Abstract Submitted
for the GEC12 Meeting of
The American Physical Society

Strong multiple-capture effect in slow Ar^{17+}-Ar collisions: a quantum mechanical analysis[1] ARASH SALEHZADEH, TOM KIRCHNER, Department of Physics and Astronomy, York University, Toronto, ON M3J 1P3, Canada — A recent X-ray spectroscopy experiment on 255 keV Ar^{17+}-Ar collisions [1] provided evidence for strong multiple-electron capture — a feature that is supported by classical trajectory Monte Carlo calculations for similar collision systems [2]. We have coupled a quantum-mechanical independent-electron model calculation for the Ar^{17+}-Ar system with (semi-) phenomenological Auger and radiative cascade models to test these findings. The capture calculations are performed using the basis generator method and include single-particle states on the projectile up to the 10th shell. The cross sections obtained for shell-specific multiple capture are fed into a stabilization scheme proposed in Ref. [3] in order to obtain n-specific cross sections for *apparent* single (and double) capture that in turn are fed into a radiative cascade code [1] to obtain X-ray emission intensities that can be compared with the experimental data. Good agreement is found for the Lyman series from n=3 to n=7 if the multiple-capture contributions are included, whereas calculations that ignore them are in stark conflict with the data.

[1] M. Trassinelli et al., J. Phys. B 45, 085202 (2012)
[2] S. Otranto and R. Olson, Phys. Rev. A 83, 032710 (2011)
[3] R. Ali et al., Phys. Rev A 49, 3586 (1994).

[1]Supported by SHARCNET and NSERC/Canada.

Tom Kirchner
York University

Date submitted: 15 Jun 2012 Electronic form version 1.4