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Dynamics of spheres falling in quiescent flows[1] FACUNDO CABRERA, MICKAEL BOURGOIN, NICOLAS PLIHON, Ecole Normale Superieure de Lyon — Despite the apparent simplicity of a single sphere falling in a quiescent flow, far enough from Stokes conditions, a rich dynamics has been found. Simulations have shown the existence of several particle trajectory regimes in a quiescent flow, whose onsets are determined by particle-fluid density ratio (ρ_s/ρ_f) and Galileo number. These regimes are mainly characterised by the presence or absence of oscillations and the trajectory angle with respect to the gravity.
Here, experiments to test the validity of the aforementioned simulations are presented. In particular, the dynamics of heavy spheres with particle-fluid density ratios between $(1.1, 10)$ and Galileo numbers between $(150, 400)$ has been studied. We have performed an exploration of the different trajectory regimes modifying the Galileo number by changing the viscosity and using particles with several densities. While the trajectories are measured using a 3D PTV system.

[1]IDEX LYON

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