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Curvature-induced microphase separation and lipid polar localization in cell membranes - I RANJAN MUKHOPADHYAY, Clark University, KERWYN HUANG, NED WINGREEN, Princeton University — Recent research has revealed the prevalence of lipid domains and heterogeneities in biological cell membranes: examples include lipid rafts found in the outer leaflet of eukaryotic plasma membranes and polar localization of the phospholipid, cardiolipin, in bacteria. One of the mysteries has been why domains obsereved in biological cell membranes, such as lipid rafts which are believed to be 10-100 nanometers in size, appear to be much smaller than micron-sized domains observed in model multicomponent lipid vesicles. In this talk we will develop a minimal model for membrane energetics that accounts for the coupling of the bilayer to an elastic substrate such as the actin cortex or cell wall, and will demonstrate how this coupling can lead to microphase separation and formation of stable lipid domains.

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