

Abstract Submitted
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Novel mechanism for creating long-lived metastable atomic negative ions¹ ALFRED MSEZANE, ZINEB FELFLI, Clark Atlanta University —
A novel mechanism is proposed for creating long-lived metastable atomic negative ions in complex atoms, such as the lanthanides. It exploits the orbital collapse of the 5d orbital in Gd ($Z=64$) into the 4f orbital of Tb ($Z=65$). In the region of collapse the properties of the 5d and 4f orbitals are quite sensitive to the changes in the effective potential. Consequently the collapse phenomenon impacts the core-polarization interaction significantly in the relevant atom, namely Tb inducing a new excited Tbanion. The mechanism is demonstrated in the lanthanide atoms Tb and Dy through the appearance of long-lived Tband Dyanions in the Regge pole calculated electron elastic total cross sections. Ground and long-lived metastable negative ion formation occurs at the second Ramsauer -Townsend minima.

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