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Total cross sections for transfer-ionization in fast ion-helium collisions ALEX GODUNOV, Department of Physics, Old Dominion University, Norfolk, VA 23529, USA, JIM MCGUIRE, Department of Physics, Tulane University, New Orleans, LA 70118, USA, V. SCHIPAKOV, Troitsk Institute for Innovation and Fusion Research, Troitsk, 142092, Russia, JAMES WALTERS, The Queen's University of Belfast, Belfast BT7 1NN, United Kingdom, COLM T. WHELAN, Department of Physics, Old Dominion University, Norfolk, VA 23529, USA — The effects of electron correlation and second order terms on theoretical total cross sections of transfer ionization in collisions of the helium atom with fast H^+, He^{2+}, and Li^{3+} ions are studied and reported. The total cross sections are calculated using highly correlated wave functions with expansion of the transition amplitude in the Born series through the second order. The allowance for electron correlation directly determines how closely theoretical calculations agree with experimental data. Second-order calculations with uncorrelated functions differ considerably from experimental data. The expansion of the transition amplitude in the Born series through the second order, and allowance for the "off-shell" terms and electron correlation result in calculations that are in sensible agreement with experimental data, including the v^{-b} dependence of the total cross sections.

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