Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Wall model for large eddy simulations accounting for particle effect.[1] PING WANG, Lanzhou University, XIAOJING ZHENG TEAM — Computational investigations of high Reynolds number turbulent multiphase flow is rather time-consuming even in large eddy simulation (LES) framework. The integral wall model (iWM) for large eddy simulation of particle-free wall-bounded turbulent flows proposed by Yang et al (2015) is further improved to include the body forces that particles exert on the fluid. The slightly modified iWMLES method is tested in the context of a finite-difference LES code for turbulent two phase flow. For model testing, the data from wall-resolved LES of particle-laden flow at Reynolds number of Re_τ =550 ˜4200 are treated as standard data. The results show that the mean velocity profiles, particle concentration, particle mean velocity and mass flux profiles compare well with standard data once particle force is properly included in WMLES of particle-laden flow. Meanwhile, it allows significant reduction of the required CPU time over simulations of turbulent two phase flow in which no-slip conditions are applied.

[1]This research was supported by the National Natural Science Foundation of China (Grants No. 11490551,) and the Fundamental Research Funds for the Central Universities (lzujbky-2016-k13, lzujbky-2018-k07).

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Date submitted: 31 Jul 2019 Electronic form version 1.4