Abstract Submitted
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Exploring the formation of trihydrogen monocations from ethane using shaped ultrafast laser pulses[1] TIANA TOWNSEND, CHARLES J SCHWARTZ, NAOKI IWAMOTO, S. ZHAO, J.L. NAPIERALA, S.N. TEGEGN, A. SOLOMON, E. WELLS, Department of Physics, Augustana University, Sioux Falls, SD 57197 USA, T. SEVERT, BETHANY JOCHIM, KANAKA RAJU P., PEYMAN FEIZOLLAH, K.D. CARNES, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Department of Physics, Kansas State University, Manhattan, KS 66506 USA
— COLTRIMS measurements of ethane molecules exposed to 23-fs, 1×10^{14}-W/cm^2, 780-nm laser pulses are used to obtain the two-body fragmentation branching ratios, kinetic energy release, and angular dependence of the resulting photofragments with an emphasis on examining D_3^+ formation. $D_3^+ + C_2D_3^+$ is the most likely two-body double ionization channel. These measurements are contrasted with velocity map imaging studies of D_3^+ and D_2H^+ production in interactions between shaped ultrafast laser pulses and the D_3C-CH_3 isotopologue of ethane, which selects between trihydrogen monocations formed from atoms on one or both sides of ethane. When an adaptive learning algorithm supplied with 3D momentum-based feedback is used to identify intense laser pulse shapes that enhance the D_2H^+/D_3^+ ratio from D_3C-CH_3, the observed D_2H^+ angular distribution is altered significantly.

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