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Classical trajectory studies on the dynamics of one-photon double photionization of H_2O[1] ZACHARY STREETER, University of California, Davis, FRANK YIP, California State University, Maritime Academy, DYLAN P. REEDY, University of Nevada, Reno, ALLEN LANDERS, Auburn University, C. WILLIAM MCCURDY, University of California, Davis and Lawrence Berkeley National Lab. — Recent momentum imaging experiments at the Advanced Light Source have opened the possibility of measuring the complete triple differential cross section (TDCS) for one-photon double ionization of H_2O in the molecular frame. The measurements depend on the complete breakup process, $H_2O + h\nu \rightarrow 2e^- + H^+ + H^+ + O$. At the 57 eV photon energy of the experiment this process could proceed via any of the nine energetically accessible electronic states of H_2O^{++}. To discover which ionization channels contribute to the observed TDCS for the electrons measured in coincidence with different kinetic energy releases, we have carried out classical trajectory studies for breakup of the water dication on all nine potential surfaces, sampling from a Wigner phase space distribution for the vibrational ground state of H_2O. The final momentum distributions of the protons and branching ratios between two- and three-body breakup are then analyzed and the results are compared with experiment to identify which ionization channels contribute to the TDCS observed in coincidence measurements of the ejected electrons.

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