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Phase-Sensitive Coulomb Explosion of CO Prepared by a 2-Color Pump Field[1] DANIEL PINKHAM, ROBERT R. JONES, University of Virginia Physics Dept. — We use an intense 30 fsec, 800 nm probe laser pulse to explore the Coulomb explosion dynamics of CO molecules coherently prepared by a 2-color (400 nm+800nm), phase-locked, pump laser pulse. When an intense, ultrashort laser pulse interacts with a molecule, it can create a rotational wavepacket through a series of Raman transitions. As the wavepacket evolves the molecule undergoes periodic field-free alignment along the laser polarization axis. In principle, by using an asymmetric laser field, produced by combining an 800 nm pulse with its second harmonic, a rotational wavepacket which exhibits periodic field-free orientation can be created. We use a single-stage time-of-flight spectrometer to monitor the forward/backward asymmetry in the ion fragments ejected along the probe laser polarization as a function of the pump-probe delay and the relative phase between the 2-colors in the probe. At the pulse overlap, we observe several delay-dependent changes in the TOF spectrum as well as a strong phase-sensitive asymmetry in the directionality of the fragment distribution.

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