

Abstract Submitted
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Complex angular momentum investigation of excited lanthanide atoms: formation of negative ions¹ A.Z. MSEZANE, Z. FELFLI, Clark Atlanta university, D. SOKOLOVSKI, Queen's University of Belfast, UK — The formation of stable excited lanthanide anions as Regge resonances is investigated in the electron impact energy region, $E < 1.0$ eV using the recent Regge-pole methodology [1] wherein is embedded the electron-electron correlations together with a Thomas-Fermi type model potential that incorporates the vital core-polarization interaction. The near-threshold electron elastic total cross sections (TCSs) for the lanthanide atoms are found to be characterized by extremely narrow resonances whose energy positions are identified with the binding energies (BEs) of the resultant anions formed during the collision as Regge resonances. The extracted BEs for the excited lanthanide anions are contrasted with those of the most recently calculated electron affinities (ground state BEs) [2, 3]. Formation of bound excited anions is identified in the elastic TCSs of all the lanthanide atoms, except Eu and Gd. The imaginary part of the complex angular momentum L is used to distinguish between the shape resonances and the bound excited negative ions. [1] D. Sokolovski *et al*, Phys. Rev. A **76**, 012705 (2007); [2] S.M. O' Malley and D. R. Beck, Phys. Rev. A **79**, 012511 (2009) ; [3] Z. Felfli *et al*, Phys. Rev. A **79**, 012714 (2009)

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