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Effects of Electrode Biasing and Sheared Magnetic Field on Edge Fluctuations in a Linear Plasma Device[1] M. GILMORE, T.R. HAYES, J. PLANK, University of New Mexico — A study of the effects of electrode biasing and magnetic field strength, B, and topology on edge fluctuations is being conducted in the linear HelCat (Helicon-Cathode) device. Two types of electrodes have been utilized - a set of concentric rings that terminate the plasma, and a semitransparent grid near the source. It is found that drift fluctuations can be reduced, or even fully suppressed, by biasing either electrode with respect to the wall, whereas biasing between the rings & grid to drive parallel current has no effect. The dynamics of fluctuations transition non-monotonically from coherent at low B to turbulent at high B, with some fields showing no fluctuations, while others show clear evidence of chaos. The bias voltage required to affect the dynamics of the fluctuations, including full suppression, also varies non-monotonically with B. High ($\sim$ 10–15xTe) grid bias is found to cause $\sim$ 100% density fluctuations across the entire plasma (except in the source region) on a time scale $\sim$ 10L/Cs, which may be due to a bistable potential profile in the presence of an electron sheath. Additionally, a single turn coil is being installed on axis to generate magnetic shear. Preliminary results on the effects of shear source operation and on fluctuation dynamics will be presented.

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