

Abstract Submitted  
for the DFD10 Meeting of  
The American Physical Society

**Lagrangian particle tracking in turbulent convection** VALENTINA LAVEZZO, FEDERICO TOSCHI, HERMAN J.H. CLERCX, Eindhoven University of Technology - The Netherlands — The dispersion of inertial particles in turbulent convection has direct relevance for many industrial and environmental applications, where the fluid heat transfer can be modified by the presence and the deposition of particles at the walls (e.g. nuclear power plants, petrochemical multiphase reactors, cooling systems for electronic devices, pollutant dispersion in the atmospheric boundary layer, aerosol deposition etc.). A high resolution numerical technique coupled with Lagrangian particle tracking is employed, in this work, to investigate the behaviour of inertial particles in a periodic turbulent Rayleigh-Benard convection cell. In particular, we focus on the effects of different flow regimes, obtained varying the Rayleigh number, on particle dispersion/resuspension. Different Stokes numbers are considered to evaluate the influence of inertia on particle clustering and consequently, on the heat exchange modification between the two walls. Single and two particle statistics are used to estimate the level of mixing and the role of turbulent structures in particle transport. Mean and higher order statistics on particle and fluid velocity and temperature fields are also presented.

Valentina Lavezzo  
Eindhoven University of Technology - The Netherlands

Date submitted: 09 Sep 2010

Electronic form version 1.4