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Inerial Particle Clusterting JOHN CHRISTOS VASSILICOS, LU CHEN, Imperial College London, SUSUMU GOTO, Kyoto University — We integrate the motion of many small spherical inertial particles in 2D inverse cascading DNS turbulence assuming that these particles do not affect the fluid flow and do not interact with each other. Their clustering closely reflects the clustering of zero-acceleration points for a broad range of Stokes numbers. For small enough Stokes numbers, we show that inertial particles move with zero-acceleration points and with no other points because of turbulent sweeping of small eddies by large ones. However, Kinematic Simulations of 2D turbulence where this sweeping is absent also cause particle clustering for an equally broad range of Stokes numbers, but as a result of a clear spatial anticorrelation with zero-velocity points where streamline curvature is high. This subtler effect could not be captured by DNS because there are many more zero-acceleration points than zero-velocity points.

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