

Fluctuations of a Single floating Lipid Bilayer: a Specular and Off-specular Reflectivity Study

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We have recently succeeded in preparing samples consisting of a homogeneous lipid bilayer (di-acyl phosphocholines, with 16 to 20 carbons per chain), floating near an identical bilayer deposited on the surface of a silicon single crystal.

I will first present a neutron specular reflectivity study of the temperature effect on such a floating bilayer. We determine both average and r.m.s. positions of the floating bilayer and observe a large increase of the water layer spacing. I will present an interpretation of this effect in terms of competition between the interbilayer potential and membrane fluctuations leading to an estimation of bending rigidity of the bilayer.

In the second part, I will present recent off-specular x-ray reflectivity results. We measure for the first time the fluctuation spectrum in submicrometric range on a single fluctuating bilayer leading to the determination of three main physical quantities which govern the bilayer height fluctuations: bending modulus, surface tension and wall attraction potential.

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