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Laboratory Investigation of the Dynamics of Shear Flows in a Plasma Boundary Layer[1] AMI DUBOIS, EDWARD THOMAS, Auburn University, WILLIAM AMATUCCI, GURUDAS GANGULI, Naval Research Laboratory — For a wide variety of laboratory and space plasma environments, theoretical predictions state that plasmas are unstable to transverse and parallel inhomogeneous flows over a very broad frequency range. Specifically, for a velocity shear oriented perpendicular to a uniform background magnetic field, the shear scale length (L_E) compared to the ion gyro-radius (ρ_i) determines the character of the shear driven instability that may prevail. An interpenetrating plasma configuration is used to create a transverse velocity shear profile in a magnetized plasma column. For the first time, the continuous variation of ρ_i/L_E, and the associated transition of the instability regimes driven by the shear flow mechanism, is demonstrated in a single laboratory experiment under identical plasma conditions. This work characterizes the compression/relaxation of boundary layers often generated in a variety of space plasma processes.

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