

Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Capillary rise of oil in an aqueous foam KEYVAN PIROIRD, ÉLISE LORENCEAU, Laboratoire Navier, UMR 8205 du CNRS, Champs-sur-Marne, France — Oil is usually known as an anti-foaming agent. Yet, it has been shown that oil droplets present in the foaming solution can have the opposite effect and stabilize a foam when unable to cross the air/water interface. In these previous studies, oil is first emulsified and then mixed with air to generate a foam. In this work, we report experiments where an aqueous foam is put in direct contact with a large oil drop. With the appropriate choice of oil and surfactants, oil spontaneously invades the liquid network of the foam without damaging it. We study the dynamics of penetration at the scale of a single Plateau border, that acts as a “liquid capillary tube” in which oil flows in an unbroken stream. At the end of the experiment, a long and stable cylinder of oil is formed in the Plateau border. This cylinder breaks up into droplets when, following a rearrangement, oil is transferred from the Plateau border to a soap film.

Keyvan Piroird
Laboratoire Navier, UMR 8205 du CNRS, Champs-sur-Marne, France

Date submitted: 31 Jul 2012

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