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The Dynamics of Dissociative Electron Attachment to Small Polyatomic Molecules[1]

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Dissociative electron attachment (DEA) is a resonant process in which an electron attaches to a molecule to form an unstable anion which subsequently fragments into stable products. DEA to small polyatomic molecules is often governed by complex electronic and nuclear dynamics that is intrinsically multi-dimensional. One-dimensional treatments of the dissociation dynamics based on resonance scattering theory, while often successful in modeling the energy dependence of total cross sections, can mask the complexity of post-attachment dynamics which is revealed by the observed angular dependence of the reaction products. The dissociation evolves on transient anion potential energy surfaces and often involves conical intersections which can result in a complete breakdown of the axial recoil approximation. I will use the examples of DEA to water, carbon dioxide and methanol to illustrate the discussion.

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