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Influence of thermal fluctuations on ligament break-up: a fluctuating lattice Boltzmann study[1] XIAO XUE, University of Rome Tor Vergata / Eindhoven University of Technology, LUCA BIFERALE, MAURO SBRAGAGLIA, University of Rome Tor Vergata, FEDERICO TOSCHI, Eindhoven University of Technology — Thermal fluctuations are essential ingredients in a nanoscale system, driving Brownian motion of particles and capillary waves at non-ideal interfaces. Here we study the influence of thermal fluctuations on the breakup of liquid ligaments at the nanoscale. We offer quantitative characterization of the effects of thermal fluctuations on the Plateau-Rayleigh mechanism that drives the breakup process of ligaments. Due to thermal fluctuations, the droplet sizes after break-up need to be analyzed in terms of their distribution over an ensemble made of repeated experiments. To this aim, we make use of numerical simulations based on the fluctuating lattice Boltzmann method (FLBM) for multicomponent mixtures. The method allows an accurate and efficient simulation of the fluctuating hydrodynamics equations of a binary mixture, where both stochastic viscous stresses and diffusion fluxes are introduced.

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Xiao Xue
University of Rome Tor Vergata / Eindhoven University of Technology

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