

Abstract Submitted
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Behavior of Heavy Particles in Turbulent Channel Flow

JUNGHOOON LEE, CHANGHOON LEE, Yonsei University — The motion of heavy particles in turbulent channel flow was investigated by using direct numerical simulation. We assumed that Stokes drag, Saffman lift and Magnus lift act on the motion of heavy spherical particles in turbulence. In this study, Stokes number is defined as the particle response time normalized by the wall units. The range of the Stokes number is 0.1~50 and the diameter of a particle is 0.06~0.3 in wall unit. Collision of particles with the wall is modelled by an elastic collision. Relevant velocity and acceleration statistics of heavy particles for the given range of Stokes number were investigated to interpret the particle accumulation near the wall. Particle accumulation at the wall is maximized when the Stokes number is around 15. And we found that Saffman lift force has a great effect on particle acceleration in the wall-normal direction near the wall. Detailed statistics including probability density function and autocorrelation of particle velocity and acceleration will be presented in the meeting.

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