

Abstract Submitted
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Confinement marries correlation to control time delays in valence-photoemissions of Ar taken hostage in C₆₀¹ HIMADRI CHAKRABORTY, Northwest Missouri State University, GOPAL DIXIT, MBI, Berlin, Germany, MOHAMED MADJET, QEERI, Doha, Qatar — Effects of confinement and electron correlations on the relative time delay between the 3s and 3p photoemissions of Ar confined endohedrally in C₆₀ are investigated using the time dependent local density approximation [1] - a method that is also found to mostly agree with recent time delay measurements between the 3s and 3p subshells in atomic Ar [2]. The Leeuwen and Baerends exchange-correlation functional to produce accurate asymptotic behavior is employed to calculate the dynamical response of the system to the photon field. At energies in the neighborhood of 3p Cooper minimum, correlations with C₆₀ electrons are found to induce opposite temporal effects in the emission of Ar 3p hybridized symmetrically versus that of Ar 3p hybridized antisymmetrically with C₆₀ [2]. A recoil-type interaction model mediated by the confinement is found to best describe the phenomenon. We suggest that future experiments be performed on the time delay in Ar and Ar@C₆₀ over broader photon energy ranges including the 3p Cooper minimum to unravel new physics from confinement and correlations.

[1] 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);

[2] G. Dixit, H.S. Chakraborty, and M.E. Madjet, *Phys. Rev. Lett.* 111, 203003, (2013).

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