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Theory of Kinetics of Registration and Anti-Registration in Lipid Bilayers PETER OLMSTED, JOHN WILLIAMSON, Georgetown University — Lipid bilayer leaflets are often treated as if they are coupled; i.e., that the two leaflets undergo simultaneous transitions between phases, and that domains involve both leaflets together in a registered fashion. We present theory and simulation showing how interleaflet couplings and hydrophobic mismatch can lead to a complex phase diagram with multiple metastable two-phase and three-phase states. Many of these states can be discerned in the experimental literature, and are expected in the early stages of coarsening when domains are sub-micron (and thus perhaps of significance to lipid rafts). We present different kinetic scenarios for transitions between these state, and show how lipid flip flop can surprisingly lead to non-symmetric anti-registered patterns.

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