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Lagrangian statistics of light particles in turbulence VIVEK N. PRAKASH, JULIAN MARTINEZ MERCADO, YOSHIYUKI TAGAWA, CHAO SUN, DETLEF LOHSE, Physics of Fluids Group, University of Twente — We study the Lagrangian velocity and acceleration statistics of light particles (bubbles in water) in homogeneous and isotropic turbulence. Bubbles of size comparable to the Kolmogorov length scale (Stokes numbers $\approx$ O(0.01)) are dispersed in a turbulent water tunnel operated at Taylor Reynolds numbers Re_λ ranging from 130 to 260. The bubble trajectories are experimentally captured using the three-dimensional Lagrangian Particle Tracking technique. The bubble acceleration PDFs are found to be highly intermittent with flatness values around 23-30. We study the dependence of the velocity and acceleration statistics (PDFs and autocorrelation functions) on Re_λ and compare our results to those from point-particle DNS and other experiments. We also present our latest results on the Lagrangian statistics of finite-size inertial bubbles (size $\approx$ 2-4 mm and St $\approx$ O(1)).

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