

## Abstract for APS DFD 2022

### Simultaneous Impact of two Droplets on a Solid Surface: Central Sheet Evolution and Splashing

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#### **Abstract**

Simultaneous impacts of two droplets on dry substrates can lead to lamella interaction that generates a central uprising sheet, modifying the outcomes of equivalent single droplet impacts. The central sheet either breaks into droplets or deposits on the impact surface depending on droplet impact conditions. We investigate the sheet evolution through a combined experimental and theoretical study. A new micro-controlled droplet generator released two droplets simultaneously on-demand for varying impact Weber number and inter-droplet spacing. Simultaneous high-speed imaging from different views recorded the sheet morphology, including its rim-bounded semilunar shape, surface waves, finger formation and deposition or splashing. The maximum height of the sheet scales with the lamella-lamella collision force at the start of their interaction. Considering geometrical constraints and mass balance, we theoretically evaluate the temporal evolution of the base width and thickness of the semilunar uprising sheet. Secondary atomisation during splashing generates larger droplets than sizes from single droplet splashing. The results provide new insights into the splash/non-splash outcomes of simultaneous multi-droplet impacts and indicate good agreement between theory and experiments.

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