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Carbon K-shell photoionization of fixed-in-space Ethylene Molecules TH. WEBER, T. OSIPOV, LBNL, M. STENER, stener@univ.trieste.it, A. BELKACEM, M. SCHOEFFLER, LBNL, L. SCHMIDT, A. LANDERS, University of Frankfurt, M.H. PRIOR, LBNL, R. DOERNER, University of Frankfurt, C.L. COCKE, Kansas State University — Using the COLTRIMS technique we performed a kinematically complete experiment measuring photoionization of the carbon K-edge of the fixed in space ethylene molecules for photon energies (293, 302, 306, 318eV), while focusing on the symmetric break-up channel (CH2+ + CH2+). The coincidenct measurements the of reaction products along with data collection and analysis on the event-by-event basis allowed us to obtain the multi differential angular distribution of photoelectrons in the body-fixed frame of ethylene molecule. We also completed very comprehensive theoretical study of the reaction. A set of dipole transition matrix elements was calculated and extracted (7 amplitudes and 5 relative phases) from the experimental results. These matrix elements along with the complete angular distributions showed a very good qualitative agreement between the experiment and the theoretical model used. From the $l = 3$, $m = 0$ partial wave contribution to the electron angular distribution we concluded the presence of an f -wave shape resonance found around 10eV above the carbon K-edge in the ethylene molecule.

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