom)** **Theoretical Momentum Distributions of Molecules with Molecules with Molecules and Molecules are also as a first of the Molecules with Molecules and Molecules are also as a first of the Molecules and Molecules are also as a first of the Molecules and Molecules are also as a first of the Molecules are also as a first of the Molecules and Molecules are also as a first of the Molecules
13.30	Lunch Break
Session 5:	Radiation Science with Applications to Biology and Health Sciences Chair: Pamir Nag (J. Heyrovský Institute of Physical Chemistry, Czechia)
14.30	Radiation Damage to DNA Nanostructures: From Fundamentals to Applications Jaroslav Kočišek (J. Heyrovský Institute of Physical Chemistry, Czechia)

15.00	Importance of Radiation-Induced Foci (IRIF) in Radiation Research and Health
	Science
	Martin Falk (Czech Academy of Sciences, Czechia)
15.30	TBC
	Julian Bonello (University of Malta, Malta)
16.00	Synthesis and Comprehensive Characterisation of TiO ₂ Nanoparticles Doped with Cu
	and Rare-Earth Elements
	Dmitrijs Bočarovs (University of Latvia, Latvia)

Thursday, 17th October 2024

Conference Day Three (COPCA Sessions)

Session 6:	Materials Science: Nanosystems, Radiation Research, and Applications Chair: Maria Alfredsson (University of Kent, United Kingdom)
09.30	Manipulating Metal Atoms in Clusters and Nanoalloys to Control Catalysis Richard Palmer (University of Swansea, United Kingdom)
10.00	Radiation Damage and Thermal Annealing Kinetics of Radiation Defects in CVD Diamond Irradiated by Xe Ions Anatoli I. Popov (University of Latvia, Latvia)
10.30	Investigation of Radiation Defects by Thermal Annealing of BaF ₂ and CaF ₂ Crystals Irradiated with Fast Xenon Ions Alma Dauletbekova (LN Gulyimov Eurasian National University, Kazakhstan)
11.00	Coffee Break
11.30	Perspectives on Electrochemical Chemosensing Benji Fenech Salerno (Imperial College London, United Kingdom)
12.00	Effect of Irradiation with Swift Heavy Ions on Luminescence of CsI:Tl Crystals Abdirash Akilbekov (LN Gulyimov Eurasian National University, Kazakhstan)
12.30	Analysis of Self-Trapped Hole Mobility in Alkali Halides, Alkaline-Earth Halides and Other Binary and Complex Metal Halides Marina Konuhova (University of Latvia, Latvia)
13.00	Coffee Break

- 14.30 Excursion to the Mnajdra and Haġar Qim Megalithic Temples
- 19.30: Conference Dinner at the Trattoria AD1530 in Mdina

Friday, 18th October 2024

Conference Day Four (COPCA Sessions)

Session 7:	Space Chemistry I: Radiation-Induced Chemistry and Physics Chair: Duncan V. Mifsud (HUN-REN Institute for Nuclear Research, Hungary)
09.30	Photodissociation of Molecular Ions Relevant for Astrochemistry and Laboratory Investigation Sanja Tosić (Institute of Physics, Belgrade)
10.00	Some Experimental Insights into the Microphysics of Ice Processing by Cosmic Rays Alexei V. Ivlev (Max Planck Institute for Extraterrestrial Physics)
10.30	Ion Processing of Astrophysically Relevant Molecular Systems Alicja Domaracka (CIMAP-CNRS, France)
11.00	Coffee Break
11.30	Ongoing Investigation of Ice Analogues of the Solar System Icy Moons Using Laboratory Facilities Zuzana Kaňuchová (Slovak Academy of Sciences, Slovakia)
12.00	Radiation Processing of Interstellar Ice Analogues Sergio Ioppolo (University of Aarhus, Denmark)
12.30	Ion Impact Studies with Astrochemical Relevance Béla Sulik (HUN-REN Institute for Nuclear Research, Hungary)
13.00	Coffee Break
Session 8:	Space Chemistry II: Complex Organic Molecules and the Origins of Life Chair: Sergio Ioppolo (University of Aarhus, Denmark)
14.00	Laboratory Studies on the Radiation-Driven Chemistry in Ices in Space Duncan V. Mifsud (HUN-REN Institute for Nuclear Research, Hungary)
14.30	Low (10 K) and High Temperature (10 ⁴ K) Astrochemistry Bhalamurugan Sivaraman (Physical Research Laboratory, India)

15.00	Reactive Collisions of Small Aromatic Compounds with Atoms / Radicals by the
	Crossed Molecular Beam Technique
	Gianmarco Vanuzzo (University of Perugia, Italy)
15.30	A Systematic IR and VUV Spectroscopic Investigation of Ion, Electron, and Thermally
	Processed Ethanolamine Ice
	Jin Zhang (Queen Mary University of London, United Kingdom)
16.00	Fragmentation of Complex Organic Molecules: Exploring Pathways to Prebiotic
	Precursors
	Heidy M. Quitián-Lara (Max Plank Institute for Extraterrestrial Physics, Germany)
16.30	Conference Closing

Exploring Electrical Breakdown in Ultra-Low Global Warming Potential Gases for Insulation in Medium and High-Voltage Technology

Dragana Marić, 1,† Jelena Marjanović, 1 and Zoran Lj. Petrović^{2,3}

¹Institute of Physics Belgrade, University of Belgrade, Belgrade, 11080, Serbia

²Serbian Academy of Sciences and Arts, Belgrade, 11000, Serbia

³ School of Engineering, Ulster University, Jordanstown, Co. Antrim BT37 0QB, UK

†Corresponding author: dragana.maric@ipb.ac.rs

Synopsis. In response to growing environmental concerns associated with SF₆ gas for insulation in medium and high-voltage technologies, a new class of gases eco-friendly gases has emerged as a potential alternative. Our work explores the breakdown properties of these fluorocarbon gases with low Global Warming Potential and Low Ozone Depletion potential. By sustaining discharge under swarm conditions at low currents and pressures, we can determine breakdown voltages, ionisation coefficients, and secondary electron yields. Measured parameters may be used directly in plasma modelling and to extend normalising sets of cross-sections to high mean energies.

