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Improved Potential for Distorted-Wave Electron-Impact Excitation Calculations CHRISTOPHER J. FONTES, ROBERT D. COWAN, GEORGE CSANAK, Los Alamos National Lab — Some first-order scattering theories, such as the distorted-wave approximation, permit a different potential when solving for the initial and final free-electron wavefunctions. Other methods, such as first-order many-body theory, allow only a single (initial) potential for the solution of both the initial and final continuum orbitals. In practice, however, numerical procedures have been developed whereby free-electron orbitals are considered to arise from each of the different configurations that comprise a level via configuration interaction (CI). This type of approach results in continuum orbitals that are computed from a different potential associated with each configuration, rather than from a single potential associated with the physical level in question. Our previous work on this subject considered a method for obtaining a single, consistent potential from a level that contains an arbitrary amount of CI. This approach has been implemented in the ACE collisional excitation computer code, which is part of the Los Alamos suite of atomic physics codes. Numerical results will be presented for electron-impact excitation cross sections between selected levels for a variety of atoms and ions in order to quantify the effect of this new approach and to investigate the conditions for which the aforementioned procedures are valid. This work was performed under the auspices of the US Department of Energy.

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