

Workshops & Events

For workshops and schools of interest for Elasto-Q-Mat members, see announcements in Events of the [Equality](#) section.

| Date | Title | Location | Details |
|------------|--|----------|---|
| 04.10.2021 | New Spin on Molecular Quantum Materials | Mainz | Workshop hosted by SPICE Webpage |
| 20.09.2021 | TRR 288 Summer School | online | Virtual summer school: Part II (Duration: 2 days) |
| 13.09.2021 | TRR 288 Summer School | online | Virtual summer school: Part I (Duration: 2 days) |
| 15.07.2021 | Planckian transport | online | Elasto-Q-Mat Colloquia: Sean Hartnoll (Webpage), Stanford University |
| 08.07.2021 | t.b.a. | online | Elasto-Q-Mat Colloquia: Heike Pfau (Webpage), Stanford University |
| 01.07.2021 | High-throughput experimentation for materials discovery | online | Elasto-Q-Mat Colloquia: Alfred Ludwig (Webpage), Ruhr University Bochum |
| 24.06.2021 | Molecular Quantum Materials: A Workbench for Novel Electronic States | online | Elasto-Q-Mat Colloquia: Martin Dressel (Webpage), University of Stuttgart |
| 17.06.2021 | Quantum matter in cavities | online | Elasto-Q-Mat Colloquia: Dieter Jaksch (Webpage), Oxford University |
| 10.06.2021 | Dynamic strain techniques - A new angle on Iron Pnictide Superconductors | online | Elasto-Q-Mat Colloquia: Matthias Ikeda (Webpage), Stanford University |
| 27.05.2021 | "I've lived as a man & a woman – Here's what I learned" | online | Elasto-Q-Mat Colloquia: Workshop on equal opportunities (TEDx Talk and discussion) |
| 20.05.2021 | Probing light-driven superconductors with ultrafast X-ray spectroscopy | online | Elasto-Q-Mat Colloquia: Matteo Mitrano (Webpage), Harvard University |

| Date | Title | Location | Details |
|------------|--|----------|--|
| 06.05.2021 | Kikuchi diffraction for microcrystallographic analysis of materials | online | Elasto-Q-Mat Colloquia: Aimo Winkelmann, AGH University of Science and Technology |
| 29.04.2021 | Typicality and exact quantum dynamics for equilibrium and non-equilibrium properties | online | Elasto-Q-Mat Colloquia: Jürgen Schnack (Webpage), University of Bielefeld |
| 23.04.2021 | Commensurate non-coplanar spin textures and their emergent electromagnetic response | online | Elasto-Q-Mat Colloquia: Max Hirschberger (Webpage), University of Tokyo |
| 15.04.2021 | Quantum Criticality of Polar Metals | online | Elasto-Q-Mat Colloquia: Premala Chandra (Webpage), Rutgers University |
| 29.03.2021 | Elasto-Q-Mat Spring Retreat | online | Elasto-Q-Mat Spring Retreat 2021: 29 March - 30 March 2021 Program |
| 18.02.2021 | Workshop in perception, stereotype formation and equal opportunities: The danger of a single story | online | Elasto-Q-Mat Colloquia: Gabriele Wiemeyer, Gustav-Stresemann-Institut in Niedersachsen e.V. |
| 11.02.2021 | Metastable quantum structures emerging from ultrafast phase transitions in 2D transition metal dichalcogenides | online | Elasto-Q-Mat Colloquia: Dragan Mihailovic (Webpage), Josef Stefan Institute Ljubljana |
| 04.02.2021 | Ultrasound as a probe of multi-component superconductivity in Sr_2RuO_4 and UTe_2 | online | Elasto-Q-Mat Colloquia: Brad Ramshaw (Webpage), Cornell University |
| 28.01.2021 | Unusual magnetism and strongly-correlated electrons in quasi-two-dimensional 4f-systems | online | Elasto-Q-Mat Colloquia: Denis Vyalikh (Webpage), DIPC, IKERBASQUE |
| 21.01.2021 | Exploratory Synthesis and Physics Discovery: the case of FeSb_2 | online | Elasto-Q-Mat Colloquia: Cedomir Petrovic (Webpage), Brookhaven National Laboratory |
| 14.01.2021 | Field-induced transition from even to odd parity superconductivity in CeRh_2As_2 | online | Elasto-Q-Mat Colloquia: Elena Hassinger (Webpage), MPI for Chemical Physics of Solids Dresden |
| 17.12.2020 | Collective modes in pumped unconventional superconductors with competing ground states | online | Elasto-Q-Mat Colloquia: Ilya Eremin (Webpage), University Bochum |
| 10.12.2020 | Pump-probe response of correlated materials under high pressures | online | Elasto-Q-Mat Colloquia: Alexej Pashkin, Helmholtz-Zentrum Dresden- Rossendorf |

