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Coherent Phase Control of the Ionization and Dissociation of Vinyl Chloride[1] ROBERT J. GORDON, VISHAL J. BARGE, ZHAN HU, JOYCE WILLIG, Department of Chemistry, University of Illinois at Chicago — Two-pathway quantum interference was used to control the photochemical reactions of vinyl chloride (C_2H_3Cl, VCl). A molecular beam of VCl was irradiated simultaneously with 532 and 177 nm laser light, produced from the second and sixth harmonics of a Nd:YAG laser. The relative phase of the visible and UV lasers was adjusted by passing them through a cell containing a variable pressure of hydrogen gas, and the parent and fragment (C_2H_3 and HCl) ions of VCl were detected with a time-of-flight mass spectrometer. The phase lags between different pairs of modulated ion signals depended on the location of the laser focus. This variation of the phase lags was produced by the axial spatial phase of the focused laser beam. A non-zero phase lag between the parent and fragment ions produced when the laser was focused in the center of the spectrometer slit is indicative of coherent control of the branching between ionization and dissociation.

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Robert J. Gordon
Department of Chemistry, University of Illinois at Chicago

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