Recently developed hydrofluoroolefins (HFOs), perfluoroketones (PFKs) and perfluoronitriles (PFNs) with a low impact on the climate are nowadays in the focus of the community, having in mind the lack of relevant data required for application to environmentally benign power equipment [1]. Our motivation extends to applying these gases in resistive plate chamber particle detectors, where a mixture of greenhouse gases (C₂H₂F₄, SF₆ and i-C₄H₁₀) is currently used [2].

Our measurements are done in a centimetre-sized plan-parallel electrode system, under swarm conditions at low currents ($\sim 1~\mu A$) and low pressures ($\sim 0.1-1~Torr$). Results include optical emission spectra, spatially and spectrally resolved distributions of discharge emission, effective ionisation coefficients, secondary electron yields and Paschen curves. The breakdown and voltage-current measurements, together with the results for effective ionisation coefficients, allow the development of complete sets of cross-sections and other

discharge parameters in the mean energy region relevant to numerous applications.

In Figure 1, we present breakdown results for 1,1,1,2-Tetrafluoroethane (R134a, C₂H₂F₄) and 2,3,3,3-Tetrafluoropropene (HFO-1234yf, C₃H₂F₄), in comparison with selected conventionally used fluorocarbons.

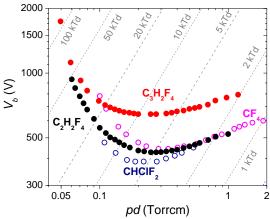


Figure 1 Paschen curves of R134a and HFO-1234yf, compared to CF_4 and $CHClF_2$ (R-22).

From spatially and spectrally resolved emission profiles, we can determine effective ionisation coefficients [4] at high values of density-normalized electric fields (E/N) (Figure 2).

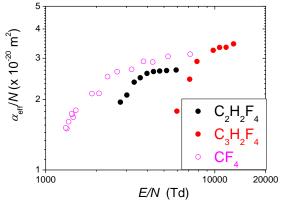


Figure 2. Effective ionisation coefficients.

With the highest breakdown voltages and ionisation coefficients pushed towards the highest E/N-s, HFO-1234yf shows the best potential for insulation. It is not a satisfactory SF₆ alternative but represents a step toward understanding elementary processes in these complex new gases.

Acknowledgements

This research was supported by MSTD and the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

- Boya Zhang, Li Chen, Xingwen Li, Ze Guo, Yunjie Pu, Nian Tang. (2020). *IEEE Transac*tions on Dielectrics and Electrical Insulation, 27(4), 1187-1194.
- A Bianchi, S Delsanto, P Dupieux, A Ferretti, M Gagliardi, B Joly, SP Manen, M Marchisone, L Micheletti, A Rosano and E Vercellin. (2019). *JINST*, 14, P1101414.
- 3. J Marjanović, D Marić, ZLj Petrović. (2024). Eur. Phys. J. D, 78, 14.
- 4. D Marić, M Savić, J Sivoš, N Škoro, M Radmilović-Radjenović, G Malović, ZLj Petrović. (2014). Eur. Phys. J. D, **68**, 155.

International Meeting on Data for Atomic and Molecular Processes in Plasmas: Advances in Standards and Modelling

November 12-15, 2024, Palić, Serbia

BOOK OF ABSTRACTS AND CONTRIBUTED PAPERS

Edited by Vladimir A. Srećković, Aleksandra Kolarski, Milica Langović, Filip Arnaut and Nikola Veselinović

CONTENTS

Plenary Invited Lectures	
Dimitrijević, M.S. Spectral line broadening and the corresponding databases	10
Invited Lectures	
Kolarski, A. Earth's Lower Ionosphere impacted by High Class X-Ray Solar Flare Events	12
Iacob, F. Pseudo harmonic oscillator potential	22
Pop, N., Djuissi, E., Mezei, J.Z. and Schneider, I.F. Reactive collisions between electrons and molecular cations. Applications in astrophysics and cold plasmas modelling	23
Milosavljevic, A.R., Nicolas, C., Robert, E. and Bozek, J. Soft x-ray photoelectron-photoion-photoion coincidence (PEPIPICO) spectroscopy of isolated molecular systems at PLEIADES beamline (SOLEIL synchrotron)	25
Kounchev, O. and Simeonov, G. Neural Networks in Astrophysics and Plasma Physics: Transformers, PINNs, KANNs, and all that	26
Dujko, S., Simonović, I.B. and Bošnjaković, D.V. Kinetic and fluid studies on Resistive Plate Cambers operated with new eco-friendly gas mixtures	27
Lectures	
Borka Jovanović, V., Borka, D. and Jovanović, P. <i>X-shaped radio galaxy 3C 315</i>	30
Starčević, N. and Petrović, S. Study of very thin crystals by rainbow scattering effect	40
Savić, M.R., Veselinović, N.B., Dragić, A.L., Maletić, D.M., Joković, D.R., Banjanac, R.M., Knežević, D., Travar, M. and Udovičić, V.I. Implications of the Temperature Effect Analysis Using Simulated Secondary Cosmic Muon Data	47

