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Liquid rims collisions and the formation of fines BAPTISTE NÉEL, EMMANUEL VILLERMAUX, Aix Marseille Université, CNRS, Centrale Marseille, IRPHE UMR 7342, 13384 Marseille, France — As an elementary mechanism for the formation of drops from liquid sheets, we investigate the collision of liquid cylinders. This results from the opening of two nearby holes on a liquid film, growing at a constant speed while collecting liquid into two rims, eventually colliding with each other. In this surface tension driven phenomenon, a unique Weber number $We = \rho(2V)^2 2a/\sigma$ controls a variety of behaviors (ρ, σ are the liquid density and surface tension, and $2V$ the relative velocity of the impinging rims, each of individual radius a). At low We, the rims merge through an inelastic, dissipative collision which produces a corrugated ligament, finally breaking into drops of size scaling like a, on average. Above a critical $We_c \approx 60$, the collision leads to a splash, with the formation of a thin transverse liquid sheet. We will describe the expansion-retraction dynamics of this secondary sheet and its destabilization, responsible for the production of a mist of finer droplets. These alter sensibly the mean, and overall drops size distribution, thus weighted by a substantial fraction of so-called fines.

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