

Abstract Submitted
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Nanoparticle-induced domain formation in zwitterionic lipid membranes MEENAKSHI DUTT, ERIK LUIJTEN, University of Illinois at Urbana-Champaign — Charged nanoparticles have been found to induce coexistence of gel and fluid states in a pure zwitterionic membrane¹ due to electrostatic interactions between the nanoparticle and the adjacent membrane monolayer. Analogies can be drawn between this system and biological membranes, where domains in the vicinity of charged peripheral proteins play an important role in regulating cell activity.² To understand the differences in the structural and dynamical properties of coexisting domains in lipid membranes, we develop a coarse-grained model that represents the monolayer as a quasi two-dimensional plane of dipoles. The electrostatic interactions between the charged nanoparticle and the adjacent membrane monolayer, as well as the steric interactions within the monolayer, are incorporated explicitly. We will discuss our model and present results on the thermodynamic and structural changes in the model membrane induced by the presence of the nanoparticle.

¹Wang et al., Proc. Natl. Acad. Sci. (in press).

²Bergelson et al., Mol. Memb. Biol. **12**, 1 (1995).

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