Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Tracking Rigid Spherical Particles in Incompressible Flows via Dissipative Hydrodynamics BRENT HOUCHENS, KENNETH DAVIS, Rice University, YONG SHI, ALBERT KIM, University of Hawaii at Manoa — Solutions for particle trajectories computed using dissipative hydrodynamics (DHD) for rigid spherical particles are discussed. DHD reproduces the many-body hydrodynamics of Stokesian Dynamics (SD), but is more computationally efficient. DHD satisfies the fluctuation-dissipation theorem of Dissipative Particle Dynamics (DPD) and therefore is not hindered by the relaxation-time limitations of Stokesian Dynamics. For a given continuum flow field, the translations and rotations of multiple particles are calculated taking into account both stochastic dissipative effects and deterministic conservative forces. Examples of particle tracking in two-dimensional and three-dimensional flows, computed via spectral element simulations, will be discussed.

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Date submitted: 06 Aug 2010 Electronic form version 1.4