

Abstract Submitted  
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**A comparison of laser induced fluorescence and continuous wave ring down spectroscopy IVDF measurements in an argon helicon plasma**  
DUSTIN MCCARREN, SAIKAT CHAKRABORTY THAKUR, JERRY CARR JR., MATTHEW GALANTE, ALEX HANSEN, EARL SCIME, West Virginia University — In this work, we compare two spectroscopic methods for measuring the ion velocity distribution functions (IVDF) in an argon helicon plasma: laser induced fluorescence (LIF) and continuous wave cavity ring down spectroscopy (CW-CRDS). An established and powerful technique, LIF suffers from a requirement that the initial state of the LIF sequence have a substantial density. In most cases, this requirement limits LIF to ions and atoms with large metastable state densities for the given plasma conditions. CW-CRDS is considerably more sensitive than LIF and can potentially be applied to much lower density populations of ion and atom states. CRDS is a line integrated technique without the spatial resolution of LIF. CRDS is a proven, ultra-sensitive, cavity enhanced absorption spectroscopy technique and when combined with a CW diode laser that has a sufficiently narrow linewidth, the Doppler broadened absorption line, i.e., the IVDF, can be measured. We will present CW-CRDS and LIF measurements of the IVDF in argon using the 668.614 nm (in vacuum) line of Ar II.

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