

Abstract Submitted
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Optical Emission Spectroscopy in an Unmagnetized Plasma JASON MILHONE, University of Wisconsin, Madison, CHRISTOPHER COOPER, General Atomics, VICTOR DESANGLES, Universite de Lyon, MARK NORBERG, BLAIR SEIDLITZ, CARY FOREST, University of Wisconsin, Madison, WIPAL TEAM — An optical emission spectroscopic analysis has been developed to measure electron temperature, neutral burnout, and Z_{eff} in Ar and He plasmas in the Wisconsin plasma astrophysics laboratory (WiPAL). The WiPAL vacuum chamber is a 3 meter diameter spherical vessel lined with 3000 SmCo permanent magnets ($B > 3$ kG) that create an axisymmetric multi-cusp ring for confining the plasma. WiPAL is designed to study unmagnetized plasmas that are hot ($T_e > 10$ eV), dense ($n_e > 10^{18}$), and with high ionization fraction. Electron temperature and density can be measured via Langmuir probes. However, probes can disturb the plasma, be difficult to interpret, and become damaged by large heat loads from the plasma. A low cost non-invasive spectroscopy system capable of scanning the plasma via a linear stage has been installed to study plasma properties. From the neutral particle emission, the neutral burnout and estimated neutral temperature can be inferred. A modified coronal model with metastable states is being implemented to determine T_e for Ar plasmas.

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