Abstract Submitted
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Experimental study of drop impacts on soap films ALI YAWAR, Yale University, U.S.A., SAIKAT BASU, Okinawa Institute of Science and Technology, Japan, ANDRES CONCHA, Adolfo Ibaez University, Chile, MAHESH BANDI, Okinawa Institute of Science and Technology, Japan — Impinging drops on flowing and static soap films demonstrate at least three distinct types of impact regimes: (a) the drop bounces off the film surface, (b) it coalesces with the downstream flow for a moving film and for static films it gets assimilated within the film, and (c) it pierces through the film. The interaction presents a unique opportunity to explore the impact of a quasi one-dimensional object on a two-dimensional fluid, much like a comet impacting on a thin atmosphere. We present a detailed experimental study of droplet impacts on soap film flow, for a number of film inclination angles and falling heights of the drop. Imaging techniques employed include sodium lamp interferometry to measure film thickness fluctuations and particle tracking velocimetry to measure the velocity field. Film thickness measures approximately 10 microns and the drop diameter is 1 mm. We mostly observe the bouncing-off regime for smaller inclination angles. However, at higher impact angles, puncturing of the film becomes a more common occurrence. We show that when the drop bounces off the film, there is a momentum transfer leading to vortex dipole shedding, along with the generation of capillary waves; an impulsive regime that may share correspondence with the locomotion of water striders.

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