Abstract Submitted
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Probing Regimes and Transitions in Rapidly Rotating Rayleigh-Bnard Convection[1] MATTEO MADONIA, JONATHAN CHENG, ANDRS AGUIRRE-GUZMN, HERMAN CLERCX, RUDIE KUNNEN, Eindhoven University of Technology — Rayleigh-Bnard convection and rapidly rotating flows are two topics that have been frequently explored by fluid dynamicists; the former is driven by buoyancy and the latter is dominated by the Coriolis force. The interiors of many celestial bodies (e. g. Earths outer core, Jupiters atmosphere) consist of fluids that experience these two effects simultaneously at extreme values of the governing parameters, known as the geostrophic regime. Our setup TROCONVEX is able to investigate a far broader range of parameter space than previous studies by using a variety of tank heights up to 4 m tall, allowing us to explore the geostrophic regime in unprecedented detail and check predictions from asymptotic theories. Here we present heat transfer results, derived from temperature measurements from different states of the geostrophic regime. Various power-law scaling ranges between the governing parameters can be inferred, indicating that different flow morphologies are anticipated. With temperature measurements in the sidewall we plot temperature profiles of the different cases and more clearly distinguish these transitions based on the vertical temperature gradient at mid-height. Rescaled parameters show universality of such transitions.

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