Concerted Reaction on the Timescale of Molecular Vibrations

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High energy excitation of gem-dihaloalkanes produces molecular iodine as one of the products. Femtosecond transition state spectroscopy (FTS) of this reaction reveals coherent vibrational dynamics in the iodine fragment. Fourier analysis of the transient reveals a bimodal distribution of vibrational levels in the D' state of iodine, consistent with the observed dynamics. A reaction pathway is proposed to explain the observed energy distribution.