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Renormalized transport of inertial particles MARCO MARTINS AFONSO, IMFT, INPT - UPS - CNRS, Toulouse (France), ANTONIO CELANI, CNRS - Inst. Pasteur, Paris (France), ANDREA MAZZINO, CNISM - INFN - Univ. Genova (Italy), PIERO OLLA, ISAC-CNR - INFN, Cagliari (Italy) — We study how an imposed flow (laminar or turbulent) modifies the transport properties of inertial particles, namely their terminal velocity and effective diffusivity. Such quantities are investigated by means of analytical and numerical computations, as functions of the control parameters of both flow and particle; i.e., density ratio, inertia, Brownian diffusivity, gravity (or other external forces), turbulence intensity, compressibility degree, space dimension, and geometric/temporal properties. The complex interplay between these parameters leads to the following conclusion of interest in the realm of applications: any attempt to model sedimentation processes (or, equivalently, floater transport by surface winds) cannot avoid taking into account the full details of the flow field and of the inertial particles.

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