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Role of unsteadiness and local dynamics in the selection of secondary droplet sizes in drop impact fragmentation L. BOUROUIBA, Y. WANG, The Fluid Dynamics of Disease Transmission Laboratory, Massachusetts Institute of Technology — Understanding the dynamics of drop fragmentation upon impact on a finite surface has a wide range of industrial and environmental applications, including predicting and controlling the transport of pathogen-bearing droplets created from contaminated surfaces and leaves. Upon impact on a small solid surface, a drop first expands into a sheet in the air, surrounded by a rim, that itself can destabilize into ligaments, that can, in turn, shed droplets. Eventually, the sheet ruptures or retracts. This process is inherently unsteady and multiscale. Yet, the quantification of droplet sizes and discussion of the underlying mechanisms linking them to the ligaments have typically not accounted for unsteadiness. In a combined experimental and theoretical study, we revisit the problem of secondary droplet generation during unsteady sheet expansion in the air from impacts on finite surfaces. We discuss how unsteadiness and local dynamics shape the sizes and speeds of the secondary droplets generated.

L. Bourouiba
Massachusetts Institute of Technology

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