Abstract Submitted
for the GEC17 Meeting of
The American Physical Society

Fully Differential Study of Dissociative Capture and Coulomb explosion in p + H_2 Collisions BASU LAMICHHANE, MADHAV DHITAL, Missouri University of Science and Technology, THUSITHA ARTHANAYAKA, Columbia Astrophysics Laboratory, AHMAD HASAN, Dept. of Physics, UAE University, Al Ain, Abu Dhabi, UAE, KRISHNA KOIRALA, TREVOR VOSS, Missouri University of Science and Technology, RAMAZI LOMSADZE, Tbilisi State University, Tbilisi 0179, Georgia, MICHAEL SCHULZ, Missouri University of Science and Technology — We measured fully differential cross sections (FDCS) for dissociation due to capture and excitation to a repulsive state as well as Coulomb explosion due to double electron capture in p+H_2 collisions. FDCS were analyzed for various molecular orientations relative to the momentum transfer in the transverse direction (q_x) as a function of projectile scattering angle (θ_p). Two orientations parallel and perpendicular to q_x were analyzed. For the latter orientation two-center interference was identified. For the dissociative case, data were obtained for a range of kinetic energy releases (KER) from 5eV to 11eV. In this region the $2p\pi_u$ and the $2s\sigma_g$ states mainly contribute to dissociation. The interference pattern observed is consistent with the $2s\sigma_g$ state being dominant at large θ_p while at small θ_p both states contributes significantly. In double capture case, KER between 13eV to 27eV were selected since here only one channel (Coulomb explosion) contributes and the KER determines the inter-nuclear separation, the phase angle should be well determined. Nevertheless, the observed interference pattern is significantly less pronounced than for dissociation.

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Date submitted: 30 May 2017 Electronic form version 1.4