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Angular Momentum Transport in Accretion Flows¹

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Accretion disks are central to astrophysical phenomena ranging from planets to black holes and quasars. They can be powerful energy sources: quasar disks convert rest mass to radiant energy more efficiently than fusion. Accretion requires a mechanism to dissipate orbital energy. Evidence that the mechanism is MHD turbulence driven by magnetorotational instability (MRI) is summarized, and the drawbacks of alternative mechanisms are briefly discussed. Despite theoretical and numerical advances, fundamental questions about MRI remain open: in particular, mechanisms of saturation, tolerance of non-ideal MHD effects, and relevance to magnetic dynamos. The prospects for addressing these questions through laboratory experiments is assessed.

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