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Breakup of a finite length fluid film JAVIER DIEZ, Instituto de Fisica Arroyo Seco, Universidad Nacional del Centro, LOU KONDIC, Department of Mathematical Sciences, New Jersey Institute of Technology — We study the process of dewetting of thin liquid films using a long-wave approximation for the film thickness, h, under partial wetting conditions. The governing equation for h includes the effects of surface tension as well as those of the gravity force, and incorporates an additional conjoining/disjoining pressure term to account for intermolecular forces. We perform standard linear stability analysis of infinite flat films, and identify the corresponding stable, unstable and metastable regions. Within this framework, we analyze the evolution of a semi-infinite film of length L in one direction. The numerical simulations show that for long and thin films, the dewetting at the extremes of the strip generates a pearling process consisting of successive stages of formation of bumps at the ends and consecutive pinch off behind these bumps. On the other hand, for shorter and thicker films, the evolution ends up by forming a single central drop. The time evolution as well as the final drops pattern shows a competition between the dewetting mechanisms caused by nucleation and by free surface instability.

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