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Direct Numerical Simulation of Particles Dispersion in Turbulent Rayleigh-Bénard Flow in a Slender Closed Cylinder PAOLO ORESTA, DIASS, Politecnico di Bari, 74100 Taranto, Italy, ROBERTO VERZICCO, DIMeG and CEMeC, Politecnico di Bari, 70125, Bari, Italy, ALFREDO SOLDATI, DEM and CIFI, Università degli Studi di Udine, 33100 Udine, Italy — In this work, we use Direct Numerical Simulation of turbulence and Lagrangian tracking to investigate on dispersion and deposition of particles swarms in a Rayleigh-Bénard flows. We consider a closed, circular and slender cylinder heated from below and we solve the flow explicitly down to the smallest scales with a finite difference solver. We then track swarms of different size inertial particles to investigate on their dispersion and deposition. The problem is of fundamental significance in nuclear reactor safety issues and in environmental flows. The flow is of particular significants due to the interactions of Kolmogorov turbulence dynamics, characterizing the core region of the domain, with Bolgiano turbulence cascade mechanisms, characterizing the thermal layers. The particular statistics of this flow have an influence on particle dynamics. We will present results showing flow and particle statistics and we will examine particle instantaneous distribution and deposition mechanisms in connection with the dynamics of the flow structures.

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