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Bringing Clouds into Our Lab! - The Influence of Turbulence on Early Stage Rain Droplets[1] ALTUG YAVUZ, RUDIE KUNNEN, GERT-JAN VAN HEIJST, HERMAN CLERCX, Fluid Dynamics Laboratory, Department of Physics, Eindhoven University of Technology, WORTEX DYNAMICS GROUP TEAM — We are investigating a droplet-laden flow in an air-filled turbulence chamber forced by speaker-driven synthetic jets in many axes. The speakers are running in a random manner; yet they allow us to control and define the statistics of the turbulence. The influence of the turbulence on the behaviour of particles, both individually and collectively, is not well known. Therefore we study the motion of the droplets with tunable size in a turbulent flow, mimicking the early stages of raindrop formation. 3D Particle Tracking Velocimetry (PTV) is chosen as the experimental method to track the droplets and carry out the statistics. Thereby it is possible to study the spatial distribution of the droplets in turbulence using the so-called Radial Distribution Function (RDF), which quantifies the clustering of the droplets under turbulence conditions. Additionally, this technique allows us to measure velocity statistics of the droplets and the influence of the turbulence on droplet trajectories, both individually and collectively. In this contribution, for different turbulence conditions, we will present velocity statistics of the droplets and quantify their clustering using the RDF.

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