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Monolayer Splat WENDY W. ZHANG, LUUK A. LUBBERS, QIN XU, SAM WILKEN, HEINRICH M. JAEGER, James Franck Institute and Department of Physics, The University of Chicago, Chicago, Illinois 60637, USA — We investigate experimentally and numerically the evolution of dense suspension drops that collide against a smooth solid surface and flatten into a rapidly expanding monolayer. Further expansion of the monolayer creates a lace-like pattern of particle clusters separated by particle-free regions. Agreement between the measured expansion rates, and those calculated using a force balance on the outermost particle, demonstrates that the splat expands as fast as the edge particle moves. We also present a model describing how the inhomogeneous particle distribution within the splat grows from slight initial fluctuations. Two-dimensional simulations using this model yield average instability growth rates and saturation values in quantitative agreement with measurements. This shows the spatial inhomogeneity can be captured by balancing forces acting on individual particles as well.

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