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Regimes of Turbulent Rotating COnvection ERIC KING, JONATHAN AURNOU — Heat transport by thermal turbulence has been of interest to the fluid dynamics community for decades. Furthermore, turbulent convective motions are responsible for many of the observed features of planets and stars, such as magnetic field generation and atmospheric jet formation. In these flows, the influence of background rotation through the Coriolis force is thought to be paramount. We present an examination of the importance of rotation in turbulent Rayleigh-Bénard convection through heat transfer measurements in a collaborative suite of laboratory experiments and numerical simulations. There exist two separate heat transfer regimes: rapidly rotating and non-rotating. We argue that the dynamical regime of a given convection system is determined by the competition between the thermal boundary layer and the Ekman boundary layer. This boundary layer control hypothesis permits the formulation of a predictive scaling of the transition between heat transfer regimes, and reconciles a broad array of previously disparate convection studies. The experimental results are also shown to apply to numerical models of planetary dynamos.

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