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Two-dimensional electron angular distributions from aligned molecules[1] VINOD KUMARAPPAN, Kansas State University, LOTTE HOLMEGAARD, CHRISTIAN MARTINY, CHRISTIAN MADSEN, THOMAS KJELDSEN, SIMON VIFTRUP, LARS MADSEN, HENRIK STAPELFELDT, Aarhus University — We report the measurement of 2D electron angular distributions from multiphoton single ionization of aligned CS_2 molecules. CS_2 molecules were cooled in a supersonic expansion and aligned non-adiabatically using a Ti:Sapphire laser pulse (800 nm, 0.5 ps, 2.9×10^{12} W/cm^2) without significant ionization, and a time-delayed second pulse (25 fs, 7.7×10^{13} W/cm^2) was used to singly ionize the molecules at best alignment at the first half-revival. 2D electron momentum spectra were measured using velocity map imaging as a function of angle between the alignment axis and the polarization vector of the ionizing pulse. The angular distribution was found to depend significantly on this angle. Calculations using molecular strong-field approximation were found to account for some, but not all, of the features seen in the experiment. The measurement of molecular-frame photoelectron angular distributions provides new challenges and more stringent tests for theoretical description of molecular ionization by intense lasers.

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