Prof. Cedomir Petrovic from BNL gave a presentation in Laboratory of MEMS

时间：2018-05-14 浏览：795

On Sep 7, 2017, Prof. Cedomir Petrovic from Brookhaven National Laboratory visited Key Laboratory of MEMS of the Ministry of Education and gave a presentation "Thermoelectric Power Factor and Electronic Correlations in FeSb_2 ". His presentation discussed FeSb_2 , a correlated electron semiconductor similar to FeSi that was found to host a record-high thermoelectric power factor (TPF).



Prof. Cedomir Petrovic is physicist with tenure in Brookhaven National Laboratory USA, an adjunct professor in Johns Hopkins University USA, an adjunct professor in Stony Brook University USA, a foreign associate member of Canadian Institute for Advanced Research (CIFAR). He earned his B. Sc. degree in Theoretical Physics from University of Belgrade in 1996, M. Sc. degree in Physics from Florida State University in 1997 and Ph.D. in Physics from Florida State University in 2000. He is a Member of American Physical Society.



New Directions in Quantum Materials Research Workshop: Friday,
January 12, 2018

INVITED SPEAKERS:

Collin Broholm - Johns Hopkins University

Marco Buongiorno-Nardelli - University of North Texas

Jennifer Cano - Princeton University

Rafael Fernandes - University of Minnesota

Tyrel McQueen - Johns Hopkins University

Emilia Morosan - Rice University

Andriy Nevidomskii - Rice University

Mike Norman - Argonne National Laboratory

Cedomir Petrovic - Brookhaven National Laboratory

近期活动

学术研究

Colloquium

Conferences

INPAC Seminars

OSERC Seminars

CMP Seminars

LLP Seminars

CAA Seminars

SCCP Seminars

SCCE Seminars

Joint Seminars

交大科学前沿论坛

教学研究学术报告系列

特别讲座

年度学术大会

2013

2014

2015

2017

教育教学

近期活动

[CMP Seminars] Superconducting and Normal States in FeX ($\text{X}=\text{Se},\text{S}$) Iron Chalcogenides
报告人: Cedomir Petrovic, Brookhaven National Laboratory

[CMP Seminars] Superconductivity and large magnetoresistance in topological materials
报告人: Kefeng Wang, University of Maryland

[INPAC Seminars] Nuclear Symmetry Energy in Finite Nuclei
报告人: Prof. Mitko K. Gaidarov, Bulgarian Academy of Sciences

[Conferences] The 3rd Conference on Condensed Matter Physics (CCMP-2017)
报告人: Physicists

[CMP Seminars] 机器学习方法在量子多体物理中的应用系列讲座
报告人: 王磊, 中科院物理研究所

« first < previous ... 36 37 38 39 40 41 42 43 44 ... next > last »

| | |
|--|--|
| 首页 (/) | 中心简介 (/zxjj/index.html) |
| 新闻动态 (/xwdt/index.html) | |
| 研究进展 (/yjjz/index.html) | |
| 人员构成 (/rygc/index.html) | |
| 仪器设备 (/yqsb/index.html) | |
| 学术报告 (/xsbg/index.html) | |
| 成果统计 (/cgtj/index.html) | |
| 欢迎加入 (/hyjr/index.html) | |
| English (/english/index.html) | |
|  2017-08-02 |  SC  学术报告 (/xsbg/index.html) |

