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Dynamics of viscous jet under electric field TIANTIAN KONG, ZHOU LIU, LIQIU WANG, HO CHEUNG SHUM, The University of Hong Kong — In this work, we study the folding and unfolding of viscous jets under an electric field. We show that the geometry of the jet responds sensitively to electric field and changes the jet dynamics accordingly. We demonstrate that a stable viscous straight jet can be induced to fold, and the folding morphology can be precisely tuned by varying the electric field. Under a controlled electric field configuration, a folded viscous jet can also be induced to unfold. We further confirm that viscous folding occurs only when a jet is sufficiently compressed and has an aspect ratio above a critical value, often known as the critical slenderness. The precise control of folding morphology is potentially useful for fabrication of nano-scaled features. Moreover, the underlying mechanisms have important implications for applications such as 3-dimensional printing and polymer processing, in which dispensing and manipulating of flowing viscous jets are of great importance.

Tiantian Kong
The University of Hong Kong

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