47

Mijić, Z.R. and Marinković, B.P. New opportunities for COST participants – actions networking tools and examples of the national funding schemes	49
Posters	
Eichelberger, H., Nina, A., Boudjada, M.Y., Kolarski, A., Veselinović, N.B., Nico, G., Biagi, P.F. and Srećković, V.A. Terminator variations of VLF/LF amplitudes - observational techniques and case studies	52
Nina, A., Butka, P., Kolarski, A., Srećković, V.A., Sarnovský, M., Bednár, P. and Popović, L.Č. Specific changes in VLF signals induced by astrophysical and geophysical phenomena: possibility of applying machine learning in statistical analyses	59
Srećković, V.A., Iacob, F. and Vujčić, V. Investigating Collisional and Radiative Processes: Important Datasets for Molecular Dynamics	65
Srećković, V.A., Pop, N., Vujčić, V., Dimitrijević, M.S., Christova, M.D. and Mijić, Z. New molecular dataset for planet formation chemistry and modeling	67
Kolarski, A., Nina, A., Srećković, V.A., Arnaut, F. and Langović, M. Earth's Lower Ionosphere under energetic events: solar flares and gamma ray bursts as drivers for VLF signal perturbations	69
Tošić, S., Srećković, V.A. and Vujčić, V. Photodissociation processes in non-symmetric systems	70
Arnaut, F., Kolarski, A., Langović, M., Srećković, V.A. and Jevremović, S. <i>Machine Learning Classification Difficulties of VLF Amplitude Variations Around the Terminator</i>	71
Marjanović, J., Marić, D., Dujko, S. and Petrović, Z.Lj.	72
Electrical Breakdown in trans-1,3,3,3-Tetrafluoropropene HFO1234ze(E)	72
Marinković, B.P., Ivanović, S.Đ. and Uskoković, N.A. Elastic electron scattering by xenon atom and data coverage within BEAMDB	74
Simonović, I.B., Bošnjaković, D.V. and Dujko, S. Fitting of the current signal of the Pulsed Towsend experiment with the gradient descent algorithm	75

Krstić, I.B., Obradović, B.M. and Kuraica, M.M. Spatio-temporal dynamics of a microsecond pulsed glow discharge	77
Sretenović, G.B., Kovačević, V.V., Obradović, B.M., Kuraica, M.M. and Ranitović, P. Helium plasma jet as a probe for the laser irradiance measurements	79
Maljković, J.B., Marinković, B.P. and Kopyra, J. Dissociative electron attachment to isoflurane molecule in the gas phase	81
Borka Jovanović, V., Borka, D., Capozziello, S. and Jovanović, P. Constraining the Deser-Woodard non-local gravity by Fundamental plane of elliptical galaxies	82
Petrović, V.M., Delibašić Marković, H.S. and Petrović, I.D. Impact of Coulomb correction on the nonadiabatic tunnel ionization in an elliptically polarized laser field	84
Jovanović, P., Borka Jovanović, V. and Borka, D. Bounds on graviton mass from astrometric data of S-stars	86
SECTIONS (MINI PROJECTS)	88
PROGRAMME	89
AUTHORS' INDEX	93

Scientific Organizing Committee

Vladimir A. Srećković, Institute of Physics Belgrade, **Co-Chair** Aleksandra Kolarski, Institute of Physics Belgrade, **Co-Chair**

Milan S. Dimitrijević, Serbia Nikolai N. Bezuglov, Russia Nebil Ben Nessib, Saudi Arabia Vesna Borka Jovanović, Serbia Nikola Cvetanović, Serbia Saša Duiko, Serbia Rafik Hamdi, Tunisia Magdalena Hristova, Bulgaria Ognyan Kounchev, Bulgaria Bratislav Marinković, Serbia Zoran Mijić, Serbia Nicolina Pop, Romania Luka Popović, Serbia Branko Predojević, Republic of Srpska, BiH Sylvie Sahal Brechot, France Sanja Tošić, Serbia Robert Beuc, Croatia Felix Iacob, Romania

Local Organizing Committee

Aleksandra Kolarski (**Co-Chair**), Institute of Physics Belgrade
Vladimir A. Srećković (**Co-Chair**), Institute of Physics Belgrade
Filip Arnaut (**Secretary**), Institute of Physics Belgrade
Zoran Mijić, Institute of Physics Belgrade
Milica Langović, Institute of Physics Belgrade
Mihailo Savić, Institute of Physics Belgrade
Nikola Veselinović, Institute of Physics Belgrade
Veljko Vujčić, Astronomical Observatory, Belgrade
Nikola Cvetanović, University of Belgrade, Faculty of Transport and Traffic Eng.

Organizer

Institute of Physics Belgrade

ISBN 978-86-82441-69-4

Published and copyright by: Institute of Physics Belgrade

Printed by: Skripta Internacional, Mike Alasa 54, 11102, Beograd

Number of copies: 50

https://doi.org/10.69646/aob241119

Electrical Breakdown in trans-1,3,3,3-Tetrafluoropropene HFO1234ze(E)

Marjanović, J., ¹ Marić, D., ¹ Dujko, S. ¹ and Petrović, Z.Lj. ^{2,3}

¹Institute of Physics, University of Belgrade, Pregrevica 118, 11080 Belgrade, Serbia

²Serbian Academy of Sciences and Arts, Kneza Mihaila 35, 11001 Belgrade, Serbia

³School of Engineering, Ulster University, Jordanstown, County Antrim BT37 0QB, United Kingdom

E-mail: sivosj@ipb.ac.rs

Hydrofluoroolefins, unsaturated organic compounds developed as "fourth generation" refrigerants, possess only 0.1% of the Global Warming Potential (GWP) of hydrofluorocarbons (HFCs) and have negligible Ozone Depletion Potential (ODP). Their excellent eco-friendly properties make them suitable for use in air conditioning systems and they are also considered to be potential replacements for SF₆ in dielectric applications. In recent years, trans-1,3,3,3-Tetrafluoropropene (HFO1234ze(E)) has garnered the research community's interest due to its applications in medium and high voltage gas-insulated transmission and distribution equipment (HV and MV GIE), as well as in RPC particle detectors (Koch and Franck 2015, Hosl et al. 2020, Chachereau et al. 2016, Preve et al. 2017). The improvement of existing applications relies on relevant and reliable data, which can be obtained from breakdown measurements. Here, we present the results from our measurements of dc breakdown in trans-1,3,3,3tetrafluoropropene. Our measurements are done in a centimeter-sized plan-parallel electrode system (Sivoš et al. 2020), under swarm conditions at low currents ($\sim 1 \,\mu\text{A}$) and low pressures ($\sim 0.05 - 3 \,\text{Torr}$). In Figure 1, we present breakdown trans-1,3,3,3-Tetrafluoropropene (HFO1234ze(E), results $C_3H_2F_4$ comparison with sulfur hexafluoride (SF₆). Paschen curve of HFO1234ze(E) is recorded for electrode distance of 1 cm. The minimum breakdown voltage of 482 V occurs at pd = 0.25 Torrcm (p - pressure, d - electrode distance). The discharge ignites and operates stably at low-currents up to ~ 0.8 Torrom, but above this value discharge ignites into periodic relaxation oscillations (Kuschel et al. 2011). The breakdown voltage values for HFO1234ze (E) are slightly lower than those for SF₆ around the Paschen minimum and on the right-hand side of the Paschen curve.

