Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Theory of Microphase separation in bidisperse Chiral membranes

RAUNAK SAKHARDANDE, STEFAN STANOJEVIEA, ARVIND BASKARAN, MICHAEL HAGAN, APARNA BASKARAN, BULBUL CHAKRABORTY, Brandeis University — We discuss the phase behavior of bidisperse chiral colloidal membranes, which are monolayers of rodlike molecules containing two species of rods, each with opposite handedness. Using a Ginzburg Landau theory, we show that the system exists in three stable states, separated by first-order phase transitions: a compositionally homogeneous state, macrophase separation between the two rod species, and a micro-phase separated state in which the minority rod species forms circular domains with a well-defined, narrow size distribution. We find that the phase behavior can be controlled by tuning two parameters, one associated with the driving force for membrane assembly, and the other related to the difference in chirality between the two rod species. We discuss implications of the calculated phase diagram for a recently developed experimental system in which bidisperse colloidal membranes comprised of two species of rodlike viruses exhibit micro-phase separation.

Raunak Sakhardande
Brandeis University

Date submitted: 06 Nov 2015 Electronic form version 1.4