Abstract Submitted
for the DFD17 Meeting of
The American Physical Society

Anisotropic instability of a stretching film BINGRUI XU, MINHAO LI, DAOSHENG DENG, Fudan Univ — Instability of a thin liquid film, such as dewetting arising from Van der Waals force, has been well studied, and is typically characterized by formation of many droplets. Interestingly, a thin liquid film subjected to an applied stretching during a process of thermal drawing is evolved into an array of filaments, i.e., continuity is preserved along the direction of stretching while breakup occurs exclusively in the plane of cross section. Here, to understand this anisotropic instability, we build a physical model by considering both Van der Waals force and the effect of stretching. By using the linear instability analysis method and then performing a numerical calculation, we find that the growth rate of perturbations at the cross section is larger than that along the direction of stretching, resulting in the anisotropic instability of the stretching film. These results may provide theoretical guidance to achieve more diverse structures for nanotechnology.

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Date submitted: 29 Jul 2017 Electronic form version 1.4