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Multiphoton control of an electrocyclic ring-opening ELIZABETH CARROLL, FOCUS Center, Department of Physics, and Department of Chemistry, University of Michigan, Ann Arbor, BRETT PEARSON, Department of Physics, SUNY Stony Brook, Stony Brook, NY, JAMES WHITE, ANDREI FLOREAN, PHILIP BUCKSBAUM, ROSEANNE SENSION, FOCUS Center, Department of Physics, and Department of Chemistry, University of Michigan, Ann Arbor, MI — We have investigated optical control over the photoisomerization of 1,3-cyclohexadiene to 1,3,5-cis-hexatriene via multiphoton excitation. Sub-80fs pulses at 800nm were shaped with an acousto-optic modulator. A closed-loop genetic algorithm (GA) searched for optimal excitation pulses while the effectiveness of each pulse was evaluated using differential absorption of a time-delayed, broadband, ultraviolet probe pulse. Reaction products were subsequently identified in an ultraviolet spectrophotometer. The GA identified pulses that increased the formation of hexatriene by a factor of two over the transform-limited pulse. Detailed analysis of the pulses in the GA search set has identified negative quadratic spectral phase and cubic phase as important control parameters. Multiphoton control mechanisms will be discussed.

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