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Nonlinear Dynamics of Fluctuations in the Presence of Sheared Flows in a Magnetized Laboratory Plasma[1] M. GILMORE, L. YAN, S. XIE, C. WATTS, University of New Mexico — Velocity shear is known to play an important role in the stability threshold of drift modes, as well as the suppression of drift turbulence, in both fusion and space plasmas. In addition, shear can destabilize modes such as Kelvin-Helmholtz (K-H). A set of laboratory experiments is described which utilize a set of concentric bias rings to affect the velocity (flow) shear in a linear device. With increasing ring bias, relative to the vacuum chamber wall, it is found that both axial and azimuthal flow shear change by only a small amount in magnitude, but move inward to the plasma core from the wall. As bias is increased, drift waves decrease in magnitude and are eventually fully suppressed, then the K-H mode is destabilized. While bias applied to rings at any radii suppresses drift fluctuations with nearly equal effectiveness, the K-H mode is more easily excited by biasing at the plasma edge. Fluctuations show increasingly chaotic and intermittent behavior as bias increases, up to V $\sim$ 10kTe/e, when the chaos disappears, as indicated by a rapid drop in correlation dimension. Experimental results and comparisons with theory are described.

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