

Abstract Submitted  
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**Double Ionization of Helium by Fast Proton Impact**<sup>1</sup> MATTHEW FOSTER, JAMES COLGAN, Los Alamos National Laboratory, Theoretical Division, MITCH PINDZOLA, Auburn University — We present total cross sections for single and double ionization of helium by various charged ion impact. A non-perturbative time-dependent close-coupling method (TDCC) has been developed to treat the correlated dynamics of ionized electrons by bare-ion impact. The two-electron helium wavefunction is subject to a time-dependent projectile interaction. The projectile-atom interaction is constructed as a multipole expansion that includes monopole, dipole, quadrupole, and octopole terms. For proton, antiproton, and alpha particle impact, good agreement is obtained between our calculations and experimental measurements of total single and double ionization cross sections. We will also report on our progress in using the TDCC method to extract differential cross sections for double ionization by fast protons.

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