**报告题目: Superconducting
and Normal States in in
FeX (X=Se,S) Iron
Chalcogenides**

摘要:

Iron based superconductors
have been attracting
considerable attention since
their discovery in 2008. In
particular, simple binary iron

报告信息

唐仲英楼B501

报告日期: 2017年08月04日

时间: 10:00

报告人: Prof. Cedomir Petrovic
(Condensed Matter Physics and
Materials Science, Brookhaven
National Laboratory)

(mailto:) (http://)



(/DFS//network//xsbg/i5689/156144743708198sh2k.png)

chalcogenides have recently emerged to the frontier of research due to traces of superconducting critical temperatures (T_c 's) similar to copper oxide high- T_c superconductors. In this talk I will discuss characteristics of FeX and $K_x\text{Fe}_{2-y}\text{X}_2$ ($X=\text{Se}, \text{S}$). I will mention in a nutshell pair breaking mechanism, magnetic states and critical currents but I will focus on the normal states in high magnetic fields as $T \rightarrow 0$ connected with the electronic and crystallographic phase separation. The presentation will also include brief discussion on magnetic states in semiconducting crystal structures with FeX building blocks.

简历:

Employment and research activities:



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Dr. Cedimir Petrovic [Brookhaven National Laboratory, USA]

Title: **Exploratory Synthesis and Novel Materials Discovery**

Time: 2:00 - 3:00 PM, Wednesday, July 19, 2017

Place: Conference Room 6-410, HPSTAR (Shanghai)

Polycom call #: 02120004

Host: Dr. Bin Chen

Abstract

Since the times of Bernd Matthias exploratory synthesis and characterization has been pushing the boundaries of materials physics. In my presentation I will briefly go over some notable historical examples. These include CeMnIn_5 ($M=\text{Co}, \text{Rh}, \text{Ir}$) compounds where superconductivity was discovered in a high-pressure experiment or electron-phonon superconductivity in MgB_2 . I will also illustrate how exploratory synthesis enables insight into inelastic neutron scattering in heavy fermion materials and will show how synthesis-induced metal-insulator transition in new narrow gap semiconductors leads to the largest thermoelectric power factor in nature. Then, in more details, I will focus on the crystallographic aspects of phase separation, pair breaking mechanism and the normal state above the H_{c2} in binary and ternary iron selenide superconductors in extreme conditions of high magnetic fields as $T \rightarrow 0$.

Biography of the Speaker



Prof. Cedimir Petrovic received his BS from University of Belgrade, Serbia in 1996 and his MS and Ph.D from Florida State University, in 1997 and 2000, respectively, both in physics. In 2000-2002, he did postdoctoral research in the Ames Lab, Iowa State University. He joined Brookhaven National Lab in 2002 as an assistant physicist. He got his tenure in 2008. In the meanwhile, he is also affiliated with Johns Hopkins University and Canadian Institute for Advanced Research.

At BNL, Dr. Petrovic has established and is leading new exploratory materials synthesis and characterization laboratory. The focus of his research is design, discovery, synthesis and characterization of new model materials for condensed matter physics. Particular emphasis is devoted to the discovery of new phenomena associated with correlated electron behavior and problems in superconductivity and magnetism.

Prof. Petrovic has published ~200 papers that have received over 10,000 citations with h index of 43. More information can be found at <https://www.bnl.gov/energy/ces/cv/petrovic.asp>.

