# Lattice-Boltzmann simulations for immiscible 2D Rayleigh-Taylor turbulence

**H. Tavares**[1], L. Biferale[2], M. Sbragaglia[3], A. Mailybaev[4]

[1] Instituto de Matemática Pura e Aplicada

[2] Università degli Studi di Roma "Tor Vergata"

[3] Università degli Studi di Roma "Tor Vergata"

[4] Instituto de Matemática Pura e Aplicada

We simulate a turbulent motion induced by the Rayleigh-Taylor instability for 2D immiscible two-phase flow. For this purpose we use the multicomponent lattice-Boltzmann method with Shan-Chen pseudopotential model implemented on GPUs. The main advantage of this method is that it allows accurate simulations following highly sophisticated topological changes of the two-phase interface. We consider a phenomenological theory for 2D immiscible Rayleigh-Taylor turbulence, derived similarly to the 3D case studied by Chertkov, Kolokolov and Lebedev (2005). Then we test predictions of this theory with numerical simulations by measuring the growth of the mixing layer, formation of drops and analyzing the role of interface for energy transfer and mixing.