Abstract Submitted
for the DFD13 Meeting of
The American Physical Society

Towards large-eddy simulation of multiphase flows using two-way coupled, Euler-Lagrangian methods WYATT HORNE, KRISHNAN MAHESH, University of Minnesota — Two-way coupled Euler-Lagrangian methods are sensitive to the size of the particle with respect to the Eulerian grid. We develop an interpolation methodology that addresses this issue for unstructured grids. The carrier fluid is solved using large-eddy simulation (LES) including finite size effects and force coupling from the Lagrangian particles. The Lagrangian particle motion is solved using equations relating the motion of the carrier fluid to forces on each discrete particle. Interpolation of Lagrangian quantities to Eulerian quantities is performed using interpolation kernels dependent on particle size that are volume averaged over control volumes. This interpolation technique is compared to other interpolation methods over several canonical flow cases. It is found from these comparisons that the developed interpolation technique is capable of producing more accurate results. Results are shown for both bubbles and solid particles. Simulations of a single sphere rising in an inclined channel under conditions similar to an experiment conducted by Lomholt et al. [Int. J. Multiphase Flow (2002) **28**:225–246] are performed. Good agreement is found between the experimental and simulated particle trajectories and velocity profiles.

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Date submitted: 01 Aug 2013 Electronic form version 1.4