

Abstract Submitted
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Correlation-induced Time Delay in Atomic Photoionization

DAVID A. KEATING, STEVEN T. MANSON, Georgia State U., PRANAWA C. DESHMUKH, IIT-Madras, ANATOLI S. KHEIFETS, Australian National U. — Interchannel coupling has been seen to result in structures in the photoionization cross sections of outer shell electrons in the vicinity of inner-shell thresholds [1], a result which leads us to ask if the same would be true for the time delay of outer shell electrons near inner-shell thresholds. Using the relativistic-random-phase approximation (RRPA) methodology [2], a theoretical study of neon, argon, krypton, and xenon were performed to search for these correlation-induced effects. Calculations were performed both with coupling and without coupling to verify that the structures found in the time delay were in fact due to interchannel coupling. Using this method to study the effects of interchannel coupling reveals how much of an impact the coupling has on the time delay, in some cases over a broad energy range. In cases where the spin-orbit doublets' respective thresholds are far enough apart, effects can be found in the $j = l+1/2$ channels due to interchannel coupling with the $j = l-1/2$ channels. These structures are purely a relativistic effect and are related to spin-orbit activated interchannel coupling effects [3]. Work supported by DOE, Office of Chemical Sciences, DST (India), and the Australian Research Council. [1] W. Drube *et al*, J. Phys. B **46**, 245006-1-6 (2013); [2] W. R. Johnson and C. D. Lin, Phys. Rev. A **20**, 964 (1979); [3] M. Ya. Amusia, *et al*, Phys. Rev. Lett **88**, 9 (2002).

Steven T. Manson
Georgia State University

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