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Breakup of impulsively actuated jets from thin films C. FREDERIK BRASZ, MATTHEW BROWN, Princeton University, YIANNIS VENTIKOS, University of Oxford, CRAIG ARNOLD, Princeton University — Understanding the breakup of liquid jets into droplets is important for printing applications, and much progress has been made on slender jets emanating from nozzles (as in inkjet printing). A more recent alternative to inkjet printing is blister-actuated laser-induced forward transfer (BA-LIFT), in which a laser pulse is absorbed in a polymer layer adjacent to a thin film of ink, forming an expanding blister that ejects ink as a jet. The lack of a nozzle allows for a wider range of inks, and the formation of the jet from an expanding blister in a thin film significantly changes the fluid physics. We study the breakup of these jets computationally by forcing an ink film with a boundary that deforms according to experimental time-resolved measurements of expanding blisters. Computational results are compared with experimental images, and parametric studies explore the effects of varying properties like laser energy, ink viscosity, surface tension, and film thickness on jet breakup. Scaling arguments are presented to justify the observed power laws for these parametric studies.

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