Abstract Submitted for the DAMOP06 Meeting of The American Physical Society

Near-threshold Inner-shell Photodetachment of Atomic Negative Ions: Post-collision Interactions and the Validity of the Wigner Law¹ R.C. BILODEAU, Western Michigan U. and LBNL-ALS, N. BERRAH, WMU, I. DUMITRIU, WMU and LBNL-ALS, J.D. BOZEK, Lawrence Berkeley National Laboratory - ALS, G.D. ACKERMAN, LBNL-ALS, C.W. WALTER, Denison U., N.D. GIBSON, DU, A. AGUILAR, California Institute of Technology - JPL — The first studies of inner-shell photodetachment threshold laws will be presented. Experiments were conducted on the Ion-Photon Beamline on Beamline 10.0.1 at the Advanced Light Source. Inner-shell detachment of negative ions results in a core-excited neutral atom that quickly emits one or more further electrons (Auger decay) to produce positive ion products that are detected as a function of photon energy. Photodetachment of a 1s electron in He⁻ [1] is found to be consistent with the Wigner p-wave threshold law despite strong post-collision interaction effects [2]. Photodetachment cross sections near the 2s and 2p thresholds in S⁻ are found to closely follow the Wigner p- and s-wave laws respectively over a surprisingly large range, even when a total of 3 or 4 electrons are emitted [1]. Detailed analysis of these threshold law behaviors and high charge-state formation [3] will be presented. [1] R.C. Bilodeau et al., Phys. Rev. Lett. 95, 083001 (2005). [2] R.C. Bilodeau et al., Phys. Rev. A (in press). [3] R.C. Bilodeau et al., Phys. Rev. A 72, 050701(R), (2005).

¹This work is funded by DOE, Office of Science, BES.

Rene Bilodeau Western Michigan U. and LBNL-ALS

Date submitted: 27 Jan 2006 Electronic form version 1.4