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Light Particles in Turbulence: acceleration statistics JULIAN MARTINEZ MERCADO, VIVEK NAGENDRA PRAKASH, YOSHIYUKI TAGAWA, CHAO SUN, DETLEF LOHSE, Physics of Fluids Group, University of Twente — Three-dimensional Lagrangian Particle Tracking experiments are used to study acceleration statistics of light particles ($\beta = 3\rho_f/(\rho_f + 2\rho_p) = 3$) in isotropic turbulence. Microbubbles of size comparable to Kolmogorov's lengthscale are injected in a turbulent water channel. By varying Re we study the effect of changing the turbulent lengthscale on the statistics for a fixed particle size. We compare our results with previous experimental and numerical data on particles in turbulence. We find that acceleration PDFs show stretched exponential tails, the shape being independent of Re. The acceleration autocorrelation shows that light particles decorrelate faster than tracer or heavy particles. The correlation drops rapidly to zero in less than one Kolmogorov's timescale. The decorrelation time increases with Re. This trend is in agreement with previous experimental data for different flows and with numerical simulations.

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