Abstract Submitted
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**On Understanding Preferential Concentration for Particle-Laden Isotropic Turbulent Flows using Combined Theoretical and Data-Driven Techniques**[1] KYLE PIETRZYK, FADY NAJJAR, JEREMY HORWITZ, ROGER MINICH, Lawrence Livermore National Laboratory — A consistent observation in particle-laden turbulence is the tendency of inertial particles to sample particular regions of a flow, known as preferential concentration. As the Stokes number increases from zero, particle trajectories become misaligned with the flow field and particle concentration gradients form. Previous investigations found that regions of high stain-rate and low vorticity promote the accumulation of particles for a low Stokes number. As the Stokes number increases, however, the mechanisms behind particle behaviors become more complex. In this work, a theoretical understanding of preferential concentration is motivated by a data-driven analysis to identify clustered particles in isotropic turbulence. Features that promote and demote particle accumulation are identified through theoretical means and verified using simulation data of particle-laden, isotropic turbulence for multiple Stokes numbers.

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