The viscous Savart sheet EMMANUEL VILLERMAUX, Aix Marseille
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We study the viscous version of the planar Savart sheet problem, using an impacting
liquid jet up to 300 times more viscous than water. Two surprising observations are
made, contrasting with the traditional case introduced by Savart where viscosity
plays no role: First, if the radius of a viscous sheet is typically reduced compared
to the water case for a given jet radius and impacting velocity, the smooth/flapping
transition is delayed, allowing for smooth sheet radii substantially bigger than those
permitted with water at large impacting Weber number. Second, the drop size
distribution is bimodal, with a substantial fraction of the drops having a very small,
well defined diameter. We understand these two facts in terms of an additional
model experiment, and simple physical arguments.

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