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Lagrangian velocity, acceleration and vorticity autocorrelations in rotating turbulence HERMAN J.H. CLERCX, LORENZO DEL CASTELLO, Eindhoven University of Technology — The influence of the Earth background rotation on oceanic and atmospheric currents, as well as the effects of a rapid rotation on the flow inside industrial machineries like mixers, turbines, and compressors, are typical examples of fluid flows affected by rotation. Rotating turbulence has often been studied by means of numerical simulations and analytical models, but the experimental data available is scarce and purely of Eulerian nature. In the present study, experiments on continuously forced turbulence subjected to different background rotation rates are performed by means of 3D Particle Tracking Velocimetry. The data collected is processed in the Lagrangian frame, as well as in the Eulerian one. The background rotation is confirmed to induce 2-dimensionalisation of the velocity field, and the large-scales are dominated by stable counter-rotating vertical tubes of vorticity. The auto- correlation coefficients along particle trajectories of velocity, acceleration and vorticity components have been explored, and in this talk the effects of rotation on the Lagrangian temporal scales of the flow will be discussed.

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