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Acceleration Statistics in Rotating and Sheared Turbulence FRANK JACOBITZ, University of San Diego, KAI SCHNEIDER, Aix-Marseille Université, WOUTER BOS, Ecole Centrale de Lyon, MARIE FARGE, Ecole Normale Supérieure — Acceleration statistics are of fundamental interest in turbulence ranging from theoretical questions to modeling of dispersion processes. Direct numerical simulations of sheared and rotating homogeneous turbulence are performed with different ratios of Coriolis parameter to shear rate. The statistics of Lagrangian and Eulerian acceleration are studied with a particular focus on the influence of the rotation ratio and also on the scale dependence of the statistics. The probability density functions (pdfs) of both Lagrangian and Eulerian acceleration show a strong and similar influence on the rotation ratio. The flatness further quantifies its influence and yields values close to three for strong rotation. For moderate and vanishing rotation, the flatness of the Eulerian acceleration is larger than that of the Lagrangian acceleration, contrary to previous results for isotropic turbulence. A wavelet-based scale-dependent analysis shows that the flatness of both Eulerian and Lagrangian acceleration increases as scale decreases. For strong rotation, the Eulerian acceleration is more intermittent than the Lagrangian acceleration, while the opposite result is obtained for moderate rotation.

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