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Heat Transfer in Turbulent Rotating Convection H.J.H. CLERCX[1], TU/e, UT, R.P.J. KUNNEN, TU/e, B.J. GEURTS[2], TU/e, UT — Rayleigh-Bénard convection is a classical problem in which a fluid layer enclosed between two parallel horizontal walls is heated from below. In a rotating frame of reference the dynamics can change considerably through the fundamental involvement of a combination of buoyancy and Coriolis forces. The rotating Rayleigh-Bénard (RRB) setting is important for many applications, e.g., in engineering and climate modelling. Direct numerical simulation (DNS) is used to calculate the heat transfer at systematically varied rotation rates. The DNS code solves the incompressible Navier-Stokes equations in a rotating frame of reference, coupled to the heat equation within the Boussinesq approximation. Periodic boundary conditions are adopted in the horizontal directions and the vertical boundaries are treated as isothermal, no-slip walls. The velocity and temperature averages from this DNS will be compared to measurements in a water-filled cylindrical convection cell. Detailed velocity and temperature data will be obtained using stereoscopic particle image velocimetry and laser induced fluorescence, respectively.

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