Single and Double Ionization of Helium by Charged Ions M. FOS-
TER, J. COLGAN, Los Alamos National Laboratory, Theoretical Division, M.S.
PINDZOLA, F. ROBICHEAUX, Auburn University — We present total cross sec-
tions for single and double ionization of helium by various charged ion impact.
A non-perturbative time-dependent close-coupling method (TDCC) has been de-
veloped to treat the correlated dynamics of ionized electrons by bare-ion impact
[Journal of Physics B (accepted)]. The two-electron helium wavefunction is subject
to a time-dependent projectile interaction. The projectile-atom interaction is con-
structed 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 [Physical Review Letters 90, 243201 (2003)].

Lewis Foster
Los Alamos National Laboratory, Theoretical Division