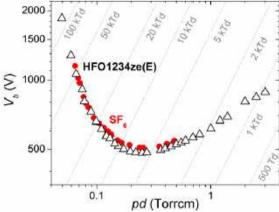


Fig. 1. Comparison of Paschen curves for trans-1,3,3,3-Tetrafluoropropene (HFO1234ze(E)) (black open triangles) and sulfur hexafluoride (SF $_6$) (red solid circles) (Stefanović 1998, Marić et al. 2014). Curves have been obtained for an electrode distance of 1 cm.

On the other hand, at lower pressures, the breakdown voltage of HFO1234ze(E) increases steeply and becomes nearly equal to SF_6 . Although HFO1234ze(E) shows significant insulation potential, it is not sufficient as a standalone substitute for SF_6 .

Acknowledgements: This research was supported by the Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWIn. Zoran Lj. Petrović is grateful to the SASA project F155.

References

Chachereau, A., Rabie, M. and Franck, C. M., 2016, Plasma Sources Science and Technology, 25, 045005

Hosl, A., Pachin, J., Eguz, E., Chachereau, A., Franck, C.M., 2020, IEEE Trans. Dielectr. Electr.Insul., 27, 322

Koch, M. and Franck, C. M., 2015, IEEE Transactions on Dielectrics and Electrical Insulation, 22, 3260

Kuschel, T., Stefanović, I., Škoro, N., Marić, D., Malović, G., Winter, J., and Petrović, Z. Lj., 2011, IEEE Trans. Plasma Sci., 39 2692

Marić, D., Savić, M., Sivoš, J., Škoro, N., Radmi-lović-Radjenović, M., Malović, G., Petrović, Z.Lj., 2014, Eur. Phys. J. D, 68, 155

Preve, C., Piccoz, D. and Maladen, R., 2017, in CIRED - Open Access Proceedings Journal, 2017, 42

Sivoš, J., Marić, D., Malović, G., Petrović, Z. Lj., 2020, Eur. Phys. J. D 74, 64

Steanović, I., 1998, Osobine difuznih električnih pražnjenja u gasovima na niskom pritisku u režimu niskih struja [Doctoral dissertation, School of Electrical Engineering, University of Belgrade]

СІР - Каталогизација у публикацији Народна библиотека Србије, Београд

52-355.3(048) 533.9(048)

539.1(048)

INTERNATIONAL Meeting on Data for Atomic and Molecular Processes in Plasmas: Advances in Standards and Modelling (2024; Palić)

Book of abstracts and contributed papers / International Meeting on Data for Atomic and Molecular Processes in Plasmas: Advances in Standards and Modelling, November 12-15, 2024, Palić, Serbia; [organizer Institute of Physics Belgrade]; edited by Vladimir A. Srećković ... [et al.]. - Belgrade: Institute of Physics, 2024 (Beograd: Skripta Internacional). - 94 str.: ilustr.; 24 cm

Tiraž 50. - Bibliografija uz većinu apstrakata. - Registar.

ISBN 978-86-82441-69-4

- Srećković, Vladimir A., 1972- [уредник]
- а) Астрофизика -- Апстракти б) Плазма -- Апстракти в) Атомска физика -- Апстракти

COBISS.SR-ID 156258313

International Meeting on Data for Atomic and Molecular Processes in Plasmas: Advances in Standards and Modelling, November 12-15, 2024, Palić, Serbia

	Program						
Tuesday 12.11.2024.		Wednesday 13.11.2024.		Thursday 14.11.2024.		Friday 15.11.2024.	
	(I day)	(II day) Session: A&M DATA and HPC Chair: Ognyan Kounchev		(III day) Session: DATA and standards Chair: Milorad Kuraica		(IV day) Session: Datasets, databases and codes for modeling: problems Chair: Milan Dimitrijević	
			Lectures		Lectures		Lectures
		10:00-11:00	Nicolina Pop	10:00-11:00	Ognyan Kounchev	10:00-11:00	Aleksandra Kolarski
		11:00-11:30	Mihailo Savić	11:00-11:30	Nikola Starčević	11:00-11:30	Organizing Committee Meeting
		11:30-12:00	Coffee break	11:30-12:00	Coffee break	11:30-12:00	Conference closing
			Lectures		Lectures	12:00	Departure
		12:00-13:00	Milosavljević Aleksandar	12:00-13:00	Felix Iacob		
			13:00-13:30 Vesna Borka Jovanović 13:00-13:30 Zoran Mijić				
		13:30-15:30	Lunch Break	13.30-15.30	Lunch Break		
		15:30-16:30	Panel discussion: Atmosphere modeling and data, code comparison Chair: Bratislav Marinković	15:30-16:30	Chair: Felix Iacob Lectures Saša Dujko		
16:00-17:30	Registration	16:30-17:30	Poster session Chair: Bratislav Obradović	16:30-17:30	Poster session Chair: Zoran Mijić		
17:30-18:00 18.00-19.00	Conference opening Chairs: Vladimir Srećković and Aleksandra Kolarski Lectures Milan Dimitrijević	17:30-19:00	Mini-excursion	17:30-19:30	Work on mini-projects		
19.00-21.00	Welcome cocktail	19:00-20:00	Work on mini-projects				
13.00-21.00	vectorie toektur			20:00-22:00	Conference dinner		

