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Anisotropy properties and geometrical scale-dependent statistics of sheared and rotating turbulence FRANK JACOBITZ, Mechanical Engineering Program, University of San Diego, San Diego, CA, USA, KAI SCHNEIDER, M2P2-CNRS & CMI, Aix-Marseille University, Marseille, France, WOUTER BOS, LMFA-CNRS, Ecole Centrale de Lyon, University of Lyon, Ecully, France, MARIE FARGE, LMD-IPSL-CNRS, Ecole Normale Superieure, Paris, France — The anisotropy properties of homogeneous turbulence with mean shear and system rotation are studied using both conventional and wavelet-based anisotropy measures. The study is based on a series of nine direct numerical simulations in which the rotation ratio f/S of Coriolis parameter to shear rate is varied. The presence of rotation stabilizes the flow, except for a narrow range of rotation ratios $0 < f/S < 1$. The main mechanism for the destabilization is an increased turbulence production due to increased anisotropy. This anisotropy at large and small scales is quantified by applying conventional measures, such as the Reynolds stress and the dissipation rate anisotropy tensors, respectively. Recently introduced directional wavelet based measures are also applied and compared with the classical ones.

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