Abstract Submitted
for the DFD15 Meeting of
The American Physical Society

Thin liquid film in polymer tubing : dynamics and dewetting in partial wetting condition PASCALINE HAYOUN, Soft Matter Sciences and Engineering, ESPCI ParisTech, France, ALBAN LETAILLEUR, Composites and Coatings Department, Saint-Gobain Research, France, JÉRÉMIE TEISSEIRE, Glass Surface and Interface, Saint-Gobain/CNRS, France, EMILIE VERNEUIL, FRANÇOIS LEQUEUX, ETIENNE BARTHEL, Soft Matter Sciences and Engineering, ESPCI ParisTech, France — Polymers such as PVC and Silicone are low cost materials widely used in industry to produce tubing for fluid transport. Most of these applications involve repeated, intermittent flow of liquids which can lead to unwanted contamination. This study aims at better understanding contamination mechanisms during intermittent flow in polymer tubing, and at elucidating the relation between flow, wetting and contamination. We experimentally and theoretically investigate, flow regimes as well as dewetting process at the triple line induced by gravity flow of a vertical liquid slug in a cylindrical geometry. Our results for Newtonian fluids evidence a succession of thick film formation, hydraulic jump creation in the thickness profile, oscillatory regime and destabilization leading to substrate contamination. In order to understand theoretically the flow, one crucial quantity to assess is the film thickness in the inside of the tube. Based on an absorption measurement method, we provide explanations for behaviors and flow regimes observed experimentally.

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Date submitted: 22 Jun 2015 Electronic form version 1.4