

Abstract Submitted
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From viscous to elastic sheets: Dynamics of smectic freely floating films¹ KIRSTEN HARTH, KATHRIN MAY, TORSTEN TRITTEL, RALF STANNARIUS, Otto von Guericke University Magdeburg — Oscillations and rupture of bubbles, composed of an inner fluid separated from an outer fluid by a membrane, represent an old but still immensely active field of research. Membrane properties except surface tension are often neglected for simple fluid films (e.g. soap bubbles), whereas they govern the dynamics in systems with more complex membranes (e.g. vesicles). Due to their layered phase structure, smectic liquid crystals can form stable, uniform and easy-to handle fluid films of immense aspect ratios. Recently, freely floating bubbles detached from a support were prepared. We analyze the relaxation from strongly non-spherical shapes and the rupture dynamics of such bubbles using high-speed video recordings. Peculiar dynamics intermediate between those of simple viscous fluid films and an elastic response emerge: Oscillations, slowed relaxation and even the formation of wrinkles and extrusions. We characterize these phenomena and propose explanations.

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