Abstract Submitted
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DNS of Multiphase Forced Isotropic Turbulence[1] LIN ZHANG, University of Illinois, S. BALACHANDAR, University of Florida, PAUL FISCHER, Argonne National Lab — Particle turbulence interaction is of fundamental importance. However, theoretical and computational studies have been generally constrained to dilute dispersion of very small particles. Our understanding of this problem in the regime where the particles are of *finite-size*, has been quite limited. In particular, influence of turbulence on the particles, back effect of particles, and inter particle effect within a distribution, are all open questions in the context of finite-sized particles. A higher-order accurate Spectral-Element-Methodology (SEM) is used in the *fully resolved* simulations of forced isotropic turbulence. 100 randomly distributed spheres, of the Taylor microscale size, are embedded in the computational domain. We had developed an efficient technique to automatically discretize the domain with randomly distributed spheres into body-fitted hexahedral elements. The subelement resolution to chosen to fully resolve all the turbulent scales, attached boundary layers on the sphere and their wakes. Employing the same random forcing, we perform the isotropic turbulence simulation in a $(2\pi)^3$ box both with and without the randomly distributed spheres. Through comparison of the energy spectra, two-point correlations, force statistics, etc, particle turbulence interactions is explored.

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