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Unconventional Superconductivity: Materials and Mechanisms

May 24 - 29, 2015

Chair

Hai-Hu Wen

Vice Chairs

Andrey Chubukov

The Chinese University of Hong Kong

Sha Tin

Hong Kong, CN

Conference Description

Superconductivity has not only fundamental impact on condensed matter physics, but also strong potential for applications. The 2015 Gordon Conference on Superconductivity will present the cutting-edge developments in this fascinating field and will chiefly focus on unconventional superconductivity. The conference will lead to in-depth discussions on the exploration of novel superconducting materials, including cuprates, iron based superconductors, heavy-fermion, and other superconductors. For the cuprates, the emphasis will be on precursors to superconductivity, charge order in the pseudogap state, and the role of Mott physics. For iron superconductors, the emphasis will be on the pairing mechanism, the gap symmetry, and the nematic order. The conference will discuss a number of hot issues concerning unconventional superconductivity, on which no consensus has been reached yet. These include the role of spin-fluctuation pairing mechanism, quantum criticality, interface superconductivity, topological superconductivity, etc. This will be a focused, content-rich workshop on modern approaches to superconductivity in the second decade of 21st century.

Related Meeting



This GRC will be held in conjunction with the "Superconductivity (GRS)" Gordon Research Seminar (GRS). Those interested in attending both meetings must submit an application for the GRS in addition to an application for the GRC. Refer to the [associated GRS program page](#) for more information.

Conference Program

| | |
|-------------------|--|
| Sunday | |
| 2:00 pm - 8:00 pm | Arrival and Check-in |
| 6:00 pm | Dinner |
| 7:30 pm - 7:40 pm | Welcome / Introductory Comments by GRC Site Staff |
| 7:40 pm - 9:30 pm | Newly Discovered Superconducting Materials Discussion Leader: Hidenori Takagi (Max Planck Institute for Solid State Research, Germany) |
| 7:40 pm - 7:50 pm | Introduction by Discussion Leader |
| 7:50 pm - 8:05 pm | Paul Canfield (Iowa State University, USA) "The Hows and Whys of Searching for New Superconducting Systems" |
| 8:05 pm - 8:10 pm | Discussion |
| 8:10 pm - 8:25 pm | Mikhail Erements (Max Planck Institute for Chemistry, Germany) "Superconductivity at 190 K in H ₂ S Under 200GPa" |
| 8:25 pm - 8:30 pm | Discussion |
| 8:30 pm - 8:45 pm | Jianlin Luo (Institute of Physics, Chinese Academy of Sciences, China) "Superconductivity on the Border of Double Helical Antiferromagnetic Order in CrAs and Related Materials" |
| 8:45 pm - 8:50 pm | Discussion |
| 8:50 pm - 9:05 pm | Zhu-An Xu (Zhejiang University, China) "Unconventional Superconductivity in New Quasi-1D Superconductors" |

| | |
|-------------------|--|
| 9:05 pm - 9:10 pm | Discussion |
| 9:10 pm - 9:25 pm | Yoshikazu Mizuguchi (Tokyo Metropolitan University, Japan) "Superconductivity in Layered Bi-Based Chalcogenides" |
| 9:25 pm - 9:30 pm | Discussion |

Monday

| | |
|---------------------|--|
| 7:30 am - 8:30 am | Breakfast |
| 9:00 am - 12:30 pm | Novel Iron-Based Superconducting Materials New trend of iron based superconductors and monolayer FeSe thin film. Discussion Leader: Andrey Chubukov (University of Minnesota, USA) |
| 9:00 am - 9:10 am | Introduction by Discussion Leader |
| 9:10 am - 9:30 am | Qikun Xue (Tsinghua University, China) "Interface Enhanced Superconductivity" |
| 9:30 am - 9:35 am | Discussion |
| 9:35 am - 9:55 am | Donglai Feng (Fudan University, China) "Superconductivity in Iron Selenides with only Electron Fermi Surfaces" |
| 9:55 am - 10:00 am | Discussion |
| 10:00 am - 10:20 am | Jennifer Hoffman (Harvard University, USA) "Quasiparticle Interference Imaging of Single-Layer FeSe" |
| 10:20 am - 10:25 am | Discussion |
| 10:25 am - 10:50 am | Group Photo / Coffee Break |

