

Abstract Submitted
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New level-resolved collision data for neutral argon, benchmarked against the ALEXIS and CTH plasma experiments¹ N. IVAN ARNOLD, STUART LOCH, Auburn University, CONNOR BALLANCE, Queen's University Belfast, ED THOMAS, Auburn University — Performing spectroscopic measurements of emission lines in cool laboratory plasmas is challenging because the plasma is often neutral-dominated and not in thermal equilibrium. The densities and temperatures are such that coronal models do not apply; meaning that generalized collisional-radiative (GCR) methods must be employed to theoretically analyze the spectral emission. We use existing atomic physics codes to calculate excitation, recombination and ionization atomic data for neutral and low charge states of argon. For the excitation data we compare with previously published theoretical cross sections and experimental optical emission cross sections. We highlight expected differences in the ionization balance due to the new dielectronic recombination data. We also compare synthetic spectra generated from our data with observations taken from the Auburn Linear Experiment for Instability Studies (ALEXIS) and the Compact Toroidal Hybrid (CTH) experiments.

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