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Thermal rupture of a free liquid sheet JENS EGGERS, University of Bristol, GEORGY KITAVTSEV, University of Oxford, MARCO FONTELOS, Instituto de Ciencias Matematicas — We consider a free liquid sheet, taking into account the dependence of surface tension on the temperature or concentration of some pollutant. The sheet dynamics are described within a long-wavelength description. In the presence of viscosity, local thinning of the sheet is driven by a strong temperature gradient across the pinch region, resembling a shock. As a result, for long times the sheet thins exponentially, leading to breakup. We describe the quasi-one-dimensional thickness, velocity and temperature profiles in the pinch region in terms of similarity solutions, which possess a universal structure. Our analytical description agrees quantitatively with numerical simulations.

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