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Acceleration modification of near-wall turbulence by heavy particles JUNGHOON LEE, CHANGHOON LEE, Yonsei University — By conducting direct numerical simulation combined with Lagrangian particle tracking, we examine modifications of the near-wall turbulence by heavy particles. For simplicity, only spherical and rigid particles are considered in our study and particles are idealized as point-sources in our spectral simulation of turbulent channel flow laden with heavy particles. To assess the effect of particles on the flow field, we use the Particle-Source In Cell (PSIC) model proposed by Crowe et al (1977). Because particles suspended in wall-bounded turbulence can modify the near-wall turbulent structures depending on Stokes number, and these structures are associated with the intermittent, strong acceleration of fluid, particles are expected to modify the turbulence acceleration statistics in the near-wall region. Therefore, in the present study, we especially focus on the modification of the acceleration statistics of turbulence by particles in turbulent channel flow for various Stokes numbers. Detailed statistical changes of acceleration of turbulence by particles and plausible physical explanations will be presented in the meeting.

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