Abstract Submitted
for the GEC20 Meeting of
The American Physical Society

**Student Excellence Award Finalist: Ejected Electron-Energy and Angular Dependence of Fully Differential Ionization Cross Sections in Proton Collisions with He and $H_2$**[1] MADHAV DHITAL, SUJAN BASTOLA, AARON SILVUS, JACOB DAVIS, BASU LAMICHHANE, Missouri Univ of Sci Tech, ESAM ALI, Northwest Missouri State University, MARCELO CIAPPINA, ELI Beamlines, Prague, RAMAZ LOMSADZE, Tbilisi State University, AHMAD HASAN, UAE University, DON MADISON, MICHAEL SCHULZ, Missouri Univ of Sci Tech — We have measured fully momentum-analyzed recoil ions and scattered projectiles, produced in ionizing collisions between protons and He and $H_2$, in coincidence. The momentum of the ejected electron was then deduced from momentum conservation. From the data we extracted fully differential ionization cross sections (FDCS) for a large number of ejected electron energies ranging from well below to well above the projectile – electron velocity matching regime. Furthermore, for each electron energy data were obtained for four different projectile scattering angles. Various signatures of the post-collision interaction were identified in the electron energy- and angular dependence of the FDCS and systematically analyzed. The data were compared to two different, but conceptually very similar distorted wave calculations. This comparison demonstrates the limitations of perturbative models under conditions where the post-collision interaction is strong and thus the need for non-perturbative methods in order to advance our understanding of the underlying few-body dynamics. Furthermore, our results show that the post-collision interaction is surprisingly strong even for electrons not ejected in the forward direction.

[1]This work was supported by the National Science Foundation under grant no. PHY-1703109

Michael Schulz
Missouri Univ of Sci
Tech

Date submitted: 29 Sep 2020 Electronic form version 1.4