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Ion Velocity Distribution Functions in a Compact, Expanding, Helicon Plasma DANIEL LEWIS, ALEXANDER HANSEN, EARL SCIME, West Virginia University Department of Physics — Previous laser induced fluorescence (LIF) measurements of ion velocity distribution functions in a compact, expanding helicon plasma were limited by the available laser power and optical access [*Keesee et al.*, Phys. Plasmas **12**, 093502 (2005)]. Here we present LIF measurements of the ivdf in argon plasmas in the CHEWIE compact helicon source as a function of fill pressure, source magnetic field, and partial pressure of argon. The LIF measurements were accomplished with a ring dye laser tuned to 611.662 nm (vacuum wavelength) to pump the Ar II $3d^2\mathrm{G}_{9/2}$ metastable state to the $4p^2\mathrm{F}_{7/2}$ state and observing the fluorescent emission at 460.96 nm photons. RF power up to 600 W is used to create a steady state plasma in the 12 cm long, 6 cm diameter Pyrex source chamber. One end of the source chamber is connected to a 30 cm long, 15 cm diameter expansion chamber. The magnetic field strength ranges from 0 to 850 Gauss. We will present measurements of argon ivdfs for gas flow rates of 10, 20, 30 sccm at constant rf power and magnetic field.

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