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**Capillary breakup of fluid threads within confinement**[1] GUOQING HU, CHUNDONG XUE, XIAODONG CHEN, Institute of Mechanics, Chinese Academy of Sciences — Fluid thread breakup is a widespread phenomenon in nature, industry, and daily life. Driven by surface tension (or capillarity) at low flow-rate condition, the breakup scenario is usually called capillary instability or Plateau–Rayleigh instability. Fluid thread deforms under confinement of ambient fluid to form a fluid neck. Thinning of the neck at low flow-rate condition is quasistatic until the interface becomes unstable and collapses to breakup. Underlying mechanisms and universalities of both the stable and unstable thinning remain, however, unclear and even contradictory. Here we conduct new numerical and experimental studies to show that confined interfaces are not only stabilized but also destabilized by capillarity at low flow-rate condition. Capillary stabilization is attributed to confinement-determined internal pressure that is higher than capillary pressure along the neck. Two origins of capillary destabilization are identified: one is confinement-induced gradient of capillary pressure along the interface; the other is the competition between local capillary pressure and internal pressure.

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