Abstract Submitted
for the DAMOP20 Meeting of
The American Physical Society

Observation of Discrete Total Center of Mass Frame Energies of H^+, H^+, H^- in the Three-Body Dissociation ofH_3^+[1] D. CALABRESE, Sierra College, D.H. JAECKS, L.M. WIESE, B. JORDON-THADEN, O. YENEN, University of Nebraska-Lincoln — We have measured the sum of center of mass (c.m.) frame kinetic energies of H+, H+ and H- from the collision induced three-body dissociation of $H_3^+$with He. This was accomplished by measuring the individual laboratory energies and scattering angles of the fragment ions that originate from a single excitation and dissociation event using triple coincidence techniques [1]. These quantities were then transformed into the frame of the fast-moving projectile. We find the rather startling result that the sum of projectile frame energies of the dissociation fragments, form discrete sets that are associated with the quantized rotational states of H_3^+. We also find that the observed sets are dominated by ortho states with angular momentum quantum numbers J=1,3,5, although para states are present. Additionally, our data reveal multiple sets of triple coincidence events that form patterns in the c.m. frame energy interval 4.5 eV to 10eV. We describe physical mechanisms that occur in the intermediate state of doubly excited H_3^+that produce these correlated sets. [1] L.M. Wiese, et al., Phys. Rev. Lett. 79, 1997 (4982).

[1]Work supported by the NSF.

Dominic Calabrese
Sierra College

Date submitted: 30 Jan 2020 Electronic form version 1.4