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Droplet Formation and Scaling in Dense Suspensions MARC MISKIN, HEINRICH JAEGER, University of Chicago — A drop detaching from a nozzle is a prototypical example of scaling behavior. For a pure fluid, this scaling is contingent on the fact that the material parameters remain invariant throughout the detachment. However, for a dense suspension, this assumption is invalid. We use high-speed photography to examine the formation of suspension droplets. We find that the minimum neck radius, R_m, near breakup can be described by a power law $(t_b - t)^{2/3}$, with a material independent exponent. By considering how particles deform the surface and appealing to topological constraints, we develop a modified version of the Laplace-Young equation relating the surface pressure to the macroscopic Gaussian curvature. This model, combined with a scaling argument, allows us to collapse all of our data for R_m near breakup. These results open a new territory for modeling suspensions by asserting that a major stress resides at the boundary, and that it can be calculated using strictly macroscopic parameters.

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