Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Biomembranes that respond to specific triggers by phase separating MATTHEW LEROUX, MATTHEW FRANTES, VERNITA GORDON, Center for Nonlinear Dynamics and Department of Physics, University of Texas at Austin — Lipid membranes are widely used as models for the cell membrane and for applications such as encapsulation, delivery, and controlled release. We have recently found that when membranes adhere nonspecifically, the adhesion site favors the nucleation and growth of more-ordered lipid phases. The physics behind this, which works by suppressing membrane fluctuations, should be applicable to specifically-adhering membranes as well. This will allow better experimental models for cell adhesion, which is mediated by transmembrane proteins and associated with lipid heterogeneities, and also indicates a new category of pathways for making 'smart,' responsive materials out of lipid membranes. We are transforming our previous, non-specifically adhering systems into membranes that specifically adhere to a surface via binder molecules. We will determine the thresholds for forming ordered phases as a function of binder stiffness, length, and density, compatibility of the binder structure with the molecular packing of lipids in these phases, and membrane properties such as bending modulus and proximity to a phase transition.

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Date submitted: 28 Nov 2010 Electronic form version 1.4