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Bond Formation and Bond Scission Dynamics in Polyatomic Molecules Revealed by Momentum Imaging Experiments and Electron Scattering Calculations.[1] DANIEL SLAUGHTER, Lawrence Berkeley Natl Lab, CYNTHIA TREVISAN, California Maritime Academy, Vallejo, California, USA, MARVIN WEYLAND, ALEXANDER DORN, Max PIanck Institute for Nuclear Physics, Heidelberg, Germany, NICOLAS DOUGUET, ANN OREL, University of California, Davis, California, USA, HIDEHITO ADANIYA, Lawrence Berkeley Natl Lab, BILL MCCURDY, Lawrence Berkeley National Laboratory and University of California, Davis, California, USA, ALI BELKACEM, TOM RESCIGNO, Lawrence Berkeley Natl Lab — We present combined experimental and theoretical studies of dissociative electron attachment (DEA) dynamics in methane and ammonia. DEA in each of these systems proceeds through electronic Feshbach resonances, where a valence electron is excited and captured with the incident electron in the lowest unoccupied orbital. In methane, one triply-degenerate resonance undergoes Jahn-Teller splitting through molecular distortions, leading to four observed final states, each having a 2-body and a 3-body dissociation with anionic products H^- and CH_2^- and neutrals CH_3, CH_2, H_2 or H. In ammonia, one resonance leads to H^- + NH_2 and NH_2^- + H, the latter resulting from non-adiabatic charge transfer. A higher energy resonance leads directly to H^- + NH_2* and indirectly to NH_2^- + H. We examine the dynamics of the transient anion in each of these processes.

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