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**Turbulence statistics in a negatively buoyant particle plume** EVAN VARIANO, ANKUR BORDOLOI, University of California Berkeley, CHRIS LAI, Los Alamos National Laboratory, LAURA CLARK, Stanford University, GERARDO VELIZ, Cornell University — Plumes containing bubbles, particles and droplets are found in many natural phenomena as well as industrial applications. We report herein the turbulence statistics in a negatively buoyant multiphase plume containing heavy particles. We generate the plume by continuously releasing nylon particles of size 2 mm inside a salt-water tank via screw-conveyor based release mechanism. The two phases are refractive-index matched, that enables us to measure the local velocity in the salt-water via stereoscopic particle image velocimetry. Besides some structural differences, the turbulence statistics in a particle plume resemble that measured in a bubble plume. The turbulent kinetic energy (TKE) production by particles (or bubbles) roughly balances the viscous dissipation, except near the plume centerline. We observe a -3 power-law in the one-dimensional power-spectra of the velocity fluctuations that puts both the particle and bubble plume in a category different from single-phase shear-flow turbulence.

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