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**Rivulet formation in falling liquid films**[1] GIANLUCA LAVALLE, JULIEN SEBILLEAU, DOMINIQUE LEGENDRE, Institut de Mcanique des Fluides de Toulouse (IMFT), Toulouse, France — When a thin liquid film falls down an inclined or vertical plane, a capillary ridge develops behind the advancing contact line. For sufficiently thick ridges, rivulets appear as a result of the contact-line instability. The formation of such complex liquid structures might degrade the performances of several industrial applications, such as coating, aerodynamic efficiency and chemical processes. We investigate the dynamics of liquid films of partially wetting fluids falling down a vertical plane. We are particularly interested in the fingering instability and the distribution of rivulets. Based on direct numerical simulations, we study the influence of initial contact-line perturbations and pre-existing surface contaminations upon the fingering topology. Interestingly, varying the wavenumber of the initial sinusoidal contact-line perturbation leads to different rivulet topologies and root velocities. Meanwhile, the presence of a pre-existing sufficiently large drop forces the formation of a rivulet where the drop and the contact line interact, thus destroying the symmetry of the flow. Finally, we discuss the wetted area for several surface contaminations in the form of pre-existing random drops.

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