| | |
|---------------------|--|
| 10:50 am - 11:10 am | Xingjiang Zhou (Institute of Physics, Chinese Academy of Sciences, China) "Evolution of Electronic Structure and Superconductivity with Doping and Number of FeSe Layers in FeSe/SrTiO ₃ Films" |
| 11:10 am - 11:15 am | Discussion |
| 11:15 am - 11:35 am | Dunghai Lee (University of California, Berkeley, USA) "Is FeSe a Nematic Quantum Paramagnet?" |
| 11:35 am - 11:40 am | Discussion |
| 11:40 am - 12:00 pm | Xianhui Chen (University of Science and Technology of China, China) "Phase Diagram in Novel Superconductor (Li,Fe)OHFeSe" |
| 12:00 pm - 12:05 pm | Discussion |
| 12:05 pm - 12:25 pm | Cedomir Petrovic (Brookhaven National Laboratory, USA) "Superconducting and Normal States in Iron Chalcogenides" |
| 12:25 pm - 12:30 pm | Discussion |
| 12:30 pm | Lunch |
| 1:30 pm - 4:00 pm | Free Time |
| 4:00 pm - 6:00 pm | <u>Poster Session</u> |
| 6:00 pm | Dinner |
| 7:30 pm - 9:30 pm | Nematicity and Orbital Physics in Iron Based Superconductors Discussion Leader: Joerg Schmalian (Karlsruhe Institute of Technology, Germany) |
| 7:30 pm - 7:40 pm | Introduction by Discussion Leader |

Physics Department



Useful Links

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Condensed Matter Seminars, year 2014/2015

All regular CM seminars take place in Serin 385 at 1:30pm on Tuesdays.
Seminars not on Tuesday are highlighted in yellow.

| Day | Title | Speaker | Speakers Host. |
|--------------------------------|---|---|-------------------|
| Tuesday, Sept 23 1:30 pm | Exploring spin-transfer and spin-Hall effects in mesoscopic metallic structures | Yi Ji , University of Delaware | Weida |
| Tuesday, Sept 30 1:30 pm | Kondo effects in quantum point contacts | Yigal Meir , Ben-Gurion University, Israel | Natan |
| Tuesday, Oct 14 1:30 pm | The Curious Electronic Properties of Hybrid Halide Perovskite Solar Cells | Mark van Schilfgaarde , King's College London | Kristjan |
| Tuesday, Oct | Optical properties of iron-based | Christopher C. Homes , | Kristjan |

| | | | |
|---|--|---|----------|
| 28 1:30 pm Tuesday, Nov 4 1:30 pm | multiband conductors and superconductors Electronic Correlations and Thermoelectric Performance of FeSb₂ | Brookhaven National Laboratory Cedomir Petrovic, Brookhaven National Laboratory | Kristjan |
| Tuesday, Nov 11 1:30 pm | Unveiling the origins of the Anomalous Hall effect | Jin, XiaoFeng, Fudan Univ | Eric |
| Tuesday, Nov 18 1:30 pm | Quantum Monte Carlo for Materials at High Pressures | Ronald Cohen, Geophysical Laboratory Carnegie Institution | Kristjan |
| Thursday, Nov 20 1:30 pm | Special Seminar: Taking Control of Coherent Superconducting Quantum Electronics | Irfan Siddiqi, , Quantum Nanoelectronics Laboratory, UC Berkeley | Lev |
| Tuesday, Nov 25 1:30 pm | Wandering amongst Feynman Diagrams for strongly correlated fermions | Nikolai Prokofev, UMass Amherst | Kristjan |
| Tuesday, Dec 2 1:30 pm | Phonon localization in relaxor ferroelectrics | Michael E. Manley, Oak Ridge NL | Kristjan |
| Monday, Dec 8 1:30 pm | Special Seminar: 1/f Flux Noise from Surface Magnetic Defects | Robert McDermott, Madison, Wisconsin | Lev |
| Tuesday, Dec 9 1:30 pm | Atom chips: quantum gases on the (sub)micron scale | Peter Kruger, U. Nottingham, UK | Piers |
| Thursday, Dec 11 10:30 am | Emergent properties hidden in plain view: Strong electronic correlations at oxide interfaces | Jacques Chakhalian, University of Arkansas | David |
| Friday, Dec 12 11:00 am | Phase lapses and dephasing in quantum Hall interferometers | Yhuda Dinaii | Natan |
| Monday, Dec 15 1:30 pm | Spin and pseudospins in 2D semiconductors | Xiaodong Xu, Department of Physics and MSE University of Washington | Misha |
| Tuesday, Dec 16 1:30 pm | Evolution of heavy fermion under temperature and pressure changes in heavy fermion compounds and topological Kondo insulators | Ji-Hoon Shim, Pohang University of Science and Technology | Kristjan |
| Spring Semester | | | |

