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On large-scale clustering in particle laden turbulence KEIGO MATSUDA, Research Institute for Value-Added-Information Generation (VAiG), Japan Agency for Marine-Earth Science and Technology (JAMSTEC), Yokohama, Japan, KAI SCHNEIDER, Institut de Mathématiques de Marseille (I2M), Aix-Marseille Université, CNRS and Centrale Marseille, Marseille, France, KATSUNORI YOSHIMATSU, Institute of Materials and Systems for Sustainability, Nagoya University, Nagoya, Japan — The nonlinear dynamics of inertial particles in high Reynolds number turbulence, and in particular clustering and void formation, are important fundamental processes in multiphase flow. Here we study particle data from three-dimensional direct numerical simulations of particle-laden homogeneous isotropic turbulence at high Reynolds number, up to $Re_\lambda = 678$ and with up to 3.2×10^9 particles, computed at resolution 4096^3. The analyzed flow data show that for sufficiently high Reynolds number the particle density spectra exhibit two well pronounced bumps. The secondary bump at larger scale is attributed to large scale clustering of inertial particles. We found that this behavior is generic and independent of the forcing scheme used to maintain a statistically stationary flow. Possible explanations for this large-scale organization of the particles will be presented.

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