XXII International Workshop on Low-Energy Positron and Positronium Physics

XXIV International Symposium on Electron-Molecule Collisions and Swarms



August 7 (Thu) – 10 (Sun), 2025, Matsue, Japan

FOREWORD

Dear colleagues, it is our pleasure to welcome you to POSMOL 2025. The POSMOL will continue this year as a joint meeting of the International Workshop on Low-Energy Positron and Positronium Physics and the International Symposium on Electron-Molecule Collisions and Swarms. As previously it is a satellite meeting of the International Conference on Photonic, Electronic, and Atomic Collisions (ICPEAC). The POSMOL conference covers a wide range of research topics related to positron, electron, positronium, and antimatter interactions with particles, atoms, molecules, and complex systems, and related subjects. The meeting will continue the tradition of a scientific forum at which a diverse group of scholars from around the world will have an opportunity to share their theoretical and experimental findings, ideas, innovations, and methodologies through formal and informal discussions to advance scientific knowledge and understanding of the fundamental collisional interactions.

We would like to express many thanks to both International Advisory Committees' members chaired by Prof. Jimena Gorfinkiel and Dermot Green, for their work and dedication to the scientific content of the conference, and the Organizing Committee members. We also would like to thank our founders and sponsors for their generous contribution, which allowed us to keep the costs of registration down.

Finally, we are grateful to all the participants in this meeting who have contributed so much to the continued success of our scientific community.

Masanori Tachikawa, Co-chair, Yokohama City University

Masashi Kitajima, Co-chair, Science Tokyo

ACKNOWLEDGEMENT

XXII International Workshop on Low-Energy Positron and Positronium Physics XXVI International Symposium on Electron-Molecule Collisions and Swarms

are supported by

Shimane Prefecture,



Matsue City,



Grants-in-Aid for Scientific Research (KAKENHI),



and

The European Physical Journal D



with the assist of

The Atomic Collision Society of Japan

and

Japanese Positron Science Society

International Advisory Committee

Positron

Dermot Green (Queen's University Belfast) Co-chair

Dmitry Fursa (Curtin University, Australia)

Takuma Yamashita (Tohoku University, Japan)

Alessandra Souza Barbosa (Universidade Federal do Paraná, Brazil)

Eva Stenson (Max-Planck-Institut für Plasmaphysik, Germany)

Dirk Peter van der Werf (Swansea University, United Kingdom)

Electron

Jimena Gorfinkiel (The Open University) Co-chair

Dragana Maric (Institute of Physics Belgrade, Serbia)

Roman Čurik (J. Heyrovsky Institute of Physical Chemistry, Czech Republic)

Romarly da Costa (Federal University of ABC, Brazil)

Janina Kopyra (University of Siedlce, Poland)

Paulo Limão-Vieira (Universidade NOVA de Lisboa, Portugal)

Sylwia Ptasinska (University of Notre Dame, USA)

Kohki Satoh (Muroran Institute of Technology, Japan)

Ronald D. White (James Cook University, Australia)

Local Organizing Committee

Positron

Masanori Tachikawa (Yokohama City Univ.) LOC co-chair

Akira Ishida (AIST)

Yasushi Kino (Tohoku Univ.)

Koji Michishio (AIST)

Yasuyuki Nagashima (Tokyo Univ. of Science)

Yugo Nagata (Tokyo Univ. of Science)

Takuma Yamashita (Tohoku Univ.)

Electron

Masashi Kitajima (Science Tokyo) LOC co-chair

Masamitsu Hoshino (Sophia Univ.)

Yasuhiro Sakai (Toho Univ.)

Kohki Satoh (Muroran Institute of Tech.)

Hajime Tanuma (Tokyo Metropolitan Univ.)

TABLE OF CONTENTS

Abstracts of Oral Presentations

Note: presenting author's name is underlined

Plenary	Lectures	
PL1	Studies of dissociative recombination	
	Å. Larson and <u>A. E. Orel</u>	1
PL2	Models for transient anions and positronic system in condensed phase	
	M. T. do N. Varella, M. B. Kiataki, M. Bergami, K. Coutinho, J. Charry, A. Reyes	2
PL3	The untold story of molecular fragmentation by electrons	
	S. Ptasinska	3
PL4	Positron generation and acceleration in a self-organized photon collider enabled by	
	an ultraintense laser pulse	
	Y. Sentoku	4
Invited L	ectures	
J1	Streamer discharges: from gaseous dielectrics to particle detectors and planetary	
	atmospheres	
	S. Dujko, I. Simonović, D. Bošnjaković	5
J2	Photodetachment spectroscopy of positronium negative ions	
	K. Michishio	6
J3	How to convert a body-frame scattering calculation into an accurate dissociative	
	recombination amplitude	
	C. H. Greene	7
J4	From trickle to torrent: the role cold positrons play in maximising antihydrogen	
	production	
	A. Cridland Mathad, on behalf of the ALPHA Collaboration	8
J5	Vibronic coupling in electron-molecule collisions and electron photodetachment	
	M. Čížek	9

