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Insights into droplet impact shape dynamics DURBAR ROY, SOPHIA M, Indian Institute of Science, RABIBRATA MUKHERJEE, Indian Institute of Technology, Kharagpur, SAPTARSHI BASU, Indian Institute of Science —
The underlying mechanics related to the initial shape transition is being studied experimentally using high speed imaging techniques for a droplet impacting on various substrates. Two traditional (Glass and PDMS) and two bio-inspired surfaces were used. A very distinct change in the shape of the deforming droplet during the early phase of the droplet spreading was observed when the impact Weber number of the droplet is varied from 1 to 50. The nature of the capillary waves (wavelength) on the droplet surface changes quite significantly. This shows the existence of a critical Weber number beyond which the shape of the droplet during the initial transient of the spreading phase changes. The wavelength of the capillary waves was found to be a function of the impacting Weber number. This work provides some basic insights related to this transitional behavior using basic dimensional analysis and scaling theories.

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