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**Exploring fluctuations in colloidal membranes with optical microscopy** JEROME FUNG, Wellesley College, ZVONIMIR DOGIC, Brandeis University — We discuss colloidal suspensions of rodlike particles that can self-assemble into monolayer membranes. The particles consist of ∼1-$\mu$m-long, ∼7-nm-diameter rodlike viruses. Adding a non-adsorbing polymer to a suspension of these virus rods induces a short-ranged attraction between the rods. This attraction can result in the formation of large sheets, one rod length thick, in which the rods lie parallel to each other. These colloidal membranes behave like biological lipid membranes, but are much easier to study with light since the virus rods are much larger than lipid molecules. We discuss measurements of two types of thermal fluctuations in these colloidal membranes using optical microscopy. First, we use an interferometric technique, reflection interference contrast microscopy, to measure height fluctuations of a membrane resting above a glass surface. These measurements may enable studies of the as yet unknown contribution of Gaussian curvature to the membrane free energy. Second, we examine membranes consisting of two types of viruses, one longer than the other, in which the long and short viruses can phase separate. We explore the free energy of the edges of phase-separated domains by measuring edge fluctuations using fluorescence microscopy.

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