Abstract Submitted
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Characterization of shear turbulence in Keplerian systems[1] ZOE YAN, Princeton Plasma Physics Laboratory — The process by which astrophysical Keplerian disks transport angular momentum is not well understood. Cool protoplanetary disks may not be sufficiently ionized for magneto-hydrodynamic forces to assist accretion and prompts the question of whether a hydrodynamic pathway for angular momentum transport is possible. The Hydrodynamic Turbulence Experiment studies turbulence evolution in differentially rotating systems. Ekman effects are mitigated by controlling the axial boundary conditions with rings which rotate independently of the inner and outer cylinders. Azimuthal and radial velocities are measured locally using a Laser Doppler Velocimetry diagnostic. Turbulence decay time-scales and Reynolds stress were inferred from these measurements. The interaction of turbulence and rotation is probed by forcing perturbations from a set of configurable jets mounted on the inner cylinder. In all cases examined, the turbulence dies away exponentially, suggesting that at least for the perturbation amplitudes achieved, no subcritical transition exists in these systems. Lifetimes of turbulent states will be presented as a function of the dimensionless shear.

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