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The calculation of generalized oscillator strength densities of Argon by using an eigenchannel R-matrix method X. GAO, Beijing Comp. Sci. Res. Center, China, J.M. LI, Shanghai Jiao Tung U./Tsinghua U., China — Understanding the detailed dynamics of electron-ion interactions is of fundamental importance to various plasma applications in the fields of astrophysics, fusion energy researches and so on. Theoretical computations should play indispensable role to satisfy needs. Using our modified R-matrix code R-Eigen, we can directly calculate the short-range scattering matrices with good analytical properties in the whole energy regions, from which we can obtain all energy levels and the related scattering cross sections with accuracies comparable with spectroscopic precision. With the corresponding high-quality eigenchannel wavefunctions, various transition matrix elements can be readily calculated, such as the generalized oscillator strength densities (GOSD). The GOSD is directly related with the high-energy electron impact excitation cross sections. In eigenchannel representation, the GOSD curves of the excited states in an eigenchannel form a surface, which is a smooth function of the momentum transfers and the excitation energies. From such smooth GOSDs, we can obtain the generalized oscillator strength of any specific excited state through multichannel quantum defect theory, e.g. infinite Rydberg(including strongly perturbed one), autoionization and continuum states. As an example, we will present our recent calculation results of Ar, which are in good agreement with available benchmark experiments.

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