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The effect of drop size on splash PRIYANKA JINDAL, LEI XU, SIDNEY NAGEL, University of Chicago — Recently Xu, et. al ¹ discovered that the splash created when a liquid drop hits a smooth, dry substrate disappears if the surrounding air pressure is lowered below a certain threshold value. In the same experiment, the dependence of this threshold pressure on the liquid drop's velocity, fluid viscosity and molecular weight of the surrounding gas, was measured. Those measurements suggest a criterion for the onset of splashing that includes a certain dependence on the drop size. Here we investigate this dependence of the threshold pressure on drop size. It is shown that the proposed scaling relations work well for the regime of high velocity impact. There is another regime at low impact velocity with different dependence on the control parameters. We see that the crossover velocity between the two regimes shifts as the drop size and fluid viscosity are varied.

¹L. Xu, W. W. Zhang, and S. R. Nagel, Phys. Rev. Lett. 94, 184505 1-4 (2005)

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