

Abstract Submitted
for the DFD10 Meeting of
The American Physical Society

Effects of turbulence intensity and gravity on transport of inertial particles across a shearless turbulence interface GARRETT GOOD, SERGIY GERASHCHENKO, ZELLMAN WARHAFT, Cornell University — Water droplets of sub-Kolmogorov size are sprayed into the turbulence side of a shearless turbulent-non-turbulent interface (TNI) as well as a turbulent-turbulent interface (TTI). An active grid is used to form the mixing layer and a splitter plate separates the droplet-non droplet interface near the origin. Particle concentration, size and velocity are determined by Phase Doppler Particle Analyzer, the velocity field by hot wires, and the droplet accelerations by particle tracking. As for a passive scalar, for the TTI, the concentration profiles are described by an error function. For the TNI, the concentration profiles fall off more rapidly than for the TTI due to the large-scale intermittency. The profile evolution and effects of initial conditions are discussed, as are the relative importance of the large and small scales in the transport process. It is shown that the concentration statistics are better described in terms of the Stokes number based on the large scales than the small, but some features of the mixing are determined by the small scales, and these will be discussed. Sponsored by the U.S. NSF.

Garrett Good
Cornell University

Date submitted: 02 Aug 2010

Electronic form version 1.4