



# ATLAS NOTE

## ATLAS-COM-PHYS-2014-193

11th June 2015



Draft version 2.1

## $H \rightarrow WW \rightarrow \ell\nu\ell\nu$ high-mass analysis with $20\text{ fb}^{-1}$ of data collected with the ATLAS detector at $\sqrt{s} = 8\text{ TeV}$

O. Arnaez<sup>a</sup>, P. Calpin<sup>b</sup>, S. Diglio<sup>c</sup>, B. Di Micco<sup>d</sup>, P. Ferrari<sup>e</sup>, J. Jovicevic<sup>f</sup>, L. Kashif<sup>g</sup>,  
C. Meineck<sup>h</sup>, C. Mills<sup>i</sup>, J. Qian<sup>j</sup>, R. Sandstrom<sup>k</sup>, T. Taylor<sup>l</sup>, I. Tsukerman<sup>m</sup>, S. L. Wu<sup>g</sup>,  
Z. Zhang<sup>b</sup>

<sup>a</sup>CERN, Geneva, Switzerland

<sup>b</sup>Laboratoire d'Accélérateur Linéaire, Orsay, France

<sup>c</sup>CPPM, Aix-Marseille Université and CNRS/IN2P3, Marseille, France

<sup>d</sup>Università di Roma Tre e sezione INFN, Rome, Italy

<sup>e</sup>NIKHEF, Amsterdam, The Netherlands

<sup>f</sup>Royal Institute of Technology (KTH), Stockholm, Sweden

<sup>g</sup>University of Wisconsin, Madison, USA

<sup>h</sup>Ludwig-Maximilians-Universität, Munich, Germany

<sup>i</sup>University of Edinburgh, Edinburgh, UK

<sup>j</sup>University of Michigan, Ann Arbor, USA

<sup>k</sup>Max-Planck-Institut fuer Physik, Munich, Germany

<sup>l</sup>University of Melbourne, Melbourne, Australia

<sup>m</sup>ITEP, Moscow, Russia

### Abstract

A search for a high-mass Higgs boson in the  $H \rightarrow WW \rightarrow \ell\nu\ell\nu$  channel by the ATLAS experiment at the LHC is described. The search uses proton-proton collision data at a center-of-mass energy of 8 TeV corresponding to an integrated luminosity of  $20\text{ fb}^{-1}$ . The results of the search are interpreted in four different scenarios. A heavy Higgs boson with a Standard Model like width, the heavy Higgs boson in the Electroweak Singlet model and the CP-even heavy Higgs boson in 2-Higgs-Doublet models are searched for in the range  $200\text{ GeV} \leq m_H \leq 1000\text{ GeV}$ . Additionally, a heavy Higgs boson with a narrow width is searched for in the range  $300\text{ GeV} \leq m_H \leq 2000\text{ GeV}$ . No excess over the Standard Model prediction is found in any interpretation.