MODELING THE 1s2l2l′ AUGER PROJECTILE SPECTRUM IN C^{4+} (1s2s ^{3}S) COLLISIONS WITH He INCLUDING RADIATIVE CASCADE REPOPULATION AND AUGER DEPLETION

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We investigate the production of the 1s2s2p ^{4,2}P states populated by single electron capture in 12 MeV C^{4+} + He collisions. The ^{4}P/^{2}P ratio of Auger electron yields has been found not to obey the expected spin recoupling statistics, but instead is enhanced [1, 2]. Various explanations have been proposed [1-3], but none of them can fully account for the observed enhancement. Here, we combine our recent Monte Carlo approach for simulating the projectile Auger spectrum utilizing the SIMION package [3] including the important solid angle corrections to the long lived ^{4}P line together with calculations of single electron capture into (1s2s ^{3}S)*nl* states [4] which include repopulation by radiative cascades and Auger depletion to model the experimental spectra. Preliminary results are presented in figure 1.

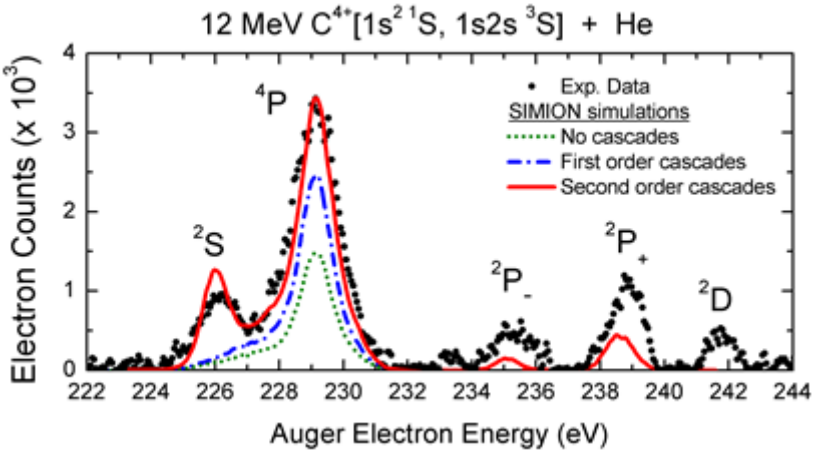

Figure 1: 1s2l2l′Auger projectile spectrum from 12 MeV C^{4+} + He collisions measured with our hemispherical analyzer. Lines: SIMION simulations including model contributions (normalized to the ^{4}P yield) are compared to the spectrum (black dots). The ^{4}P line is seen to be strongly enhanced by cascades. The observed excess electron yield in the $^2P_{\pm}$ and ^{2}D states is due to Transfer-Excitation from the ground state not included in the capture calculations.

References

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[2] T. J. M. Zouros *et al.* Phys. Rev. A**77**, 050701R (2008).
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[4] D. Rohrbein, T. Kirchner, and S. Fritzsche, Phys. Rev. A**81**, 042701 (2010).