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Bursting of dilute emulsion-based liquid sheets driven by a Marangoni effect CHRISTIAN LIGOURE, LAURENCE RAMOS, CLARA VERNAY, L2C UMR5 521 University of Montpellier & CNRS, SOFTMATTER TEAM — We study the destabilization mechanism of thin liquid sheets expanding in air and show that dilute oil-in-water emulsion-based sheets disintegrate through the nucleation and growth of holes that perforate the sheet. The velocity and thickness fields of the sheet are not perturbed by holes and hole opening follows a Taylor-Culick law. We find that a pre-hole, which widens and thins out the sheet with time, systematically precedes the hole nucleation. The growth dynamics of the pre-hole follows the law theoretically predicted for a liquid spreading on another liquid of higher surface tension due to Marangoni stresses. Classical Marangoni spreading experiments quantitatively corroborate those findings.

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