

Liquid foam and soap film vibrations

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A liquid foam is a soft porous material, which consists of gas bubbles separated by liquid membranes stabilised by tensioactive molecules. We investigate the response of the foam to a vibration (acoustic) wave. Since the foam is multiphasic and structured at a mesoscopic scale, its behaviour in response to a vibration wave is complex.

We present here some experimental evidences of the interaction between the vibration wave and the physical properties of the foam, through

- (i) the modification of an acoustic wave by the foam,
- (ii) the adaptation of the foam to the wave.

Whereas the first point involves macroscopic acoustical measurements (sound velocity and attenuation by the foam), the second point presents observations at the scale of the bubble: heterogeneous distribution of the liquid content due to the wave (see image below), soap film vibration and bursting. Those experiments are a starting point of a vast subject of investigation: the acoustic properties of liquid foams.



Vibrating “bamboo” foam in a tube: a standing acoustic wave is present in the tube; a swelling of the soap films is observed at the antinodes of the wave: the thicker soap films appear white on the image.

Session: Microstructure, morphology and acoustical properties

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