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Computational comparison of high and low viscosity micro-scale droplets splashing on a dry surface ARNOUT BOELENS, Institute for Molecular Engineering, University of Chicago, ANDRZEJ LATKA, Department of Physics, University of Chicago, JUAN DE PABLO, Institute for Molecular Engineering, University of Chicago — Depending on viscosity, a droplet splashing on a dry surface can splash immediately upon impact, a so called prompt splash, or after initially spreading on the surface, a late splash. One of the open questions in splashing is whether the mechanism behind both kinds of splashing is the same or not. Simulation results are presented comparing splashing of low viscosity ethanol with high viscosity silicone oil in air. The droplets are several hundred microns large. The simulations are 2D, and are performed using a Volume Of Fluid approach with a Finite Volume technique. The contact line is described using the Generalized Navier Boundary Condition. Both the gas phase and the liquid phase are assumed to be incompressible. The results of the simulations show good agreement with experiments. Observations that are reproduced include the effect of reduced ambient pressure suppressing splashing, and the details of liquid sheet formation and breakup. While the liquid sheet ejected in an early splash breaks up at its far edge, the liquid sheet ejected in a late splash breaks up close to the droplet.

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