Curvature-coupled protein diffusion in a fluctuating membrane

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In this talk I will present the influence of an interaction between curved proteins and a fluctuating model membrane on the fluctuation spectrum of the membrane and the lateral diffusion of the proteins. In order to perform both analytical calculations and simulations coupled equations of motion for the membrane dynamics and the diffusion of the inclusions are derived.

The protein-membrane interaction leads, for one protein, to an altered height correlation function of the membrane that displays two time regimes. These correlation times resemble the time scale of the membrane fluctuations and of the protein diffusion. Likewise the diffusion coefficient of the protein is also affected by the curvature-coupling. An analytical expression for the resulting diffusion coefficient is derived, which is found to be smaller than the free diffusion of the protein.

After regarding one protein, the focus is directed to two proteins. Here I will discuss the interaction potential between two proteins and the additional effects on the dynamics of the system.