Abstract Submitted
for the DFD09 Meeting of
The American Physical Society

Hybrid RANS/LES of particle-laden turbulent flows MARCEL ILIE, University of Central Florida, STEFAN LLEWELLYN SMITH, University of California, San Diego — One of the main issues in using large-eddy simulation (LES) for high Reynolds number flows in bounded domains is the requirement of very fine grid resolution near walls. We present a hybrid RANS/LES method in conjuction with a Lagrangian particle tracking algorithm, for the numerical prediction of particle-laden turbulent flows. The hybrid RANS/LES methodology aims to reduce the high computational effort of wall-resolved LES. This approach is based on the concept of dividing the simulation into a near-wall RANS part and an outer LES part, and allows the thickness of the near-wall RANS layer to be chosen freely. The near-wall layer is interfaced to the outer LES region using compatibility conditions for velocity and turbulent viscosity across the interface that are extracted dynamically as the simulation progresses. The influence of parameters such as particle shape and size, particle density and flow Reynolds number on the particle dispersion and total deposition is examined. Particles of fiber shape are more prone to deposition. Total particle deposition increases with the particle size, density and Reynolds number.

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Date submitted: 08 Aug 2009 Electronic form version 1.4