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Subgrid scale flux of heavy particle concentration in coarse grained Eulerian fields as deduced from DNS of 2D homogeneous isotropic turbulence MARCELO CHAMECKI, Penn State University, J. CHRISTOS VASSILICOS, Imperial College London — Properties of preferential concentration of heavy particles in 2D homogeneous isotropic turbulence are investigated in an Eulerian framework. Particle motion is simulated in a Lagrangian framework, which is then used to derive the Eulerian particle concentration and velocity fields. Eulerian fields are coarse grained at several filter widths within the turbulence inertial subrange and statistics are analyzed. Focus is placed on the development of models to represent the subgrid scale (SGS) particle flux in large eddy simulation using the Eulerian equilibrium approach. It is argued that the SGS particle flux has two independent components that represent different physical processes: turbulent mixing due to SGS turbulence and clustering due to particle inertial response to SGS acceleration. These processes are completely independent and must be modeled separately. Phenomenological models based on centrifuging and the sweep-stick mechanisms are proposed for the inertial component.

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