Abstract Submitted
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Stability of a falling viscous sheet CLAUDE PERDIGOU, University Paris 6, GILLES PFINGSTAG, Saint Gobain Recherche Aubervilliers, BASILE AUDOLY, University Paris 6 and CNRS, AREZKI BOUDAOUD, Ecole Normale Superieure de Lyon and CNRS — Falling films can be found in various processes of the food, glass and polymer industry. We study thin viscous films flowing vertically under the action of gravity, when poured from a slit. The lateral sides are unconstrained and the stretching effect of gravity induces a narrowing of the film in the horizontal direction, by Poisson's effect. This leads to compressive stress for some range of parameters, and we study the associated viscous buckling instabilities. A local stability analysis is used to characterized the flow parameters leading to potential instabilities. A global stability analysis is carried out, and an eigenvalue problem is solved numerically. This is implemented using the finite-element method with high order derivatives.

Claude Perdigou
University Paris 6

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