J6	Iowards highly accurate resonance energies in electron-molecule scattering F. Kossoski	10
J7	Interatomic coulombic electron capture: a journey through theory N. Sisourat	11
J8	The impact of low energy electrons in the fragmentation of astrochemical relevant molecules	
	M. Mendes, P. Guerra, R. Rodrigues, L. M. Cornetta, O. Ingólfsson, F. Ferreira da Silva	12
J9	Similarity of the near-threshold cross sections for positronium formation and photoionization in polyatomic molecules	
	G. F. Gribakin	13
J10	At the crossroads of GBAR: antiproton and hydrogen charge exchange reactions with positronium	
	P. Comini, on behalf of the GBAR collaboration	14
J11	Positron transport and cooling in CF4 in a magnetic dipole trap	
	A. Deller, J. von der Linden, S. Nissl, K. Michishio, H. Saitoh, H. Higaki, E.V. Stenson	15
J12	Positron annihilation rates in noble gases: sensitivity to scattering cross sections and positronium dynamics	
	G. J. Boyle, D. L. Muccignat, J. R. Machacek, R. P. McEachran	16
J13	Low-energy electron collisions with molecules of biological interest: From single to microhydrated systems	
	V. T. T. Nguyen, J. Chen, F. Izadi, <u>S. Denifl</u>	17
E1	Low-energy electron scattering with nitrogen oxides: New experimental insights from	
	the magnetically confined electron beam system A. I. Lozano, A. García-Abenza, J. Rosado, F. Blanco, J. C. Oller, P. Limão-Vieira, G.	
	García	18
E2	Electron collision with molecular hydrogen	
	V. S. Prabhudesai, A. Kumar, S. Swain, E. Krishnakumar	19

E	3 Electron induced reactions in isolated molecules and in clusters	
	B. Kocábková, J. Ďurana, J. Rakovský, V. Poterya, A.Pysanenko, J. Fedor, M. Fárník	20
Е	4 Deep learning methods for determining electron and positron scattering cross-	
	sections in condensed and gaseous phases	
	D. L. Muccignat, G. J. Boyle, N. A. Garland, R. D. White	21
Р	1 Binding a positron to neutral atomic and molecular dimers	
	A. Reyes, R. Porras, M. Varella, R. Flores, F. Moncada, J. Charry	22
Р	2 Electron-positronium scattering and the photodetachment of Ps-	
	S. J. Ward, W. Mitchell	23
Р	3 Probing resonant positron-molecule annihilations beyond fundamental modes	
	S. Ghosh	24
Р	4 Positronium diffraction experiment using a graphene target	
	Y. Nagata, R. Mikami, Y. Nagashima	25
Р	5 A slow beam of antihydrogen atoms for spectroscopy of the ground-state hyperfine	
	structure	
	D.J. Murtagh, on behalf of the ASACUSA Cusp collaboration	26
Abst	racts of Poster presentations	
Note:	presenting author's name is underlined	
1	Reliable humidity measurement for controlling environmental conditions in experiments	
	H. Abe, N. Ishiwata	27
Р	-HT7	
2	Development of a Low-Energy Positron Diffraction (LEPD) experimental station and	
	quantitative surface structure analysis on metal surfaces	
	R. Ahmed, I. Mochizuki, T. Hyodo, K. Wada	28

4	Positron affinity in hydrocarbons and halogenated hydrocarbons: A theoretical analysis of its relationship with physical properties	
	M. Ashiba, D. Yoshida, Y. Kita, T. Shimazaki, T. Takayanagi. M. Tachikawa	30
5	Theoretical study on positron-molecular complexes for graphene-like molecules	
	H. Baba, D. Yoshida, T. Shimazaki, M. Tachikawa, T. Takayanagi, Y. Kita	31
P-H	IT4	
6	Positron scattering by oxygen-containing molecules: ab-initio and model potential	
	approaches via the Schwinger Multichannel method	
	F. F. Frighetto, S. Sanchez, <u>A. S. Barbosa</u>	32
E-H	IT7	
7	Slit lenses in electron momentum spectroscopy	
	D. Bou Debes, D. G. Matalon, K. L. Nixon	33
8	Electron- and UV-induced reactions in isolated and clustered benzonitrile	
	D. Bou Debes, M. Mendes, R. Rodrigues, F. Ferreira Da Silva, S. Eden	34
9	On the drift-diffusion analysis of the Pulsed Townsend experiment	
	G. J. Boyle, D. L. Muccignat, R. D. White, H. Vemulapilli, M. Akbas, C. M. Franck	35
10	A study of threshold photoelectron source using undispersed synchrotron radiation for	
	differential cross section measurements in very-low-energy	
	Y. Chaki, H. Azuhata, J. Soga, A. Murakawa, G. Kitajima, M. Kitajima, and R. Thissen	36
E-H	IT10	
11	Determination of electronic resonances by analytic continuation using barycentric formula	
	R. Čurík, J. Horáček	37
E-H	IT6	
12	Experimental evidence for dipole-supported state as doorway to dissociative Electron	
	Attachment	
	G. Das, Y. Sajeev, V. S. Prabhudesai	38
13	Axisymmetric fluid streamer model with curvilinear electrodes in the AMReX Library	
	I. Simonović, D. Bošnjaković, <u>S. Dujko</u>	39

14	Current waveform analysis in Monte Carlo simulation of an idealized pulsed-Townsend experiment	
	D. Bošnjaković, I. Simonović, <u>S. Dujko</u>	40
15	Transport of electrons and the propagation of streamers in the atmosphere of K2-18b	
	S. Dujko, I. Simonović, D. Bošnjaković, E. Fangel-Lloyd, P. Gourbin, C. Köhn	41
E-H	T-5	
16	Energy loss spectroscopy of ionic liquids by electron impact	
	Y. Endo, P. Limão-Vieira, J. Adachi, M. Hoshino	42
17	Close-coupling approach to a model problem for resonant collisions of electrons with diatomic molecules	
	J. M. Erak, L. H. Scarlett, I. Bray, D. V. Fursa	43
E-H	T-1	
18	Velocity map imaging of dissociative electron attachment close to 0 eV	
	P. Nag, A. Paul, S. Saha, M. Ranković, <u>J. Fedor</u>	44
19	Low-energy dissociative recombination of light diatomic ions	
	<u>J. Forer, D. Hvizdo</u> s, J. Boffelli, C. H. Greene, I. F. Schneider, V. Kokoouline, D. W.	
	Savin	45
20	Convergent close-coupling approach to electron-impact dissociative excitation and	
	ionisation of H₃+	
	R. K. Horton, M. V. Pak, I. Bray, <u>D. V. Fursa</u>	46
21	Virtual photon exchange and electron transfer in Interparticle Coulombic Electron	
	Capture (ICEC)	
	V. Graves, J. Šenk, P. Kolorenč, N. Sisourat, <u>J. D. Gorfinkiel</u>	47
22	Fragmentation dynamics through geometrical distortion in low-energy electron	
	attachment to CS ₂	
	A. Paul, D. S. Slaughter, S. Ptasinska, D. Nandi, I. Carmichael, <u>J. D. Gorfinkiel</u> ,	
	D. Chakraborty	48

