

Abstract Submitted
for the DFD05 Meeting of
The American Physical Society

Velocity fluctuations of initially-stratified sedimenting spheres

PETER MUCHA, University of North Carolina, SHANG-YOU TEE, MICHAEL BRENNER, DAVID WEITZ, Harvard University — The study of velocity fluctuations in the sedimentation of spheres is complicated by the time evolution of the underlying particle distribution, both at the microscale and in the bulk. We perform a series of experiments and simulations to isolate the effect of an initial, stable stratification of the particle density. The directly observed dependence of velocity fluctuations on stratification, in agreement with a previously-obtained scaling theory, confirms the importance of even very small stratifications in controlling velocity fluctuations in sedimentation.

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Date submitted: 03 Aug 2005

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