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Cascade of coalescences for droplets near liquid interfaces[1]
STÉPHANE DORBOLO, University of Liege, KAREN MULLENERS, University of Eidhoven, TRISTAN GILET, NICOLAS VANDEWALLE, University of Liege, GRASP COLLABORATION — An experimental study on the coalescence of liquid droplets in a system composed of two immiscible liquids is carried out. When a liquid droplet is deposited on the interface separating both liquids it floats momentarily before coalescing with the bottom layer. In some cases the droplet does not coalesce entirely. A smaller satellite droplet is pinched off and partial coalescence may start again. This results in a cascade of successive coalescence. The coalescence cascade is found to be characterized by the liquid viscosities, the liquid densities and the initial radius of the released droplet. The fine study of these parameters yields some interesting information about multiple coalescence. The evolution of the radii of successive droplets is studied and found to be independent of the liquid viscosities. On the other hand the number of steps in a coalescence cascade is shown to be a function of the viscosities and the initial droplet radius. Several arguments are provided that give rise to the existence of a critical as well as a maximum droplet radius.

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