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Theoretical investigation of precursor to droplet splashing MAD-HAV MANI, SHREYAS MANDRE, MICHAEL BRENNER, Harvard University — This study is motivated by drops splashing on rigid substrates. Experiments have shown that the surrounding air can affect the nature of splashing. A thin film of air between the drop and the substrate exerts viscous forces on the drop thereby deforming it and potentially altering the dynamics of the splash. We simulate the thin film as a compressible lubrication layer and model the drop by an inviscid fluid with or without surface tension. Without surface tension, we find that contact is achieved in a self-similar fashion in finite time. However, the addition of capillarity qualitatively changes the approach of the drop to the substrate through the generation of capillary waves.

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