Temporal correlations along particles' trajectories in turbulent flows FEDERICO TOSCHI, IAC-CNR, Roma, Italy, ROBERTO BENZI, LUCA BIFERALE, University of Tor Vergata, Rome, Italy, ENRICO CALZAVARINI, ENS-Lyon, France, DETLEF LOHSE, University of Twente, The Netherlands, AN-DREA SCAGLIARINI, University of Tor Vergata, Rome, Italy — Inertial particles advected by turbulent flows are characterized by preferential concentration in space and non trivial temporal correlations, as a response to fluctuations of the advecting turbulent velocity field. An important open problem deals with the possibility to statistically relate fluid to particles' properties. We analyze a numerical database from Direct Numerical Simulations of fluid tracers and of heavy/light inertial particles at medium and high-resolutions ($Re_\lambda \simeq 180$ and $\simeq 380$). We present results on the temporal autocorrelation of fluid velocity gradients along particles trajectories, also in the form of a Lagrangian version of the Refined Kolmogorov Similarity Hypothesis (LRKSH) for neutral, heavy and light particles. We use multiparticle correlations to extract information on the statistical properties of the advecting turbulent flow.

Federico Toschi
IAC-CNR, Roma, Italy

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