

Abstract Submitted
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Argon neutral LIF measurements are consistent with no energetic electron population AMY KEESEE, EARL SCIME, West Virginia University — Most studies in plasma physics are devoted to studying the ions and electrons that make up plasma. However, any plasma that is not 100% ionized will interact with the neutral gas present in the experiment. Understanding these neutrals can help us better understand plasma characteristics and how neutrals affect the plasma. Measurement of the neutral atoms is available with spectroscopic diagnostics such as laser-induced fluorescence (LIF) and passive emission spectroscopy of neutral lines. However, these measurements apply to an excited neutral atom state, rather than the entire neutral population. A collisional-radiative model describes the relationship between densities of the excited states, given electron densities and energy distributions. Using electron data obtained via Langmuir probe measurements, a collisional-radiative model code is used to compare radial profiles of theoretical excited state densities to those measured experimentally with LIF and passive emission spectroscopy in a helicon source with argon gas. The CR model radial neutral density and electron distribution function profiles can be varied to obtain the best comparison with experimental data. For plasma in helicon mode, the model results best match the experimental data when the radial neutral profile is hollow and electron population consists of a single Maxwellian electron distribution with no energetic electron population.

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