Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Electron Impact Excitation of Xenon[1]

DIRK LUGGENHOELSCHER, UWE CZARNETZKI, Ruhr University (Bochum, Germany), OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University (Des Moines, Iowa, USA) — We have applied a novel experimental technique to measure cross sections for electron-impact excitation of the $5p^5 6s$ and $5p^5 6p$ states of xenon from its $5p^6$ ground state. This is a complex collision system, for which benchmarking of theory against experiment is needed. The experiment is performed using ultrashort current pulses released from an electrode by femtosecond laser pulses with 80 MHz repetition rate. In order to minimize space charge effects, only about 10^4 electrons are generated in each pulse. Electrons are accelerated by a homogeneous electric field to energies of typically 250 eV. The fluorescence light generated in collisions with Xe atoms at low pressure (Pa range) is imaged perpendicularly and provides a direct image of the energy-dependent excitation cross section. The calculations were carried out with a fully relativistic and parallelized version of the B-spline R-matrix code [1], using a 75-state close-coupling model [2] with the target structure obtained earlier [3]. [1] O. Zatsarinny, Comp. Phys. Commun. **174** (2006) 273. [2] O. Zatsarinny and K. Bartschat, J. Phys. B: At. Mol. Opt. Phys. **43** (2010) 074031. [3] O. Zatsarinny and K. Bartschat, Phys. Scr. T**134** (2009) 014020.

[1]OZ and KB acknowledge support from the United States National Science Foundation.

Klaus Bartschat
Drake University

Date submitted: 01 Jun 2017 Electronic form version 1.4