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Flow anisotropy in rotating buoyancy-driven turbulence HADI RAJAEI, KIM ALARDS, RUDIE KUNNEN, FEDERICO TOSCHI, HERMAN CLERCX, Eindhoven Univ of Tech — We report a combined experimental–numerical study of the effects of background rotation on large- and small-scale isotropy in rotating Rayleigh–Benard convection (RBC) from both Eulerian and Lagrangian points of view. 3D particle tracking velocimetry (3D-PTV) and direct numerical simulations (DNS) are employed at three different heights within the cylindrical cell. The Lagrangian velocity fluctuation is utilized to evaluate the large-scale isotropy for different rotation rates. Furthermore, we examine the experimental measurements of the Lagrangian acceleration of neutrally buoyant particles and the second-order Eulerian structure function to evaluate the small-scale isotropy as a function of rotation rate. It is found that background rotation enhances large-scale anisotropy at the cell center and close to the top plate, while decreases it at intermediate height. The large-scale anisotropy, induced by rotation, has negligible effect on the small scales at the cell center, whereas the small scales remain anisotropic close to the top plate.

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