

Abstract Submitted
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Recoil frame photoelectron angular distributions for valence photoionization of CF_4 ¹ ROBERT R. LUCCHESI, Lawrence Berkeley National Lab., CYNTHIA S. TREVISAN, California State University, Maritime Academy, C. WILLIAM MCCURDY, University of California, Davis and Lawrence Berkeley National Lab., SAIJOSCHA HECK, KIRK A. LARSEN, THOMAS N. RESCIGNO, Lawrence Berkeley National Lab. — Results of recent momentum imaging experiments on photoionization of CF_4 have shown that upon valence ionization producing several states the CF_4^+ cation dissociates to produce $\text{CF}_3^+ + \text{F}$, thereby allowing the measurement of the photoelectron angular distribution relative to the axis of recoil. For ionization from the $4t_2$ orbital, the experiment shows a dramatic reversal in the angular distribution of the photoejected electron over a narrow range energies of less than 2 eV. We present the results of photoionization calculations using both the complex Kohn variational and Schwinger variational methods that reveal two overlapping shape resonances of a_1 and t_2 symmetry whose interference is responsible for this behavior and which require coupling between the ionization channels producing the degenerate components of the A^2T_2 state of the CF_4^+ ion. It is shown that ionization from the $3t_2$ orbital shows similar resonances but not the dramatic changes in angular dependence with photon energy. Comparison of theory and experiment is also presented for ionization from the $1t_1$ and $1e$ orbitals.

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