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Lagrangian Properties of Cloud Particles in Turbulence Obtained by Holographic Particle Tracking J.P. FUGAL, J. LU, H. NORDSIEK, E.W. SAW, R.A. SHAW, Michigan Technological University — We have designed a laboratory system for studying Lagrangian statistics of particles in homogeneous, isotropic turbulence. The system is designed to match the flow and particle conditions governing the collision rate of droplets in atmospheric clouds (e.g., particle Stokes number and gravitational settling parameter). Two methods for particle tracking are used, both based on digital in-line holography. The first is a combination of stereo-imaging and holography using two cameras. The second uses a single holographic system with depth resolution improved by temporal averaging of particle position. These approaches provide a tool for quantifying the 3-D Lagrangian properties of inertial particles with finite settling speed in homogeneous isotropic turbulence. Lagrangian statistics relevant to the cloud coalescence problem are discussed. Acknowledgement: This work has benefited greatly from our collaboration with E. Bodenschatz, L. Collins, and Z. Warhaft through the International Collaboration for Turbulence Research (ICTR).

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