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Drop impacts close to edges of complex geometry: Sheet dynamics S. EL MOUSADIK, Y. WANG, L. BOUROUIBA, MIT — Drop impacts close to surface edges of complex geometry lead to secondary spray droplets that are important for rain-induced foliar pathogen transmission and cleaning of contaminated surfaces. Despite the ubiquitous nature of impacts close to edges, little is known on the role of complex edges in shaping fragmentation or retention of the impacting fluid drop. Upon impact, a drop is transformed into a liquid sheet expanding partially on the surface and partially in the air, bounded by a rim which can eventually destabilize into ejected secondary droplets of varying sizes and speeds. Predicting the secondary droplet sizes and speeds emitted or the portion of fluid remaining on, or in the vicinity of, the impacted surface starts by elucidating the physics of the sheet created upon drop impact. In this combined experimental and theoretical study, we incorporate the history of the fluid parcels on the surface, into the evolution of the liquid sheet in the air. This is done via both modelling and direct measurement of the properties of the boundary layer on the surfaces. Our analysis enables the prediction of the time-varying evolution of the asymmetric liquid sheet dynamics.

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