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The fluid transport in inkjet-printed liquid rivulets TIMOTHY SINGLER, LIANG LIU, XIAOZE SUN, YUNHENG PEI, State Univ of NY - Binghamton, MICROFLUIDIC AND INTERFACIAL TRANSPORT LAB TEAM
— Inkjet printing holds significant potential for the controlled deposition of solution-processed functional materials spanning applications from microelectronics to biomedical sciences. Although theoretical and experimental investigations addressing the stability criteria of the inkjet-printed liquid rivulets have been discussed in the literature, the associated transport phenomena have received little attention. This study focuses on the experimental investigation of printed rivulets, stable with respect to Rayleigh-Plateau, but exhibiting bulge instability. The morphological evolution and the depth-resolved flow field of the rivulets were assessed via high-speed imaging in conjunction with micro-PIV. We discuss in detail effects of repetitive wave motion induced by periodic drop impact at the leading edge and the associated pulsatile flow, as well as the persistent nonuniform mass distribution in the ridge region of the rivulet. The results provide an experimental foundation for more detailed theoretical modelling of printed rivulet flows.

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