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Splash and droplet ejection after disc impact on a liquid IVO R. PETERS, DEVARAJ VAN DER MEER, University of Twente, The Netherlands, JOSE MANUEL GORDILLO, Universidad de Sevilla, Spain — When a circular disc hits a water surface, a thin sheet of liquid is ejected close to the edge of the disc. Surface tension deforms the tip of this sheet into a rim which, depending on the experimental conditions, becomes unstable and ejects small droplets. At the region very close to the edge of the disc and for times close to the moment of impact, we find that the liquid sheet shows a clear self-similar behavior for any value of the Weber number provided that $Fr = U^2/(gR_{disc}) > 1$. We demonstrate, by using both experimental results and boundary-integral simulations, that the ejection of droplets in this experiment is caused by a Rayleigh-Taylor instability. This results from a strong downwards pointing acceleration present in the liquid sheet, much larger than the gravitational acceleration. By determining the length-scale and the acceleration at the tip of the sheet, we show that the transition to droplet ejection occurs when the Bond number is of order 1.

Devaraj van der Meer
University of Twente, The Netherlands

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