

Abstract Submitted
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Segregation of heavy particles by gravitational force¹ YONGNAM PARK, CHANGHOON LEE, Yonsei University, Seoul, Korea — The effects of gravitational force on the segregation of heavy particles are investigated in forced isotropic turbulence using direct numerical simulation. The mechanism of preferential concentration of heavy particle has been known to be strongly related with the vortical structures of background turbulence when gravity is not considered. The degree of preferential concentration is maximized when the characteristic time scale of a particle is comparable with the Kolmogorov time scale. In this study, we discover that strong gravity causes a different kind of preferential concentration for high Stokes number particles. Such phenomenon does not seem to be related with the vortical structures. In order to provide a plausible explanation, we investigate the statistics of horizontal divergence at the location of heavy particles. Particles tend to be segregated more as the particles experience longer time of negative divergence, meaning converging motion in the horizontal plane. The ratio of mean duration time of negative divergence to that of positive divergence increases with gravitational force for the high Stokes number particles. More detailed statistics and relevant explanation will be presented in the meeting.

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Changhoon Lee
Yonsei University, Seoul, Korea

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