

X-Ray and neutron reflectivity in biophysics

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Specular reflectometry (of neutrons and X-rays, NR and XRR respectively) is a powerful technique to investigate the internal structure of thin films deposited at interfaces, such as solid-air, solid-liquid, liquid-air and liquid-liquid. This technique is very suited to investigate biological films (made of lipids, surfactants, proteins, etc...) since it probes length-scales in the nanometer range.

This lecture aim to describe the basic principle of specular reflectometry techniques for the investigation of thin bio-films. In the first part, I will describe

- i) the systems that can be studied by neutron and X-ray reflectometry
- ii) the information that can be derived from the data analysis.

In the central part of the lecture will focus more on the mathematical description of specular reflectivity curves, describing the differences in the treatments of NR and XRR data. I will close this part describing how to plan and execute a state of the art experiment.

In the final part, I will give some examples on recent applications of NR and XRR for the study of lipid membranes, protein films and their interaction with macromolecules.