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Spectral Phase Effects on Ultrafast Coherent Control H.U. JANG, M.L. TRACHY, G. VESHAPIDZE, C.W. FEHRENBACH, B.D. DEPAOLA, Kansas State University — A long-time goal in laser-matter interaction is the use of lasers to efficiently control chemical reactions. The newest tool in this field is the ultrafast laser. Using a genetic algorithm to guide laser parameters, specific pathways in certain chemical reactions have already been optimized, though later deducing exactly why those laser parameters were optimal has proven difficult. In the experiments described in this talk we examine the effects of spectral phase on the coherent control of a particular ultracold collision process, photoassociation followed by coherent excitation and ionization (PAI). We concentrate on step functions and pulses in the spectral phase. When combined with high resolution time-of- flight spectroscopy as a diagnostic, we find that such phases help in furthering our understanding of PAI, hopefully leading to a better understanding of the physics underlying the coherent control of this collision path. The experimental measurements will be compared with the results of simple calculations.

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