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Experimental investigation on dynamics of charged inertial particles in turbulence XUAN RUAN, Tsinghua University, MATT GORMAN, RUI NI, Johns Hopkins University — We present an experimental study on interaction between turbulence with triboelectrically-charged particles in a two-stage apparatus. In this study, bi-disperse spherical particles are first charged by an upward jet in a high-pressure capsule. During this process, particles undergo frequent collisions and gain sufficient charges. By suddenly discharge the gas-solid mixture into a lower-pressure environment, an energetic particle-laden turbulent jet flow is generated, and their dynamics are tracked by our in-house particle tracking system to determine the particle-particle interaction. Furthermore, the charge distribution as a function of particle size are measured by a Faraday cage. Through systematic experiments, the effects of ambient conditions and particle parameters on particle-particle interaction and particle-turbulence interaction are discussed in detail. This study will unveil the complex coupling between charged particles and turbulence.

Xuan Ruan
Tsinghua University

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