

Abstract Submitted
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Effect of gravity on the preferential concentration of heavy particles¹ YONGNAM PARK, CHANGHOON LEE, Yonsei University — The effects of gravity on the preferential concentration of heavy particles are investigated in forced isotropic turbulence using direct numerical simulation. Preferential concentration of heavy particles is usually observed for particles with $St \approx 1$ and the mechanism of preferential concentration is strongly related with the vortical structure of background flows. In this study we found that strong gravity causes a different kind of preferential concentration for high Stokes number particles which is not related with the vortical motion of fluid. We introduce average distance concept between particles for quantitative analysis of preferential concentration, and suggest that the closest distance between particles is a good indicator of preferential concentration. Moreover, we investigate the effect of gravity on the geometric nature of heavy particle's trajectories such as curvature and torsion. PDF of curvature and torsion are determined by the Gaussian distribution of particle velocity, and thus their PDFs are not modified by gravity as long as the particle's velocity maintains the Gaussian characteristics. More detailed analysis will be discussed in the meeting.

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