

Abstract Submitted
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Lifetimes and Fano asymmetry parameters of inter-Coulombic decay resonances in photoionization of Ar@C₆₀ MOHAMMAD JAVANI, STEVEN T. MANSON, Georgia State University, MOHAMED E. MADJET, QUEERI, Doha, Qatar, HIMADRI S. CHAKRABORTY, Northwest Missouri State University — In a theoretical study of the photoionization of Ar@C₆₀ we find evidence of inter-Coulombic decay (ICD) probability of Ar single-core-electron excited states through degenerate ionization continua of the encapsulating fullerene [1]. Resonances from the “backward ICD,” namely, the decay of C₆₀ photoexcited inner holes through Ar 3s ionization are also detected. We further predict abundance of a new type of resonance from the interference between concurrent autoionizing and ICD processes that can be termed as resonant hybridized Auger-ICD [2]. Calculations are carried out on a framework of the time-dependent local density approximation where the fullerene ion core of sixty C⁴⁺ ions is smudged into a continuous jellium distribution [3]. All these classes of resonances assume significantly different shapes from each other and from those of the pure autoionizing resonances of both Ar and C₆₀. The resonances are fit to Fano profiles in order to calculate their lifetime, strength and Fano asymmetry parameter q and compare with the regular autoionizing resonances. [1] V. Averbukh and L.S.Cederbaum, *Phys. Rev. Lett.* **96**, 053401 (2006); [2] M.H. Javani, J.B. Wise, R. De, M.E. Madjet, S.T. Manson, and H.S. Chakraborty, arXiv:1312.2144 [physics.atm-clus]; [3] 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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