Four-Body **Charge**
Transfer Processes in proton-helium Collisions[1] UTTAM CHOWDHURY,
Missouri S&T, ALLISON HARRIS, Henderson State, JERRY PEACHER, DON
MADISON, Missouri S&T — Recent advancements in experimental techniques now
allow for the study of fully differential cross sections for four-body collisions. The
simplest four-body problem is a charged particle collision with a helium atom, in
which both atomic electrons change state. This type of collision can result in many
different outcomes, such as double excitation, excitation-ionization, double ioniza-
tion, transfer-excitation, transfer-ionization, and double charge transfer. Theoret-
ical fully differential cross sections will be presented and compared with absolute
experimental data for transfer-excitation and double charge transfer proton-helium
collisions. The model used is a fully quantum mechanical, first order perturbative
model that includes all relevant two particle interactions. Numerically, this requires
a full nine-dimensional integral, and is quite computationally expensive. The role of
different scattering mechanisms will be discussed.

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