

Abstract Submitted
for the DAMOP10 Meeting of
The American Physical Society

Asymmetry of electron cusps in the strong perturbation domain

SIEGBERT HAGMANN, Inst. f. Kernphysik Univ. Frankfurt, GSI-Darmstadt, Dep. of Physics, KSU, Manhattan, CHUNLEI LIAO, Dep. Physics, KSU, Manhattan KS, BERTOLD KRAESSIG, Argonne National Lab — One of the most remarkable features in the doubly differential cross sections for electron emission in ion-atom collisions is the prominent electron capture to continuum (ECC) cusp. For small perturbations $q_{proj}/v_{proj} \ll 1$ the skewness of the ECC towards lower lab velocities served as evidence for second Born terms in the electron capture amplitude. A tacit assumption in these considerations has always been the one-active-electron model. We have now shown that for strong perturbations, $0.35\text{A MeV } I^{23+} + \text{Ar}$, the dominant contribution to the ECC cusp arises from simultaneous capture of several electrons into bound states changing its nature into a multiple transfer ionization (mTI) cusp. A remarkable observation is the strong dependence of the asymmetry on the number of electrons transferred with the asymmetry even switching from negative at pure ECC to strongly positive, i.e. skewness towards higher laboratory velocities, in the multiple TI region.

Siegbert Hagmann
Inst. f. Kernphysik Univ. Frankfurt, GSI-Darmstadt,
Dept. of Physics, KSU, Manhattan

Date submitted: 22 Jan 2010

Electronic form version 1.4