Abstract Submitted
for the DFD14 Meeting of
The American Physical Society

The oscillation modes of large-scale circulation in turbulent Rayleigh-Bénard convection DANDAN JI, KUNLUN BAI, ERIC BROWN, Department of Mechanical Engineering and Materials Science, Yale University — We present measurement of the large-scale circulation (LSC) of turbulent Rayleigh-Bénard convection of cubic cell. We found the reorientation events by rotation through the LSC orientation θ_0 with a multi-peaked probability distribution $p(\theta_0)$, as predicted by the model presented by Brown and Ahlers (Phys. Fluids, 2008). In contrast to the results of oscillation modes in cylindrical cell, when the LSC was confined into one corner, the flow didn't exhibit the twisting and sloshing oscillation with a well-defined periodicity. The phase relation of θ_0 at different heights in the cell was not fixed, so LSC was not in a plane. The sloshing displacement of the LSC from a center plane exhibited random switching between two states.

Dandan Ji
Department of Mechanical Engineering and Materials Science, Yale University

Date submitted: 31 Jul 2014 Electronic form version 1.4