

Abstract Submitted
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Potential and Flow Profiles and Fluctuation Dynamics in a Large Scale Helicon Plasma With Electrode Biasing¹ ALAN LYNN, SHUANGWEI XIE, TIFFANY HAYES, MARK GILMORE, LINCAN YAN, ANDREW SANCHEZ, University of New Mexico — Experiments utilizing two sets of biased electrodes to affect the velocity flow shear in the linear HelCat device are described. HelCat (Helicon-Cathode) is a 4 m long, 50 cm diameter experiment. A grid electrode was placed at the source end of the experiment (~ 7 cm in front of the helicon antenna) and biased with respect to the vacuum chamber wall, while a set of concentric ring electrodes terminated the plasma column at the far end and was biased in various ways. Flow profiles exhibit complicated changes with bias in both the azimuthal and parallel directions. Drift fluctuations can be partially or fully suppressed by biasing. During the onset of suppression, the fluctuations exhibit complicated dynamics, which can be chaotic or more dynamically complex, and involve turbulent transport, density gradients, azimuthal flows and neutral collisionality. Additionally, an axial return flow toward the source is observed which appears to be driven by neutral damping and a stress tensor coupling.

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