Abstract Submitted for the DFD07 Meeting of The American Physical Society

Experiemetal study of turbulent transport of material particles MICKAEL BOURGOIN, NAUMAN QURESHI, UNAI ARRIETA, CHRISTOPHE BAUDET, ALAIN CARTELLIER, YVES GAGNE, LEGI - UJF/INPG/CNRS -We report measurements of Lagrangian velocity and acceleration statistics of particles transported in a turbulent flow obtained with an acoustic Doppler velocimetry technique. We consider a homogeneous isotropic grid turbulence generated in a wind tunnel with a Reynolds number based on Taylor microscale of R  $\sim$  180. We focus on the effects of particles finite size and of the particle to fluid density ratio. The versatility of our setup allows to explore a parameter space over a significant range of particles densities and sizes. An intermittent dynamics, with time scale dependent statistics of Lagrangian velocity increments, is observed for all particles size and density, though intermittency has different signature depending on particles density. Acceleration probability density function is found non-gaussian and independent on particles size and density. In particular acceleration statistics are not found to tend to gaussian as the particles Stokes number increases. Though the global shape of acceleration statistics does not change, the acceleration variance does strongly depend on particles size and density. Systematic trends will be discussed.

> Mickael Bourgoin LEGI - UJF/INPG/CNRS

Date submitted: 29 Jul 2007

Electronic form version 1.4