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**Tuning transitions in rotating Rayleigh-Bénard convection**[1]
PRANAV JOSHI, RUDIE KUNNEN, HERMAN CLERCX, Technische Universiteit Eindhoven — Turbulent rotating Rayleigh-Bénard convection, depending on the system parameters, exhibits multiple flow states and transitions between them. The present experimental study aims to control the transitions between the flow regimes, and hence the system heat transfer characteristics, by introducing particles in the flow. We inject near-neutrally buoyant silver coated hollow ceramic spheres ($\sim$100 micron diameter) and measure the system response, i.e. the Nusselt number, at different particle concentrations and rotation rates. Both for rotating and non-rotating cases, most of the particles settle on the top and bottom plates in a few hours following injection. This rapid settling may be a result of "trapping" of particles in the laminar boundary layers at the horizontal walls. These particle layers on the heat-transfer surfaces reduce their effective conductivity, and consequently, lower the heat transfer rate. We calculate the effective system parameters by estimating, and accounting for, the temperature drop across the particle layers. Preliminary analysis suggests that the thermal resistance of the particle layers may affect the flow structure and delay the transition to the "geostrophic" regime.

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