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Phase behavior of a binary phospholipid/cholesterol Langmuir monolayer: comparison of Brewster angle and fluorescence microscopy
FANINDRA BHATTA, PRITAM MANDAL, DAVID ALLENDER, ELIZABETH MANN, Dept. of Physics, Kent State University, Kent OH 44242, YASMIN ISLER, Dept. of Chemistry, KSU, Kent OH 44242, EDGAR KOOLJMAN, Dept. of Biology, KSU, Kent OH 44242, ANDREW BERNOFF, Dept. of Mathematics, Harvey Mudd College, Claremont, CA 91711 — The binary mixture of dihydrocholesterol and dimyristoyl phosphatidylcholine exhibits two liquid phases at the air/water interface: a cholesterol-rich and a phospholipid-rich phase, with a well-known critical point at a critical composition. Approaching that point with increasing monolayer pressure, the differences between phases disappear, along with the line tension between phases. In our experiments, the line tension is determined through comparison of the relaxation of domain shapes towards equilibrium with a compact, numerically tractable boundary integral model for the system hydrodynamics. We use both fluorescence microscopy and Brewster angle microscopy to visualize the lipid monolayer, and find the two methods have significant differences in monolayer behavior near the critical point.

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