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Transitions to Turbulence in an Electromagnetically-Driven 2D Fluid[1] LOGAN KAGEORGE, Georgia Inst of Tech, JEFFREY TITHOF, University of Rochester, BALACHANDRA SURI, RAVI PALLANTLA, ROMAN GRIGORIEV, MICHAEL SCHATZ, Georgia Inst of Tech — We present an experimental and numerical analysis of the transition to turbulence for a quasi-two-dimensional liquid. Our system is a Kolmogorov-like flow, realized as a Lorentz-forced thin fluid layer, which exhibits shearing-induced vortex pattern formation. The system dynamics are quantified using particle image velocimetry to create time-resolved velocity fields. We focus on the series of bifurcations leading to spatiotemporally chaotic behavior and quantitatively compare these results with simulations of an identical system to adjust system-specific parameters in accordance with first-principle modifications to the Navier-Stokes equations.

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