

Abstract Submitted
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Experimental Investigation of Charged Inertial Particles in Turbulence¹ HANSEN NORDSIEK, JIANG LU, EWE WEI SAW², RAYMOND SHAW, Department of Physics, Michigan Technological University — We report results from experiments aimed at studying the interactions of electrically charged inertial particles in homogeneous, isotropic turbulence. Conditions are selected to investigate the effects of mutual electrostatic repulsion of particles on their dynamics. We measure droplet clustering and relative velocities. The experiments are carried out in a laboratory chamber with nearly homogeneous, isotropic turbulence. The turbulence is characterized using LDV and 2-frame holographic particle tracking velocimetry. We seed the flow with charged particles and use digital holography to obtain 3D particle positions and velocities. From particle positions, we investigate the impact of mutual electrostatic repulsion on inertial clustering through the calculation of the radial distribution function (RDF). Specifically, repulsion overcomes inertial clustering below a shielding length as seen by a strong reduction in the RDF.

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