23	Recent activities of atomic, molecular, and sputtering data workshop group in NIFS M. Hoshino, M. Goto, T. Hirayama, Y. Hoshino, A. Igarashi, A.M. Imai, K. Ishii, D. Kato,	
	M. Kato, N. Kimura, M. Kitajima, T. Kusakabe, T. Kawate, K. Moribayashi, T. Morishita,	
	I. Murakami, B. Peterson, H.A. Sakaue, N. Shimakura, K. Soejima, H. Tsuchida	49
E-H	T8	
24	Comparing theoretical methods of electron molecular-ion scattering with a hydrogen- like toy model	
	D. Hvizdoš	50
25	Dissociative electron attachment to pentafluorophenyl triflate, a potendial photo acid	
	generator for chemically amplified extreme ultraviolet lithography resists	
	M. Mendes, P. Guerra, R. Tafrishi, F. Holzmeier, F. Ferreira da Silva, <u>O. Ingólfsson</u>	51
26	Dissociative ionization of pentafluorophenyl triflate, a potendial photo acid generator	
	for chemically amplified extreme ultraviolet lithography resists	
	M. Mendes, P. Guerra, R. Richter, F. Holzmeier, <u>O. Ingólfsson</u> , F. Ferreira da Silva	52
P-H	T10	
27	Development of positronium formation material for Bose-Einstein condensation	
	A. Ishida, N. Oshima, B. E. O'Rourke, K. Michishio, K. Ito, T. Namba, T. Hyodo, I.	
	Mochizuki, K. Wada, M. Maekawa	53
28	Towards the measurement of the absolute photodetachment cross sections of Ps ⁻	
	C. Ito, Y. Nagata, K. Michishio, Y. Nagashima	54
P-H	IT8	
29	New results and future prospects of the positronium $1^3S \rightarrow 2^3S$ experiment	
	E. E. Javary, L. de Sousa Borges, E. Thorpe-Woods, P. Crivelli	55
E-H	тз	
30	Radiative dissociation of positronium molecules in excited state	
	N. Kamiya, T. Yamashita, Y. Kino	56
E-H	IT11	
31	Transport properties of electron swarms in SF_6 under RF electric fields	
	S. Kawaguchi, K. Takahashi, K. Satoh	57

32	Mobility measurements of H_{3^+} and D_{3^+} ions in He gas at 77.3 K	
	R. Kimura, S. Nagano, H. Tanuma	58
33	A new experimental apparatus for ultra-low-energy electron collision utilizing	
	secondary electron beam	
	G. Kitajima, J. Soga, H. Murakami, T. Nishiyama, M. Kitajima	59
	<u>a. Ktajima,</u> v. ooga, m. Marakami, m. Moniyama, M. Majima	55
34	Peak asymmetry in Feshbach resonance of Ne (${}^{2}P_{3/2}$, ${}^{2}P_{1/2}$) by spin-polarized electron	
34		
	impact: application to spin polarimeter	00
	H. Azuhata, <u>M. Kitajima,</u> H. Tanaka	60
35	Ultrafast electron transfer and vibronic coupling in molecular collisions with potassium	
	S. Kumar, G. García, <u>P. Limão-Vieira</u>	61
E-H		
36	SF_6 negative ion formation probed in electron transfer experiments	
	S. Kumar, M. Hoshino, G. García, <u>P. Limão-Vieira</u>	62
P-F	IT5	
37	Metastable helium atom production by positron impact	
	L. Wymer, S. Kumar, T.J. Gay, S. Hodgman, S. Buckman, <u>J. Machacek</u>	63
38	Effective ionization coefficients in HFO1234yf and HFO1234ze(E)	
	J. Marjanović, <u>D. Marić</u> , Z. Lj. Petrović	64
P-F	IT5	
39	Studies on positronium transmission through graphene films	
	R. Mikami, O. Miyauchi, Y. Nagata, Y. Sada, Y. Nagashima	65
40	O ₂ + production coming from CO ₂ single-event electron impact	
	A. B. Monteiro de Carvalho, L. Sigaud, E. C. Montenegro	66
41	The role of double ionization for the production of O+ coming from CO₂ ionization by	
	electron impact	
	A. B. Monteiro de Carvalho, L. Sigaud, E. C. Montenegro	67
	<u> = </u>	٥,

