

Abstract Submitted
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Effect of gravity on the finite-size particle within spectral resolution YONGNAM PARK, CHANGHOON LEE, Yonsei University — This study aims at the finest simulation of settling particles by using the immersed boundary method and direct numerical simulation with pseudo-spectral scheme. In many particle-laden simulations with the point-particle approach, due to the heavy particle approximation only Stokes drag force and gravity force are taken into account. On the other hand, most published works using an immersed boundary method considered particles as large as the Taylor micro scale. However, the Stokes number of particle of the Taylor micro scale size is over hundreds such that particles are not directly affected by turbulent flows. Due to the large Stokes number of finite-size particles, the density ratio of finite-size particles is limited to small range. In this study, the size of particles is comparable with the Kolmogorov length scale, and density ratio is larger than 10 in order to compare the results by the point particle simulations. In this simulation range, settling particles attenuate the turbulence because the particles can easily penetrate the vortex core and disturb the evolution of turbulence. Detailed statistics of particle motion will be discussed in the presentation.

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