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Predicting particle concentration enhancement due to preferential concentration in a mechanically-driven regime using the two-fluid equations SARA NASAB, PASCALE GARAUD, University of California, Santa Cruz — Using Direct Numerical Simulations (DNSs), we find that particle concentration enhancement follows a simple scaling law, derived from arguments of dominant balance. We consider a two-phase system characterized by a dilute collection of small inertial particles in a turbulent carrier flow driven by an imposed body force. We use the two-fluid equations, in which we apply a continuum treatment to the particles and solve for the particles and fluid separately. We find that when the system reaches a statistically steady state, the maximum particle concentration enhancement over the mean scales with the rms fluid velocity, the particle stopping time, and the "assumed" particle diffusivity. This recovers previous results obtained in the context of the particle-induced Rayleigh-Taylor instability (Nasab Garaud, arXiv:2001.05588, 2020).

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