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Drop Impact on Liquid Film: Bouncing to Merging Transition for Two-Liquid System ABHISHEK SAHA, XIAN WU, University of California San Diego — Impact of a drop on liquid film is critical in several industrial applications, including inkjet printing and thermal sprays. Previous studies using single liquid for both drop and film showed that the impact could result in two outcomes, namely bouncing and merging, and the transition between these two states is a function of impact Weber number and film thickness. It was also reported that for a range of Weber number, the impact outcome changes from merging to bouncing, back to merging and then to bouncing again, as we increase the film thickness. Since many of the advanced printing technologies such as 3D inkjet printers can print multiple materials, very often the drop and the impacted liquid film are required to be of different liquids with varying properties. Recognizing its importance, in this talk, we will present a study on the dynamics of drop impact on liquid film using two liquids with similar surface tension, but different viscosities. The results with two-liquid systems show a shift in the transitional boundaries with respect to that of the single-liquid system. In addition to the two types of merging, early merging and late merging, reported for single-liquid systems, a third kind of merging was also observed for two-liquid systems. This third kind of merging was found to reduce the degree of non-monotonicity of the transitional boundaries between bouncing and merging states.

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