

Abstract Submitted
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Resonant inter-Coulombic decay processes from atom to fullerene and backward in the photoionization of Ar@C₆₀¹ MOHAMMAD JAVANI, Georgia State University, MOHAMED MADJET, CFELS, DESY, Germany, HIMADRI CHAKRABORTY, Northwest Missouri State University, STEVE MANSON, Georgia State University — In a theoretical study of the photoionization of Ar@C₆₀ we find the evidence of strong decay probability of Ar single-core-electron excited states through degenerate ionization continua of the encapsulating fullerene *via* a mechanism known as the resonant inter-Coulombic decay (RICD) [1]. The resulting resonance structures in C₆₀ subshell cross sections are found to assume significantly different shapes from those of the pure autoionizing resonances of Ar. We further predict an abundance of “backward RICD” processes. These are the decay of C₆₀ inner-shell excitations through Ar continua. Several of such resonances are also obtained in 3*p* and 3*s* cross sections of the confined Ar. Mutual hybridizations between some of Ar and C₆₀ orbitals influence the properties of these resonances. Calculations are carried out on a framework of time-dependent local density approximation where the fullerene ion-core of sixty C⁴⁺ ions is smudged into a continuous jellium distribution [2].

[1] V. Averbukh and L.S. Cederbaum, *Phys. Rev. Lett.* **96**, 053401 (2006);

[2] M.E. Madjet, T. Renger, D.E. Hopper, M.A. McCune, H.S. Chakraborty, J.-M. Rost, and S.T. Manson, *Phys. Rev. A* **81**, 013202 (2010).

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