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Importance of Different Interactions for Simultaneous Excitation-Ionization of Helium by Electron Impact A.L. HARRIS, M. FOSTER, J.L. PEACHER, D.H. MADISON, University of Missouri-Rolla, K. BARTSCHAT, Drake University — Fully differential cross sections (FDCS) for simultaneous excitation-ionization of helium by 500 eV electron-impact are examined using various theoretical models. In the first Born approximation-Hartree Fock (FBA-HF), the projectile electron is treated as a plane wave, and the ejected electron is treated as a static-exchange Hartree-Fock distorted wave. In the first Born approximation-R-Matrix (FBA-RM), the ejected electron is represented as a closed-coupling R-Matrix wavefunction which has an improved treatment of exchange between the ejected electrons and bound state electrons. In the six distorted wave (6DW) model, all two particle interactions are included on an equal footing. The unique feature of all of these calculations is the use of fully-correlated initial state wavefunctions, such as the Hylleraas or Pluvinage. The different theories are compared with experimental data, and agreement is best for higher ejected- electron energies and smaller scattering angles.

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