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Experiments on the Dynamics of Droplets in Turbulent Flows GREGORY BEWLEY, KELKEN CHANG, HOLGER NOBACH, HAITAO XU, EBERHARD BODENSCHATZ, MPI for Dynamics and Self-Organization, ICTR COLLABORATION — We report experiments on the settling and coalescence of micron size water droplets in a turbulent airflow. The turbulence is generated in an  $80 \times 80 \times 100 \text{ cm}^3$  tank using two opposing arrays of 32 randomly triggered loudspeaker driven jets. Using a combination of PDPA, LDV and 3-d particle tracking we report data on the evolution of the droplet size distribution, the radial distribution function, and the droplet settling velocity. By varying the Reynolds number of the flow, we observe droplets with Stokes and Froude numbers in the range of 0.05 to 5, where the Stokes and Froude numbers gauge the importance of droplet inertia and setting velocity relative to the fluid time and velocity scales. We then compare our results with models and numerical simulations of inertial particle sedimentation.

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