



**TOR VERGATA**  
UNIVERSITÀ DEGLI STUDI DI ROMA

Dipartimento di Fisica



**European Research Council**  
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## ***Seminar***

Wednesday, 7 February 2024 - h. 15:00

*Fisica della Materia room (Department of Physics)*

### **Diego TAGLIENTI**

*Department of Physics & INFN, University of Rome "Tor Vergata"*

## **“Droplet dynamics in homogeneous isotropic turbulence with the Immersed-Boundary Lattice Boltzmann method”**

### ***Abstract***

We develop a numerical method for simulating the dynamics of a droplet immersed in a generic time-dependent strain field. This approach is grounded on the hybrid coupling between the Lattice Boltzmann (LB) method, employed for flow simulation, and the Immersed Boundary (IB) method, utilized to couple the droplet with the surrounding fluid. We show how to enrich the numerical scheme with a remeshing technique, allowing droplets to sustain large deformations. The resulting methodology is adapted to simulate the dynamics of droplets in homogeneous and isotropic turbulence, with the characteristic size of the droplet being smaller than the characteristic Kolmogorov scale of the outer turbulent flow. We report on statistical results for droplet rheology such as deformation and orientation, collected from an ensemble of turbulent trajectories as well as comparisons with existing models and available literature results.

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**(P.I. Prof. Luca Biferale)**

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