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Electron Collision Processes with Carbon Dioxide: Resolving Long-Standing Paradoxes[1] T.N. RESCIGNO, D.J. HAXTON, LBNL, C.W. MCCURDY, LBNL and UC Davis — The principal features of low-energy electron-CO_2 collisions have been known and studied for over forty years. The scattering is characterized by a rapid rise in the total cross section below 1 eV, anomalous threshold behavior for excitation of symmetric stretch and bending vibrational modes, resonant vibrational excitation near 4 eV with weak "boomerang" structure in the excitation cross sections and dissociative electron attachment cross sections leading to CO + O^- which peak near 4 eV and 8 eV and have angular distributions which show large deviations from axial recoil. The nuclear dynamics associated with all these features is intrinsically polyatomic in nature and cannot be described with one-dimensional models. The present study provides a consistent description of all these phenomena and resolves a number long-standing paradoxes and misconceptions found in the extant literature.

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