DFD19-2019-001731

Abstract for an Invited Paper
for the DFD19 Meeting of
the American Physical Society

Lagrangian turbulent thermal convection[1]

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Thermally driven turbulence plays an important role in numerous areas of science and technology. Many natural (atmospheric and oceanic dynamics, processes in planetary cores, etc.) and industrial (cooling of buildings, heat exchangers, etc.) flows are indeed controlled by thermal convection, and often exhibit peculiar inhomogeneity and non-stationnary behavior. While a prolific literature exists regarding transport phenomena for homogeneous, isotropic and stationary turbulence, understanding the transport properties of thermal turbulence remains a real challenge, especially from the Lagrangian prospect. In this presentation, recent experimental results on the Lagrangian description of thermal turbulence in Rayleigh-Bnard convection will be presented. The specific roles of small-scale turbulence and large scale inhomogeneities and unsteadiness will be discussed, revisiting both the Lagrangian dynamics of single particles and the celebrated pair dispersion problem.

[1]IDEX Lyon