

Buoyant objects in vertical soap films

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An analogy can be drawn between density stratified fluids, like oceans or atmosphere, with vertical soap films, which are stratified in thickness. To study this analogy, we have built an experimental set up to create large steady soap films, with dimensions of 10 x 25 cm². Fed from the top by a syringe pump, each film typically shows a lifetime from a few minutes up to one hour. We use two methods based on interferometry effects to measure the thickness profile. This experimental set up allows us to introduce hair rings in the soap film to probe buoyancy effects. In particular, we study the presence of an effective Archimède's force, as each ring stabilizes at an equilibrium thickness in the film. This equilibrium position is measured experimentally as a function of ring properties (mass and radius) and compared to theoretical predictions. Additionally, by displacing the rings from their equilibrium position, we study how the ring relaxes to this position.