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*bulging_membrane_in_1Hz_70mV_ac_field_with_marangoni_flow
_till_rupture_12fps_xvid_small.avi*

The video shows a Black Lipid Membrane (BLM) made of DPhyPC (1,2-diphytanoyl-sn-glycero-3-phosphocholine) in aqueous buffer solution (preparation details see MS) imaged by a divergent partially coherent x-ray beam.

The freestanding film is bulged by application of a hydrostatic pressure on one side of the interface. Due to the extension of the film the Marangoni flow drives solvent from the surrounding torus, i.e. the Plateau-Gibbs-border, into the film. The BLM thickness and consequently the phase shift of the interacting x-ray wave front increase. As a result, the BLM, which originally cannot be resolved in the finally thinned state at this propagation distance, becomes visible. Due to adhesion forces of the two monolayers and the hydrophobic support the solvent is squeezed out and the BLM starts to thin again.

In addition an AC field (1 Hz frequency, 70 mV amplitude) excites the BLM resulting in an oscillatory behavior at the beginning.

Experimental details: effective propagation distance: $z_{\text{eff}}=67.83$ mm; magnification: $M=6.575$; effective pixel size: 143 nm; illumination time: $t=250$ ms.

Video details: frame rate: 12 fps (3 times faster than real time); resolution: 640 pixel x 480 pixel