

Abstract Submitted
for the GEC06 Meeting of
The American Physical Society

High-precision calculations for electron collisions with krypton and xenon.¹ OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University — We extended our earlier work on electron collisions with Ne [1] and Ar [2] to the heavier noble gas targets Kr and Xe. In our *B*-Spline *R*-matrix method [3,4], relativistic effects are accounted for through the most important terms of the Breit-Pauli hamiltonian in the inner region of the *R*-matrix box. Several sets of non-orthogonal valence orbitals were employed to account for the strong term dependence in the one-electron orbitals. Using non-orthogonal basis sets avoids the need for pseudo-orbitals to improve upon the target description and reduces pseudo-resonance problems. The agreement between our predictions and experiment [5] is much better than that obtained in previous calculations based on the standard *R*-matrix approach with strictly orthogonal orbitals, particularly in details such as resonance positions and widths. Our new results for excitation from both the ground and the metastable states are believed to represent a significant improvement of the current database for electron collisions with heavy noble gases.

[1] O. Zatsarinny and K. Bartschat, J. Phys. B **37** (2004) 2173.

[2] O. Zatsarinny and K. Bartschat, J. Phys. B **37** (2004) 4693.

[3] O. Zatsarinny and C. Froese Fischer, J. Phys. B **33** (2000) 313.

[4] O. Zatsarinny, Comp. Phys. Commun. **174** (2006) 274.

[5] S.J. Buckman and C.W. Clark, Rev. Mod. Phys. **66** (1994) 539.

¹Work supported by the NSF under PHY-0244470, PHY-0311161 and PHY-0555226.

Klaus Bartschat
Drake University

Date submitted: 12 Jun 2006

Electronic form version 1.4