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Light particles in turbulence: velocity statistics VIVEK NAGENDRA PRAKASH, JULIAN MARTINEZ MERCADO, YOSHIYUKI TAGAWA, CHAO SUN, DETLEF LOHSE, Physics of Fluids Group, University of Twente — We conduct experiments to study light particles in turbulence using Particle Tracking Velocimetry (PTV) in three-dimensions. Microbubbles are dispersed in a homogenous and isotropic turbulent flow in the Twente water tunnel. The size of the microbubbles is fixed and is comparable to the Kolmogorov length scale of the flow. The Lagrangian velocity statistics of the microbubbles are obtained from the trajectories captured using PTV. The velocity statistics (PDF, autocorrelation and structure functions) of microbubbles are studied at different Re and compared with previous experiments and numerics for particles in turbulence. The velocity PDF of the 3 velocity components (x, y and z) show a robust gaussian profile (independent of Re) with flatness values between 2.74 to 3.25. We calculate the velocity autocorrelation and find that the decorrelation time increases with increasing Re . We also calculate the second and fourth - order velocity structure functions and find a reasonable agreement with previous numerical simulations.

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