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Spectroscopic Diagnosis of a Dense Hydrogen Plasma Source[1]
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— Diagnosing an energetic dense plasma source is a unique challenge. A hydrogen discharge in a helicon source has been studied by coupling spectroscopic measurements with a Collisional Radiative model to produce a series of measurements of the plasma, without the complication of exposing a probe to the degrading plasma environment or measurement perturbing magnetic field and RF fields. This plasma diagnosis yielded an electron temperature on the order of 5 eV and electron density in the high 10^{11} cm^{-3} range. The hydrogen gas atomic to molecular ratio was measured between 10 and 27, and the gas temperature was measured by analyzing molecular line emission and found to be on the order of 500K. These results will be useful both in comparing the studied helicon with contemporary helicon sources, and optimizing ion current extraction for use in an Inertial Electrical Confinement fusion device.

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