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Image based adaptive femtosecond control of ethylene fragmentation[1] E. WELLS, C. RALLIS, T. BURWITZ, P. ANDREWS, A. VOZNYUK, Department of Physics, Augustana College, Sioux Falls, SD 57197 USA, M. ZOHRABI, BETHANY JOCHIM, U. ABLIKIM, K.D. CARNES, M.F. KLING, I. BEN-ITZHAK, J.R. Macdonald Laboratory, Kansas State University, Manhattan KS 66506 USA — Using an adaptive femtosecond control scheme, ethylene is ionized by a shaped ultrafast laser pulse, leading to isomerization to the ethylidene $(HC\text{-}CH3)^{q+}$ configuration, from which CH_3^+ fragments are generated. Feedback for the control process is obtained by rapidly inverting velocity map images of the CH_3^+ and competing CH_2^+ fragments, allowing identification of dissociation channels and subsequent control of the CH_3^+/CH_2^+ ratio. Additionally, we have identified the $C_2H_4^+ \rightarrow C_2H_3^+ + H$ and $C_2H_4^+ \rightarrow C_2H_2^+ + H_2$ channels as creating ion images with rich structure that offer possible routes to investigate control via conical intersections on the $C_2H_4^+$ potential energy surface.

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