| | | | |
|--|---|--|------------|
| Tuesday, Jan 27 1:30 pm | TBA | Nai Phuan Ong, Princeton University | Kristjan |
| Tuesday, Feb 3 1:30 pm | TBA | Andrey Chubukov, University of Wisconsin Madison | Kristjan |
| Wednesday, Feb 4 4:45 pm (Colloquium) | TBA | Gregory Fiete UT Austin | Piers |
| Tuesday, Feb 10 1:30 pm | TBA | Douglas R. Strachan, U. Kentucky | Vitaly |
| Tuesday, Feb 17 1:30 pm | TBA | Mohammed Hamidian Cornell University | Piers |
| Tuesday, Feb 24 1:30 pm | TBA | Boris Altshuler, Columbia University | |
| Tuesday, March 3 1:30 pm | No Seminar: March Meeting | | |
| Tuesday, March 10 1:30 pm | Isostatic Lattice: From Jamming to Topological Surface Phonons | Tom Lubensky U. Penn. | Piers |
| Tuesday, March 24 1:30 pm | TBA | Philip Phillips, University of Illinois, Urbana Champaign | Gabi,Piers |
| Tuesday, March 31 1:30 pm | TBA | Tony Heinz, Columbia | Vitaly |
| Tuesday, April 7 1:30 pm | TBA | Name, Institution | |
| Tuesday, April 14 1:30 pm | TBA | Name, Institution | |
| Tuesday, April 21 1:30 pm | TBA | Name, Institution | |
| Tuesday, April 28 1:30 pm | TBA | Name, Institution | |

Last Updated: 07/07/2014



TRR 80 Sonderseminar

Am Donnerstag, den 12. Juni um 13:30 Uhr

spricht

Prof. Dr. Cedomir Petrovic

**Condensed Matter Physics, Brookhaven National Laboratory
Upton NY USA**

über das Thema

Superconducting and Normal States in Iron Chalcogenides

Iron based superconductors have been attracting considerable attention since their discovery in 2008 [1]. In particular, alkali-doped iron selenide materials have recently emerged to the top of research fronts in physics [2]. In this talk I will outline selected properties of FeSe-based superconductors with particular emphasis on crystal structure and mechanisms of neighboring insulating states [3-9]. This will be followed by the results in high magnetic fields which address the influence of the subtle crystal structure features on the pair breaking mechanism and the normal state above H_{c2} as $T \rightarrow 0$ [10-12].

References:

- [1] J. Am. Chem. Soc. 130, 3296 (2008)
- [2] Science Watch, April 2013
- [3] Phys. Rev. Lett. 107, 137002 (2011)
- [4] Phys. Rev. B 86, 054503 (2012)
- [5] Phys. Rev. B 85, 224515 (2012)
- [6] Phys. Rev. B 84, 054526 (2011)
- [7] Phys. Rev. B 83, 174503 (2011)
- [8] Phys. Rev. B 84, 060506 (2011)
- [9] Phys. Rev. B 83, 180503 (2011)
- [10] Sci. Tech. Adv. Mater. 13, 054305 (2012)
- [11] Phys. Rev. B(R) in press (2014)
- [12] Submitted (2014)

Gäste sind herzlich willkommen.

Der Vortrag findet im Seminarraum S-403 / Institut für Physik, Universität Augsburg statt.

