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Flow, flow shear, and related profiles in helicon plasmas EARL SCIME, ROBERT HARDIN, AMY KEESEE, West Virginia University, COSTEL BILOIU, Varian Associates, XUAN SUN, Los Alamos National Laboratory — Measurements of the three-dimensional ion flow field and the ion temperature in a cross section of a cylindrical, argon, helicon plasma are presented. When combined with radially resolved measurements of the plasma density, electron temperature, neutral density and neutral temperature, the radial profiles of the ion viscosity and ion-neutral momentum transfer rate can be calculated. The ion viscosity and ion-neutral momentum transfer rate profiles are important input parameters for theoretical models of azimuthal flows arising from the nonlinear interaction of drift waves in helicon sources. The experimentally determined magnitudes and radial profiles reported in this work are significantly different than those used in recent theoretical studies. Measurements of the radial flow of argon neutrals and helium neutrals are also presented for a helicon plasma.

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