

Abstract Submitted  
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**Membrane lateral structure: How immobilized particles can stabilize small domains**<sup>1</sup> RICHARD VINK, TIMO FISCHER, Institute of Theoretical Physics, University of Goettingen, Germany — Membranes are two-dimensional fluid environments, consisting of lipids and proteins. In model membranes, macroscopic phase separation is routinely observed, but not so in biological membranes. Instead, the lateral structure of a biological membrane is characterized by small domains. This poses an interesting puzzle because a structure of small domains inevitably implies a large amount of interface, which is unfavorable because of line tension. In this contribution, it is shown that immobilized protein obstacles provide a mechanism to compensate the cost of line tension. The presence of such obstacles in biological membranes is known to occur (arising for instance from interactions with the underlying cytoskeleton). We present results from computer simulation, which indeed show that a structure of small domains becomes stable, already at a low concentrations of quenched obstacles. In addition, these results confirm a fundamental conjecture of de Gennes, stating that a fluid with quenched obstacles belongs to the universality class of the random-field Ising model.

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