42	Experimental apparatus for measuring high-resolution differential cross sections with specified molecular orientation	
	A. Murakawa, H. Daiki, G. Yoshimura, T. Okumura, M. Kitajima	68
43	Theoretical analysis of positronic compounds of halogen molecular divalent anions T. Nakazono, D. Yoshida, T. Shimazaki, M. Tachikawa, Y. Kita	69
44	Associative ionization between muonic hydrogen and hydrogen atoms A. Neki, T. Yamashita, Y. Kino	70
P-H	IT9	
45	Exploration of spin-selective interactions between chiral molecules and positrons M. Nobuoka, M. Maekawa, S. Seki, A. Kawasuso	71
46	Detecting solvated electrons created by electron collisions with liquid micro-jets M. Rankovć, P. Nag, S. Saha, V. Malynovskyy, C. Sicard-Roselli, J. Fedor	72
E-H	IT4	
47	Resonances and dissociative electron attachment in benzonitrile M. Rankovć, D. Bou Debes, P. Nag, J. Kočišek, J. Fedor	73
48	Cyanide anion formation via DEA in nitrilarenes R. Rodrigues, M. Mendes, L. Cornetta, O. Ingólfsson, F. Ferreira da Silva	74
49	The role of low energy electrons in EUVL tin-oxo photoresist proxies D. Sequeira, J. Ferreira, R. Rodrigues, M. Mendes, F. Holzmeier, O. Ingólfsson, F. Ferreira da Silva	75
50	Negative ion formation prediction using AI T. Silva, R. Rodrigues, M. Mendes, V. Lobo, J. Pereira-da-Silva, F. Ferreira da Silva	76
51	The role of low energy electrons in hydrofluoroolefins F-Gases J. Ferreira, D. Sequeira, R. Rodrigues, M. Mendes, L. C. Cornetta, J. M. M. Araújo, F. Ferreira da Silva	77
52	Observation of the transmission of slow positrons through free-standing graphene films supported on TEM grid Y. Sada, R. Mikami, K. Tsushima, Y. Nagashima	78

53	Probing molecular geometrical rearrangement effects after ionization L. Sigaud	79
54	Dynamics of dissociative attachment of electrons to simple organic molecules	
	D. S. Slaughter	80
55	A geant 4 simulation of the positronium target cloud in the GBAR experiment	
	K. Szymczyk, GBAR collaboration	81
56	An isotope effect in dissociative ionization of hydrogen molecules	
	K. Takahashi, Y. Sakai, H. Sakaue, D. Kato, I. Murakami	82
57	A real-time gas monitoring device based on ion attachment - ion mobility spectrometry	
	for working environments	
	K. Takaya, R. Tanabe, I. Wada, S. Matoba, Y. Sakai	83
58	Isotope effect in mobility of HeH+ and HeD+ ions in He gas at 77.3 K	
	S. Nagano, R. Kimura, <u>H. Tanuma</u>	84
59	Elastic cross sections of tungsten hexafluoride molecules in 2.0 - 200 eV energy	
	electron impact: Similarities with six fluorine containing molecules and evidence of F- atom like scattering	
	K. Tsuzuki, P. Limão-Vieira, F. Blanco, G. García, J. Kim, A. Suzuki, M. Matsukuma,	
	M. Hoshino	85
E-H	Τα	
	Convergent close-coupling calculations for electron scattering on LiH and Li ₂	
	H. Umer, L. H. Scarlett, A. J. C. Singor, I. Bray, M. C. Zammit, D. V. Fursa	86
61	Variational calculations of low-energy positron and electron scattering from helium	
	C. M DeMars, S. J. Ward, P. Van Reeth	87
62	One- and two-photon detachment of the positronium negative ion	
	W. Mitchell, S. J. Ward	88
63	Investigation of positron scattering for fluorocarbons in plasma applications	
	A. Yadav, B. Antony	89

P-F	IT2	
64	Three-particle correlation in positronium ions and in positronium (anti)hydrides	
	T. Yamashita, Y. Kino, E. Hiyama, S. Jonsell, P. Froelich	90
P-F	IT1	
65	Positron binding properties in cage-structured water clusters	
	D. Yoshida, T. Takayanagi, Y. Kita, T. Shimazaki, M. Tachikawa	91

Effective Ionization Coefficients in HFO1234yf and HFO1234ze(E)

Jelena Marjanović¹, <u>Dragana Marić</u>¹ and Zoran Lj. Petrović^{2,3}

In light of the environmental concerns associated with the use of sulfur hexafluoride (SF₆) as an insulator in medium- and high-voltage systems, there has been considerable interest in a new generation of environmentally sustainable gases. Newly developed hydrofluoroolefins (HFOs), perfluoroketones (PFKs), and perfluoronitriles (PFNs) are currently under active investigation, although their adoption is limited by the lack of application-relevant data [1]. Our interests also extend to their potential use in resistive plate chamber (RPC) particle detectors, which currently rely on gas mixtures containing greenhouse gases SF_6 , $C_2H_2F_4$, and $i-C_4H_{10}$ [2].

In this work, we investigate the breakdown properties of two hydrofluoroolefins, 2,3,3,3-tetrafluoropropene (HFO1234yf, C3H2F4) [3], and trans-1,3,3,3-tetrafluoropropene (HFO1234ze(E), C3H2F4), in comparison with older generation freons, CHClF $_2$ (R22), $C_2H_2F_4$ (R134a). Reduced effective ionization coefficients are determined from breakdown curves and spectrally resolved emission profiles, under the swarm conditions, at low currents and pressures [4]. Measured parameters are directly applicable in plasma modeling and can contribute to extending cross-section sets to a higher range of electron energies.

Acknowledgements: This research was supported by the MSTD, Science Fund of the Republic of Serbia, Grant No. 7749560, project EGWln. Zoran Lj. Petrović is grateful to the SASA project F155.

¹ Institute of Physics Belgrade, University of Belgrade, Belgrade, Serbia

² Serbian Academy for Sciences and Arts, Belgrade, Serbia

³ School of Engineering, Ulster University, Jordanstown, United Kingdom Email contact: draganam@ipb.ac.rs

^[1] Boya Zhang, Li Chen, Xingwen Li, Ze Guo, Yunjie Pu, Nian Tang. (2020). *IEEE Transactions on Dielectrics and Electrical Insulation*, **27**(4), 1187-1194.

^[2] A Bianchi, S Delsanto, P Dupieux, A Ferretti, M Gagliardi, B Joly, SP Manen, M Marchisone, L Micheletti, A Rosano and E Vercellin. (2019). *JINST*, **14**, P1101414.

^[3] J Marjanović, D Marić, ZLj Petrović. (2024). Eur. Phys. J. D, 78, 14.

^[4] D Marić, M Savić, J Sivoš, N Škoro, M Radmilović-Radjenović, G Malović, ZLj Petrović. (2014). Eur. Phys. J. D, 68, 155.