

Abstract Submitted
for the DAMOP13 Meeting of
The American Physical Society

Low-energy electron elastic scattering from Os atom: New electron affinity¹ Z. FELFLI, F. KIROS, A.Z. MSEZANE, Clark Atlanta University — Bilodeau and Haugan [1] measured the binding energies (BEs) of the ground state and the excited state of the Os^- ion to be 1.07780(12) eV and 0.553(3) eV, respectively. These values are consistent with those calculated in [2]. Here our investigation, using the recent complex angular momentum methodology wherein is embedded the crucial electron-electron correlations and the vital core polarization interaction, has found that the near threshold electron-Os elastic scattering total cross section (TCS) is characterized by three stable bound states of the Os^- ion formed as resonances during the slow electron collision, with BEs of 1.910 eV, 1.230 eV and 0.224 eV. The new extracted electron affinity (EA) value from the TCS of 1.910 eV for the Os atom is significantly different from that measured in [1]. Our calculated elastic differential cross sections (DCSs) also yield the relevant BEs for the ground and the two excited states of the Os^- ion. The complex characteristic resonance structure in the TCS for the Os atom is ideal for catalysis [3], but makes it difficult to execute the Wigner threshold law in describing the threshold detachment behavior of complex atoms and extracting the reliable attendant EAs.

[1] R. C. Bilodeau and H. K. Haugen, *Phys. Rev. Lett.* **85**, 534 (2000); [2] P. L. Norquist and D. R. Beck, *Phys. Rev.* **A61**, 014501 (2000); [3] A. Tesfamichael et al, *J. Phys. Chem. C* **116**, 18698 (2012)

¹Supported by U.S. DOE, AFOSR and CAU CFNM, NSF-CREST Program

Z. Felfli
Clark Atlanta University

Date submitted: 28 Jan 2013

Electronic form version 1.4