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Channel-coupling and second-order effects in electron-impact excitation of Ar(3p) and Ar(3s)[1] KLAUS BARTSCHAT, OLEG VOROV, Drake University — Recent experimental studies for electron-impact ionization of argon [1-3] have revealed major problems with numerical approaches, in which the projectile and the ejected electron are described by distorted waves, exchange effects are neglected or approximated by local potentials, and single-configuration descriptions of the initial bound state and the final ionic state are used. We have further developed a hybrid method [4-6], in which the interaction between a "fast" projectile and the target is still described perturbatively, up to second-order, while the ejected-electron–residual ion interaction is treated by an R-matrix (close-coupling) expansion. This guarantees a proper description of exchange effects for the "slow" electron, and it also allows for the use of multi-configuration initial and final target states. The sensitivity of theoretical predictions on the details of the collision model are discussed.

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