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Keplerian-Like Systems in the Dissociation of Polyatomic Ions[1]
B.J. JORDON-THADEN, O. YENEN, L.M. WIESE, D.H. JAECKS, University of Nebraska-Lincoln — In the dissociation of H_3^+ and D_3^+ measured in triple coincidence into the Coulomb interacting channels of H^++H^++H^- and D^++D^++D^-, the results exhibit unique features when scrutinized from a center-of-mass energy partitioning perspective. Starting from the Wannier concept of the reaction zone boundary, classical and molecular simulations of the three Coulomb interacting fragments were undertaken, with the goal of modeling the measured system energy partitioning. Starting from various configurations of dissociated H_3^+ and D_3^+, the simulations show that a bound H^+-H^- or D^+-D^- complex may form due to post-dissociation interactions. For short times these complexes exhibit classical Keplerian-like orbits with each fragment maintaining its original physical characteristics. In order to identify and explore the properties of the time development of the three-body system's center-of-mass energy partitioning, we use a generalized form of the Dalitz plot that highlights the time dependence of the three body correlations with which we can then relate to experimental results. Comparisons will be made between the experimental and theoretical results.

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