Gastgeber: Dr. Vladimir Tsurkan
www.trr80.de



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NEWS/SEMINARS/EVENTS

10.9.2015

**Quantum criticality and
geometric frustration in the
anisotropic Kondo material
CeRu₄Sn₆**

Wesley Fuhrman, Institute for
Quantum Matter and Department of
Physics and Astronomy, The Johns
Hopkins University, Baltimore, MD,
USA

[Invitation](#)

22.09.2014

New end of FWF project no. I623
**THERMOELECTRICITY OF QUANTUM
MATTER** is set: September 3, 2015.

2.4.2014

**Electronic Correlations and
Thermoelectric Performance of
FeSb₂ and (Sr,Ca)MnBi₂**

Cedomir Petrovic, Condensed
Matter Physics, Brookhaven National
Laboratory, New York, USA

[Invitation](#)

8.1.2014

**Fermi surface(s) and
superconducting gap(s) in bulk
SrTiO₃**

Kamran Behnia, LPEM (UPMC &
CNRS), Ecole Supérieure de
Physique et de Chimie Industrielles
(ESPCI), Paris, France

[Invitation](#)

15.12.2013

New end of FWF project no. I623
**THERMOELECTRICITY OF QUANTUM
MATTER** is set: March 31, 2015.

Funding institution:

[FWF Austrian Science Fund](#)

Project leader:

[Silke BÜHLER-PASCHEN](#)

Project duration:

April 2011 - October 2015

[Search](#)[Contact us](#)

Design and discovery of heavy fermion superconductors and semiconductors

Speaker

Cedomir Petrovic — Brookhaven National Laboratory

Time and Place

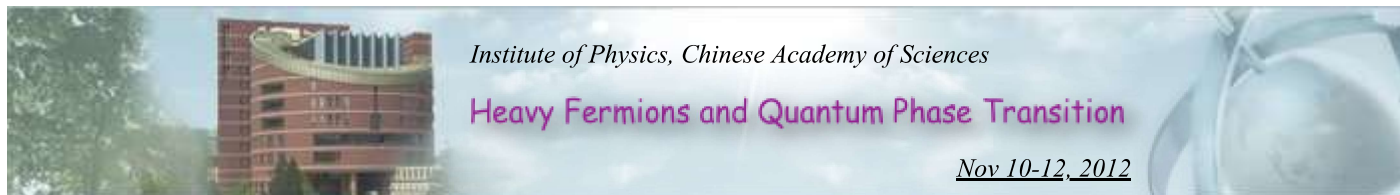
Thursday, 13 March 2014 - 11:00am — CSEC Seminar Room

Abstract

Design and Discovery of Heavy Fermion Superconductors and Semiconductors Cedomir Petrovic Condensed Matter Physics, Brookhaven National Laboratory Heavy fermion superconductors and semiconductors have been attracting considerable interest in the past several decades whereas new materials have been the driving force in the field [1-4]. One of the main points of interest has been the proximity to magnetic ground states, i.e. the possibility that superconducting and semiconducting gaps are driven by or related to magnetic interactions [5-6]. In this talk I will discuss two model materials: heavy fermion superconductor family CeMIn₅ (M=Rh,Ir,Co), and FeSb₂ - a correlated electron semiconductor similar to Kondo Insulators. The CeMIn₅ family of quasi two dimensional heavy fermions has emerged as one of the primary clean model materials where large effective masses due to Abrikosov-Suhl resonance interplay with magnetic and superconducting states [7-9]. I will present CeMIn₅ in the historical context, progressing from the discovery of this superconducting family, touching upon quantum criticality and ending with some recent results. In the case of FeSb₂ I will address the similarity and difference with Kondo Insulators [10], structural and thermoelectric properties of crystals with and without Metal-Insulator transition [11] and unconventional metallic states induced by Te substitution [12]. References: [1] Phys. Rev. Lett. 43, 1892 (1979) [2] Science 239, 33 (1988) [3] Phys. Rev. Lett. 71, 1748 (1993) [4] Nature 450, 1177 (2007) [5] Nature 394, 22 (1998) [6] Phys. Rev. Lett. 69, 490 (1992) [7] Phys. Rev. Lett. 84, 4986 (2000) [8] Europhys. Lett. 53, 354 (2001) [9] J. Phys. Cond. Matter 13, L337 (2001) [10] Phys. Rev. B 72, 045103

