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Transport and mixing in strongly coupled dusty plasma medium
VIKRAM DHARODI, AMITA DAS, BHAVESH PATEL, Inst for Plasm Res —
The generalized hydrodynamic (GHD) fluid model has been employed to study the transport and mixing properties of Dusty plasma medium in strong coupling limit. The response of lighter electron and ion species to the dust motion is taken to be instantaneous i.e. inertia-less. Thus the electron and ion density are presumed to follow the Boltzman relation. In the incompressible limit (i-GHD) the model supports Transverse Shear wave in contrast to the Hydrodynamic fluids. It has been shown that the presence of these waves leads to a better mixing of fluid in this case. Several cases of flow configuration have been considered for the study. The transport and mixing attributes have been quantified by studying the dynamical evolution of tracer particles in the system. The diffusion and clustering of these test particles are directly linked to the mixing characteristic of a medium. The displacement of these particles provides for a quantitative estimate of the diffusion coefficient of the medium. It is shown that these test particles often organize themselves in spatially inhomogeneous pattern leading to the phenomena of clustering.

Vikram Dharodi
Inst for Plasm Res

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