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Impact of a large-viscosity liquid drop: Rim dynamics ROBERT D. SCHROLL, University of Chicago, CHRISTOPHE JOSSERAND, STÉPHANE ZALESKI, CNRS/Universite P. & M. Curie, WENDY W. ZHANG, University of Chicago — Recent experiments suggest that whether the rim of the liquid sheet ejected after impact remains stable against azimuthal perturbations is crucial for splash formation in large-viscosity liquids. Without air, the rim of the ejected sheet remains smooth. With sufficiently high air pressure, azimuthal undulations develop on the rim and slowly grow into a splash [Xu, PRE **75**, 056316 (2007)]. Motivated by these observations, we simulate large-viscosity liquid impact and focus on the rim dynamics when air effects are small. We found that, surprisingly, the height of the rim increases at a nearly constant rate, independent of whether the impacting drop is expanding or contracting. This decoupling of the rim growth dynamics from the overall radial deformation appears because the large-viscosity drop evolves towards a flat pancake shape. The pancake thickness is controlled by liquid viscosity and, once formed, remains constant over the duration of the impact. Thus the rim always grows from a sheet of the same thickness. We have in addition compared these results against existing scaling predictions, measurements as well as results from different numerical implements and found good agreement throughout.

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