

# Some aspects of the interaction between turbulent flow and finite-size particles

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In this talk we will present results of a direct numerical simulation of dilute turbulent particulate flow in a vertical plane channel, fully resolving the phase interfaces. We observe the formation of large-scale columnar-like structures which are only marginally decorrelated in the longitudinal direction. Voronoi analysis of the spatial particle distribution shows that the state of the dispersed phase can be characterized as slightly more ordered than random tending towards a homogeneous spatial distribution. It is also found that the p.d.f.'s of Lagrangian particle accelerations for wall-normal and spanwise directions follow a lognormal distribution as observed in previous experiments of homogeneous flows. The streamwise component deviates from this law presenting significant skewness. Finally, a statistical analysis of the flow in the near field around the particles reveals that particle wakes present two regions, a near wake where the velocity deficit decays as  $x^{-1}$  and a far wake with a decay of approximately  $x^{-2}$ .