Abstract Submitted
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New insights in negative ion formation in atomic Pu[1] ZINEB FELFLI, ALFRED Z MSEZANE, Clark Atlanta University — We probe the response to low-energy electron collision with atomic Pu through the elastic total cross sections (TCSs) calculation and find them to exhibit both atomic and molecular character as was discovered for the fullerene molecules [1]. They also exhibit the size effect through the creation of a new polarization-induced metastable TCS with anionic binding energy value of 1.22 eV close to that of the first metastable negative ion at 1.57 eV. The calculations were carried out using our robust Regge-pole methodology which embeds the crucial electron-electron correlation effects and the vital core polarization interaction; these are the major physical effects that are responsible for stable negative ion formation in low-energy electron collisions with complex heavy systems. The identification of the ground state binding energy (BE) of the formed negative ion during the collision provides a new approach to the definitive determination of the theoretically challenging to calculate EAs of complex heavy systems. The extracted ground state anionic BE located at the second Ramsauer-Townsend (R-T) minimum viz. 3.25 eV is largest BE of the previously investigated actinide atoms, including the U atom [2]. The Pu TCSs will be contrasted with those of the U atom, while the BEs will be compared with those from other calculations. These results demonstrate the importance of the delineation and identification of the resonance structures in the near threshold electron scattering TCSs, particularly the ground state anionic BEs. 1. A. Z. Msezane and Z. Felfli, Chem. Phys. **503**, 50 (2018); 2. Z. Felfli and A. Z. Msezane, Applied Physics Research Vol. **11**, No. 1 (2019). doi:10.5539/apr.v8n1pxx

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