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Transient turbulence in beta-plane and quasi-Keplerian Taylor-Couette flows E.M. EDLUND, E. CHERTKOV, E.P. GILSON, H. JI, Princeton Plasma Physics Laboratory — The transfer of energy between small-scale turbulent structures and large-scale flows and waves in the presence of gradients of potential vorticity is thought to be central to the regulation of angular momentum transport in accretion disks and energy transport in tokamak plasmas. Experiments conducted at PPPL in the HTX device, a modified Taylor-Couette apparatus, explore the connections between potential vorticity and turbulent transport through two different types of studies. In the first, quasi-Keplerian rotation is established and then perturbed by an array of jets mounted on the inner cylinder to test the stability of these flows with respect to a subcritical transition to turbulence. In the second, sloped axial boundaries impose a gradient in potential vorticity under solid body rotation. Turbulent fluctuations are then introduced by the jets and the temporal evolution of the flows is observed. Recent results from these studies will be presented with commentary on the implications for transport in accretion disks and tokamak plasmas.

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