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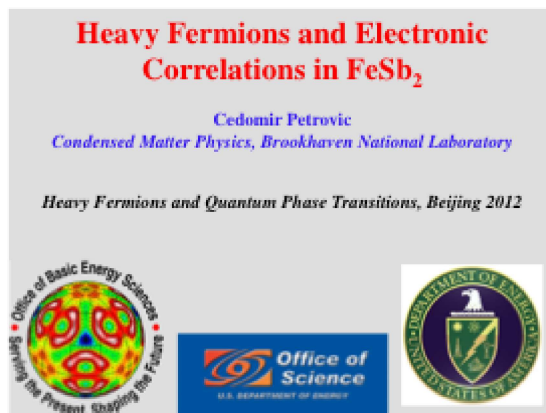
Heavy Fermions and Electronic Correlations in FeSb₂

Cedomir Petrovic

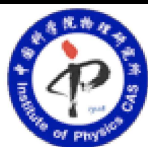
Condensed Matter Physics, Brookhaven National Laboratory, USA

Heavy fermion semiconductors have been attracting considerable interest in the past several decades whereas new materials have been the driving force in the field [1-4]. One of the main points of interest has been the mechanism of the gap and its proximity to magnetic ground states, i.e. the possibility that semiconducting gap is driven by or related to magnetic interactions [5-7]. In this talk I will discuss heavy fermions and electronic correlations in FeSb₂ [8-9], a correlated electron semiconductor similar to FeSi [10]. I will address the similarities and differences with Kondo Insulators as well as structural and thermoelectric properties of crystals with and without Metal-Insulator transition [11].

References: [1] Comments Condens. Matter Phys. 16, 155 (1992), [2] Rev. Mod. Phys. 69, 809 (1997), [3] Adv. Phys. 49, 257 (2000), [4] Phys. Rev. Lett. 69, 490 (1992), [5] Nature 405, 160 (2000), [6] Phys. Rev. B 54, 8452 (1996), [7] Phys. Rev. Lett. 72, 522 (1994), [8] Phys. Rev. B 72, 045103 (2005), [9] Europhys. Lett. 80, 17008 (2007), [10] Phys. Rev. Lett. 71, 1748 (1993), [11] Phys. Rev. B in press (2012).



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Title : ISSP Introductory Lectures by Visiting Professors (mostly in Japanese)

Date : 2008/4/17(Thu)

Time : 10:00 AM - 0:05 PM

Place : Lecture Room (A632), 6th Floor, ISSP

Summary :

- 10:00-10:10 Opening, Yasuhiro IYE (Director)
- 10:10-10:25 Cedomir Petrovic (Brookhaven National Laboratory, US)
Exploratory Synthesis and Characterization of Heavy Fermion Materials
- 10:25-10:40 Anders Sandvik (Boston University, US)
Nature of quantum fluctuations in a valence-bond solid state on the square lattice
- 10:40-10:55 Jyunshi Haruyama (Aoyama Gakuin University)
Recent Progress in a study of carbon nanotube superconductivity
- boron doping -
- 10:55-11:10 Miho Nakashima (Shinsyu University)
Search for pressure-induced superconductivity in Ce₂CuGe₆ by diamond anvil cell
- 11:10-11:20 Break
- 11:20-11:35 Hitoshi Seo (Japan Atomic Energy Agency)
Metal-insulator transition in mixed valenced systems -molecular conductors and transition metal oxides-
- 11:35-11:50 Jun Nakamura (The University of Electro-Communications)
Nano-scale profile of the dielectric constant near the Si/Oxide interface: A first-principles approach
- 11:50-12:05 Hideo Kitamura (RIKEN)
Status of XFEL Construction at SPring-8

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