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A Study of Biasing and Magnetic Field on Intrinsic Fluctuations in a Linear Plasma Device TIFFANY HAYES, MARK GILMORE, JOSH PLANK, University of New Mexico — Biasing experiments are currently being conducted in the linear Helicon-Cathode (HelCat) Device. Using a set of concentric electrode rings, biasing is used to suppress intrinsic drift fluctuations. It is seen that the fluctuation magnitude is strongly dependent on the magnetic field strength, B. Depending on the magnetic field, modes with varying m numbers are observed, and at high B, fluctuations are turbulent. The change from coherent at low field, to turbulent at high field, is non-monotonic. At some B-field strengths, no instability exists, while chaos is observed at others. With the change in magnetic field, and fluctuation amplitude, the bias needed to affect the instability also changes. At a low B, a bias of approximately $3T_e$ is sufficient to suppress fluctuations, whereas at B, $40T_e$ or greater bias is needed to have an effect. Additionally, biasing has been performed using a semitransparent grid electrode near the source. A grid bias $\sim$ 10-15 T_e causes the plasma to develop large scale ($\sim$ 100%) fluctuations in both density and potential across the entire plasma column on a timescale $\sim$ 10L/cs. This plasma collapse and rebound may indicate the presence of a bistable potential profile. Experimental results and 1D simulations will be presented.

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