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Anisotropy of inertial-particle clustering in homogeneous turbulent shear flow[1] PARVEZ SUKHESWALLA, LANCE COLLINS, Cornell University — We study the clustering of inertial particles dispersed in homogeneous turbulent shear flow (HTSF), with a view towards characterizing the effects of flow-anisotropy on clustering as a function of Stokes numbers, separation distance, and time. Recent experiments [Nicolai et al., *Phys. Fluids* (in review)] have shown preferential orientation of clusters along the plane of maximum mean-strain, for separations larger than the Kolmogorov scale (η). High-resolution ($2048 \times 1024 \times 1024$ grid) direct numerical simulations at similar flow conditions are performed using a hybrid Pseudospectral-WENO scheme, that allows well-resolved, long-time simulations of HTSF at high Reynolds numbers. Inertial particles at different Stokes numbers are tracked, and their angular distribution functions (ADFs) are analyzed. Consistent with Nicolai et al., we observe the particle concentrations are maximal along the extensional axis of the strain component of the imposed uniform mean shear. We quantify the anisotropy by the harmonic decomposition of the ADFs. The first harmonic is found to peak between 5 and 10η for all particle classes. The results pave the way for future studies of the role anisotropy plays in aerosol processes such as collision and gravitational settling.

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Parvez Sukheswalla
Cornell University

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