Abstract Submitted
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Inducing coalescence by a superposition of two Rayleigh-Plateau instabilities: Theoretical analysis THEO DRIESSEN, PASCAL SLEUTEL, FRITS DIJKSMAN, University of Twente, ROGER JEURISSEN, Eindhoven university of technology, DETLEF LOHSE, University of Twente — We demonstrate a novel method of producing a stream of widely spaced high-velocity droplets by imposing a combination of two unstable modes on a liquid jet. The wavelengths of the two modes are chosen close to the wavelength of the most unstable mode. After the initial breakup of the jet into small droplets, these droplets coalesce to produce a stream of larger droplets spaced at a much larger distance than the wavelength of the most unstable mode of the jet. We analytically derive sets of perturbations that robustly induce this process, and we investigate the influence of the nonlinear interactions in the Rayleigh-Plateau instabilities on the coalescence process. Experiments and numerical simulations demonstrate that the jet breakup and the subsequent droplet merging are governed completely by the selected modes.

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