

Abstract Submitted
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Spatially-resolved spectroscopic measurements of plasma rotation in MCX* J. GHOSH, A. CASE, R.F. ELLIS, R.C. ELTON, H.R. GRIEM, A. HAS-SAM, R. LUNSFORD, C. TEODORESCU, University of Maryland, College Park, MD 20742 — Earlier spectroscopic measurements [1] of averaged plasma rotation velocities on the Maryland Centrifugal Experiment (MCX) have been supplemented to include radial resolution with a five-channel fiber-optic collection system. Detailed information from each view is made possible by an 8X increase in spectral resolution, using a 2-m spectrograph and a 2400/mm grating. Inversion of the integrated chordal emissions into a radial dependence are performed by two methods: (a) an iterative comparison of the measured emissions with a summation of assumed emissions in five concentric zones, and (b) a combination of Abel-like matrices inversions [2]. Preliminary results show mean velocities of 45 +/-10 km/sec for both C+ and C++ ions. A major advance is the measurement of a radial shear in rotational velocity as large as 9 km/sec/cm, which is in the range theoretically predicted to achieve MHD stability. Also determined is a radial distribution of carbon ions, indicating a dominant location near the central core. Supporting spatially-resolved values for electron density are derived from the Stark widths of hydrogen Balmer-series spectral lines. *Sponsored by DoE. [1] J.Ghosh, et al., Phys. of Plasmas v.11, p. 3813 (2004). [2] R.Bell, Rev. Sci. Inst. v.86, p. 558 (1995); v. 68, p. 1273 (1997).

Raymond Elton
University of Maryland

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