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Bouncing and coalescence of droplets on falling liquid films¹ ZHIZHAO CHE, AMANDINE DEYGAS, OMAR MATAR, Imperial College London — When a droplet impacts on a falling liquid film, the outcome depends on the fluid properties of the droplet, its speed, and angle of incidence, as well as on the film flow rate and associated flow regimes. In this study, the oblique impact of droplets on a falling liquid film is investigated experimentally. The falling film is created on an inclined substrate and the Reynolds number is varied. Droplets with different sizes and different speeds are used to study the impact process for different Weber and Ohnesorge numbers. Different phenomena of droplet impact are identified and analysed, such as bouncing, partial coalescence, total coalescence, and splashing. An impact regime map is generated, and the effects of droplet impact speed and size, and the film flow rates are studied. The propagation of waves on the liquid film post-impact is analysed. The results show that the flowing film can significantly affect the impact process of droplets, and the latter can alter the propagation of waves on the falling film.

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