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Mechanical properties of giant folds in a Langmuir monolayer[1]
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— We study the mechanical properties of giant folds in a catanionic monolayer at the air water interface. The system of study is a dioctadecyldimethylammonium bromide (DODAB) and sodium dodecyl sulfate (SDS) monolayer which folds upon compression in a Langmuir trough. Carboxylate-coated polystyrene beads (1 micron diameter) are attached to the monolayer in order to track its displacement with epifluorescence microscopy and particle image velocimetry. This analysis yields a measurement of the velocity of the monolayer around the fold. The quantities of monolayer material entering and leaving the fold are recorded as well. Maximum material velocities and fold depths are found to be on the order of 0.1 mm/s and 1 mm, respectively. Analysis also reveals that the unfolded material displacement follows a characteristic curve. Mechanical properties of the monolayer are also probed with optical tweezer microrheology.

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