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Binary drop interaction on surfaces: onset and bounding ligaments of Crescent-Moon fragmentation LYDIA BOUROUIBA, YONGJI WANG, The Fluid Dynamics of Disease Transmission Laboratory, Massachusetts Institute of Technology — Drop impacts on surfaces can splash and create secondary droplets. These have important implications for industrial, environmental, and health processes such as air contamination by secondary pathogen-bearing droplets shaping disease transmission. Most studies of splash on surfaces have focused on the impact of one drop on a dry surface. Nevertheless, the outcome of impacts by spray or rain are shaped by the presence of adjacent sessile drops on the surface. Recently, in the context of rain and spray-induced disease transmission in crops, one particular binary drop interaction, the crescent-moon splash, was identified as a frequent and efficient source of secondary droplets (Gilet and Bourouiba ICB 2014 and JRSI 2015). The crescent-moon results from the interaction of an impacting drop with a sessile drop in the neighborhood of the impact point. Here, we report and rationalize the existence of a critical transition of impact parameters that enables the crescent-moon fragmentation to emerge. We also report and rationalize the peculiar, yet universal emergence of two bounding ligaments that are important in shaping the crescent-moon sheet.

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