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Ineractions of Turbulence and Sediment Particles in an Open Channel Flow[1] PEDRAM PAKSERESHT, SOURABH APTE, Oregon State University, JUSTIN FINN, None — Interactions of glass particles in water in a turbulent open channel flow over a smooth bed is examined using direct numerical simulation (DNS) together with Lagrangian Discrete-Element-Model (DEM) for particles. Unlike several studies on wall-bounded turbulent flows with particles, in this work, the gravity is perpendicular to the mean flow, resulting in interesting dynamics between the destabilizing lift forces on the particles and stabilizing effects of graivty. The turbulent Reynolds number (Re_τ) is 710 corresponding to the experimental observations of Righetti & Romano (JFM, 2004). Particles of size 100 microns with volume loading of 10^{-3} result in a single layer of non-touching particles at the bottom wall. The entrainment and deposition mechanisms of particles and their interactions with the near wall turbulence structure are studied in detail. For the particle concentration studied, the particles affect the flow field in both the outer as well as inner region of the wall layer where particle inertia and concentration are higher. The effect of these interactions on the wall events is being explored.

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