

Abstract Submitted
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Inference of Neutral Depletion in the Large Plasma Device¹ KYLE CALLAHAN, TROY CARTER, BYONGHOON SEO, STEVE VINCENA, University of California, Los Angeles — Quantification of neutral particle populations within a plasma is of strong importance because they can influence particle flux and energy confinement through charge exchange and impact ionization, leading to fast ion losses and decreased energy confinement. The direct measurement of neutral particle density however has proven elusive, often necessitating complex and costly experimental measurement techniques such as laser induced fluorescence and charge exchange spectroscopy. An alternative line-ratio spectroscopy-based measurement technique has been studied both experimentally and theoretically to determine the neutral density content in Helium plasma experiments on the Large Plasma Device. Considerations taken when modeling plasma emission involve non-Maxwellian collisional radiative modeling, predicting the opacity of line-integrated measurements through Beer's law, and modeling plasma ionization rates and transport to determine neutral density evolution with time.

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