Abstract Submitted
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Low-energy electron scattering from atomic Th, Pa, U and Np using the Regge pole methodology[1] ZINEB FELFLI, ALFRED Z MSEZANE, Clark Atlanta University — Here we investigate negative ion formation in low-energy electron collisions with the actinide atoms Th, Pa, U and Np through the elastic total cross sections (TCSs) calculations. For these atoms, the presence of two or more open d- and f- sub-shell electrons presents a formidable computational task for conventional theoretical methods. Our robust Regge pole methodology which embeds the crucial electron correlations and the vital polarization interaction is used for the calculations. These are the major physical effects responsible for stable negative ion formation in low-energy electron scattering. We find that the TCSs are characterized generally by Ramsauer-Townsend minima, shape resonances and dramatically sharp resonances manifesting ground and metastable anionic formation during the collisions. The extracted from the TCSs ground states anionic binding energies (BEs) are found to be 3.09 eV, 2.98 eV, 3.03 eV and 3.06 eV for Th, Pa, U and Np, respectively. We also found that our highest excited states anionic BEs for these atoms compare well with the calculated EAs using the relativistic configuration-interaction method [1]. Interestingly, the ground states anionic BEs for these actinides are comparable to those for the fullerenes [2]. 1. K. D. Dinov and D. R. Beck, Phys. Rev. A **52**, 2632 (1995); ——A **53**, 4031 (1996) 2. Z. Felfli and A. Z. Msezane, Euro Phys. J. D Submitted (2017)

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