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Geometrical statistics of the vorticity vector in rotating turbulence HERMAN J.H. CLERCX, Phys. Department, Eindhoven University of Technology, Eindhoven, The Netherlands, LORENZO DEL CASTELLO, CNR, UOS Sapienza, Roma, Italy — We report results on the geometrical statistics of the vorticity vector obtained from particle tracking experiments in electromagnetically forced rotating turbulence. A range of rotation rates is considered, from non-rotating to rapidly rotating turbulence. Based on the full set of velocity derivatives, measured in a Lagrangian way by 3D Particle Tracking Velocimetry, we have been able to quantify statistically the effect of system rotation on several flow properties. We have studied the orientation of the vorticity vector with respect to the three eigenvectors of the local strain rate tensor and with respect to the vortex stretching vector. Additionally, we have quantified the role of system rotation on the self-amplification terms of the enstrophy and strain rate equations and the direct contribution of the background rotation on these evolution equations. The main effect of background rotation is the strong reduction of extreme events and related (strong) reduction of the skewness of PDFs of several quantities such as, for example, the intermediate eigenvalue of the strain rate tensor and the enstrophy self-amplification term. These results reflect the two-dimensionalisation of the flow at the highest rotation rates.

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