Abstract Submitted
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The effects of viscosity and pressure on the bursting of a drop in a Hele-Shaw cell[1] ANDREW WHITE, THOMAS WARD, North Carolina State University — As one fluid is injected into another fluid of greater viscosity, instabilities occur in the form of fingers which extend radially from the injection point (Saffman & Taylor, Proc. R. Soc. Lon. A, 1958). As the lower-viscosity fluid reaches the free surface it rapidly bursts through the higher- viscosity fluid (times are typically less that 50 ms for our system) and a pressure drop occurs. This pressure drop induces the shrinking of the non-bursting fingers. By varying the air pressure and water-glycerol viscosity we study this process by analyzing sequences of images prior and after the bursting event inside a Hele-Shaw cell with a gap spacing of between 10 and 500 micrometers. It has been shown that in a micro-scale environment the effects of gravity are negligible as fluid flow is dominated by capillary forces, thus such a setup would behave in space just as it does on Earth. Therefore it may then be possible to use hot air injected into a Hele-Shaw cell filled with water to generate steam in a microgravity environment.

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