EIDGENÖSSISCHE TECHNISCHE HOCHSCHULE LAUSANNE
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Institut de Génie Mécanique

ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

Seminar given by Dr. Benjamin Dollet on March 15, 2012, at 14:00

CNRS, Université Rennes 1, France

Foams, bubbles and films : mechanics at liquid interfaces

I will first present my original approach on liquid foam rheology, focussed on two-dimensional flows in complex geometries (around obstacles, or in a constriction). Detailed image analysis of experiments enables to quantify precisely the mechanical state of the foam at the local scale, revealing the subtle interplay between elasticity, plasticity and flow. This approach is exemplified with the inverse lift experienced by an airfoil placed in a foam flow.

In the context of contrast agents for medical imaging, I will then describe the oscillations of coated bubbles in response to ultrasound. I will show how the mechanical properties of the bubble shell influence the linear bubble response, and enhance its nonlinear response. I will also present our studies on bubble/bubble and bubble/wall interactions, and on the pinch-off process during bubble formation in flow-focussing devices.

Finally, I will present my recent results on viscous dissipation in thin films, in the context of the flow of single films, film trains, or foams. I will mainly focus on the simple case of a single soap film pushed through a tube, which behaviour will be showed to strongly depend on the mechanical resistance of the liquid/air interface.