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Nonlinear Dynamics under Applied Electrical Field at Magnetized Laboratory Plasma Edge[1] SHUANGWEI XIE, MARK GILMORE, CHRISTOPHER WATTS, LINCAN YAN, University of New Mexico — Experiments conducted on a linear helicon plasma (HelCat) device shows evidence of drift wave instability fluctuations, which are suppressed when an increased positive DC electric potential is applied perpendicular to the magnetic field. Simultaneously, a new K-H instability appears, and deterministic chaos also can be observed during this transaction. Measurements show both axial and azimuthal flow speed, as well as Reynolds stress change under the effect of E×B flow shear caused by this external disturbance. When neutral gas pressure is increased during the process, the suppression, requires a higher DC bias, and the K-H transition is not observed. From axial flow measurements, a possible mechanism is suggested from the reduced flow speed which may caused by increased collisions between charged particles and neutrals. Two simple models are presented to predict neutral change with increased gas pressure.

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