

Abstract Submitted  
for the DFD11 Meeting of  
The American Physical Society

**Effect of gravity on the dispersion of heavy particles**<sup>1</sup> YONGNAM PARK, YONGRAK JUNG, CHANGHOON LEE, Yonsei University — The effect of gravity on the dispersion of heavy particles is investigated in direct numerical simulation of forced isotropic turbulence at moderate Reynolds numbers. The integral time scales of fluid seen by particle show different behavior from that of Lagrangian fluid for wide range of Stokes number and magnitude of gravity. Autocorrelation functions of velocity of heavy particles become reduced when stronger gravity is applied, implying the reduction of dispersion. Integral time scales of fluid seen by particle also get smaller when gravity is stronger. Compared to the direction of gravity, normal direction velocities show shorter correlation. Settling velocity of heavy particle gets smaller when the Stokes number goes to zero or gravity gets smaller. Gravity enhances the preferential concentration of heavy particle and different type of large-scale nonuniform distribution of particles is clearly observed for the Stokes number of 10 when strong gravity is exerted. The preferential concentrations by strong gravity are not related with the turbulence structure and relevant physical explanation will be discussed in the meeting.

<sup>1</sup>Authors acknowledge support from ERC program sponsored by National Research Foundation of Korea.

Changhoon Lee  
Yonsei University

Date submitted: 05 Aug 2011

Electronic form version 1.4