

Abstract Submitted
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Ultrafast double hydrogen migration in ethanol¹ NORA G. KLING, RAZIB OBAID, Univ of Connecticut - Storrs, SERGIO DIAZ-TENDERO, Universidad Autonoma de Madrid, HUI XIONG, MARGARET SUNDBERG, SOROUSH KHOSRAVI, MICHAEL DAVINO, ANN MARIE CARROLL, Univ of Connecticut - Storrs, TIMUR OSIPOV, SLAC National Accelerator Laboratory, FERNANDO MARTIN, Universidad Autonoma de Madrid, NORA BERRAH, Univ of Connecticut - Storrs — Hydrogen migration is ubiquitous in nature. Strong-field induced single hydrogen migration in small hydrocarbons has been studied with a variety of light sources, and, for acetylene and allene, has even been controlled via the carrier-envelope phase of a laser pulse. Previous strong field laser experiments have also shown that for more complex targets, such as ethanol, two hydrogen atoms can migrate, producing the H_3O^+ hydronium ion. Here we use 35 fs, 790 nm, mid- 10^{14} W/cm² laser pulses, to induce double hydrogen migration in ethanol and record the resulting ionic fragments with a cold-target recoil ion momentum spectrometer (COLTRIMS) apparatus. Following Coulomb explosion, the molecules fragment into many channels, including the coincident $\text{H}_3\text{O}^+ + \text{C}_2\text{H}_3^+$ channel of interest. Theoretical support indicates that the first hydrogen comes from the terminal carbon, and the second comes from the adjacent carbon, occurring on a 10's to 100's of fs timescale.

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