Abstract Submitted
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Line tension and entropy in a liquid crystal Langmuir film[1] ELIZABETH MANN, PRITAM MANDAL[2], JOSEPH YARZEBINSKI, NABIN THAPA, Department of Physics, Kent State University, J. ADIN MANN, Department of Chemical Engineering, Case Western Reserve University — Often two or more phases coexist within a monolayer or bilayer; the connection between these and possible dynamic or static microdomains within cell membranes is still debated. The line tension associated with the boundary between two phases within a monolayer or bilayer controls the size distribution, shape, and dynamics of domains. Theoretical models for this energy remain relatively untested. This work considers a model fluid system, trilayer/monolayer coexistence within a Langmuir film. The line tension associated with the boundary between these phases is measured as a function of temperature over a large range (12-37°C). Compact, isolated trilayer domains are stretched from their equilibrium circular shape, and the free relaxation is analyzed with a hydrodynamic model previously tested by Wintersmith et al. [1] Line tension decreased with rising temperature. A careful treatment of the thermodynamics of the line boundary allow us to estimate the line entropy associated with the trilayer, and to test possible models for the boundary.

[1] Wintersmith, Jacob R.; Zou, Lu; Bernoff, Andrew J.; Mann, J. Adin Jr; Kooijman, Edgar E.; and Mann, Elizabeth K.. "Determination of Interphase Line Tension in Langmuir Films." Physical Review E 75 (2007).

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