

Clustering, fronts, and heat transfer in turbulent suspensions of heavy particles

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Heavy inertial particles transported by a turbulent flow are shown to concentrate in the regions where an advected passive scalar, such as temperature, displays very strong front-like discontinuities. This novel effect is responsible for extremely high levels of fluctuations for the passive field sampled by the particles that impacts the heat fluxes exchanged between the particles and the surrounding fluid. Instantaneous and averaged heat fluxes are shown to follow strongly intermittent statistics and anomalous scaling laws.

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