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Thin Sheet Formation in Viscous Splash MICHELLE DRISCOLL, SIDNEY NAGEL, James Franck Institute, University of Chicago — Ambient air is crucial for creating a splash on smooth dry surfaces for both viscous and inviscid liquids.[1] In a viscous splash, the drop initially spreads in the form of a thick lamella until t_{ejt} at which time it emits a thin fluid sheet. We have previously shown that t_{ejt} is set by the ambient pressure and the liquid viscosity, and shows only a weak dependence on drop impact velocity and surface tension.[2] We have measured the thickness of the ejected sheet using absorption measurements of a dyed liquid drop. The ejected sheet has a thickness $\sim 10\ \mu m$ that is approximately a tenth the thickness of the lamella preceding it. Using high-resolution, high-speed photography we have observed that as the ejected sheet expands, air bubbles are entrained into the trailing lamella. The bubble size increases as the lamella velocity decreases. Air entrainment ceases at a critical lamella velocity, $v_c \sim 1.2\ m/s$, which appears to be independent of drop impact velocity as well as the ambient pressure. At the critical velocity, the bubble radius is approximately 30 μm.

[1]L. Xu, *Phys. Rev. E* **75**, 056316 (2007); L. Xu *et al.*, *Phys. Rev. Lett.* **94**, 184505 (2005).
[2]M. Driscoll *et al.*, *DFD 2008* BAPS.2008.DFD.AG.5

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