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Momentum imaging of dynamical processes in dissociative electron attachment: resolving a mystery in CO2[1] DANIEL SLAUGHTER, HIDEHITO ADANIYA, THOMAS RESCIGNO, DANIEL HAXTON, Lawrence Berkeley Lab, ANN OREL, University of California, Davis, C. WILLIAM MCCURDY, ALI BELKACEM, Lawrence Berkeley Lab, CHEMICAL SCIENCE DIVISION TEAM — We will report recent developments and experimental results of the dynamics of dissociative electron attachment (DEA) to CO2 by momentum imaging of the dissociating transient anion resonance. A 4-pi solid angle momentum spectrometer of the experimental apparatus, consisting of a pulsed electron beam, an electrostatic lens and a time-and position-sensitive detector, enables the measurement of the full 3D momentum distribution of dissociating negative ions. When combined with the spatial orientation of the incident electron, determined by ab initio theoretical methods, the ion momentum distribution yields a wealth of information relevant to the dynamical study of DEA. Recent experimental results for CO2 have confirmed the known three DEA resonances, leading to CO + O-, at 4.4, 8.2, 13.0 eV electron energies, where we have discovered unique momentum distributions specific to each resonance. Combining these experimental results with ab initio theoretical calculations, we have resolved a long standing misconception for the 8.2 eV and 4 eV resonances.

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