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Flow Focused steady liquid jetting by gas: numerical and experimental studies on the minimum flow rate MIGUEL A. HERRADA, ANTONIO OJEDA-MONGE, ESI, Universidad de Sevilla, Spain, BLUTH BENJAMIN, University of California, Irvine School of Medicine, ALFONSO M. GANAN-CALVO, ESI, Universidad de Sevilla, Spain — A direct axisymmetric VOF numerical simulation on flow-focused liquid jetting by gas, and a collection of detailed experiments are presented in this work. The minimum liquid flow rate for which steady jetting is possible is analyzed both from the numerical and the experimental sides. In particular, a strong recirculation is observed in the numerical simulations to take place inside the conical meniscus and is found to play an important role on the global stability of the system. Close to the minimum liquid flow rate for steady jetting, the recirculation cell penetrates deep into the feed tube. Besides, the jet size reported agrees very well with a simple theoretical prediction (Ganan-Calvo 1998, Phys. Rev. Lett. 80, 285). In addition, the transition from jetting to dripping is numerically analyzed in detail in some illustrative cases, showing a remarkable agreement with experiments.

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