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Effects of Particle Size on Acceleration Measurements in Intense Turbulence RACHEL D. BROWN, Wesleyan University, STEPHANIE NEUSCAMMAN, Cornell University, GREG VOTH, Wesleyan University, ZELLMAN WARHAFT, Cornell University — We present 3D Lagrangian particle tracking measurements of large neutrally buoyant particles ($0.4 < d/\eta < 30$) in intense turbulence ($400 < R_\lambda < 815$). Stereoscopic high speed cameras image polystyrene tracer particles in a flow between counter-rotating disks at a frame rate of 20kHz. For large particles with diameter in the inertial range, the acceleration variance decreases with diameter as $d^{-2/3}$. This result is predicted by a model that identifies the particle acceleration with the fluid acceleration at the scale of the particle diameter. We show that this model can be extended to describe the transition from particle sizes in the inertial to the dissipation range. In addition, the measured particle acceleration PDF displays no significant dependence on particle size, extending results from previous work to a larger range of particle sizes.

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