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**Heavy particles clustering in the dissipative and inertial range of turbulence** ALESSANDRA S. LANOTTE, CNR - ISAC and INFN (Lecce- Italy), JEREMIE BEC, CNRS-OCA, Laboratoire Cassiopee (Nice- France), LUCA BIFERALE, Dept. Physics, Univ. Tor Vergata (Rome - Italy), MASSIMO CENCINI, INFM-CNR, SMC Dept. Physics (Rome - Italy), STEFANO MUSACCHIO, CNRS-INLN (Nice - France), FEDERICO TOSCHI, CNR-IAC and INFN, (Rome - Italy) — The statistics of heavy particles and of fluid tracers transported by a fully developed turbulent flow are investigated by means of high resolution direct numerical simulations, at varying the Reynolds and the Stokes numbers, i.e. the fluid turbulence and the particle inertia, respectively. At those scales where the fluid velocity is smooth, we show that particles clusterise on a fractal set whose dimension depends on the Stokes number only. As spatial inhomogeneities extend up to the the largest scales of the system, we contrast the mass statistics of heavy particles with that of tracers at scales belonging to the inertial range, also. We show that distribution of the coarse-grained mass has power-law tails; in addition, we show that, when varying the inertia, mass distributions collapse one onto the other, if the correct rescaling is applied.

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