

## MEMBRANES AT INTERFACES: STRUCTURE STUDIES BY AFM AND TIME-RESOLVED NEUTRON REFLECTIVITY

BEATE KLÖSGEN<sup>1</sup>, TH. SPANGENBERG<sup>1</sup>, H. NIEHUS<sup>1</sup>, T. GUTBERLET<sup>2</sup>,  
R. STEITZ<sup>2,3</sup> and G. FRAGNETO<sup>4</sup>

<sup>1</sup>Institut für Physik, HU Berlin, 10115 Berlin, <sup>2</sup>Hahn-Meitner-Institut Berlin,  
14109 Berlin, Germany, <sup>3</sup>I.-Stransky-Institut, TU Berlin, 10623 Berlin, Germany

<sup>4</sup>ILL, 38042 Grenoble, France

Model biomembranes are either organized as vesicles or as planar bilayers. These represent two principally different model systems for the investigation of biophysical processes in single bilayers. Here we report on supported planar layers prepared by precipitation of lipid molecules from vesicles in a suspension [1], and on initial studies of small peptides interacting with such model membranes. The layered sandwich consists of lipid (DMPC) mono- and bilayers that are deposited either onto a polymer grafted soft -Si/SiO<sub>2</sub> support or directly onto the hard solid surface, either hydrophobic or hydrophilic. The structural changes are monitored step by step by neutron reflectometry; appropriate contrast variation by D/H exchange provides information about the single layers. Series of reflectometry patterns were collected using the reflectometer V6, HMI, Berlin and, at high temporal resolution (~1min.), using the time-of-flight reflectometer D17, ILL, Grenoble. Data analysis applies a box model with a roughness term to account for fuzzy boundaries [Gutberlet, T. et al. Appl. Phys. A. (2001)]. The structure investigation was complemented by AFM studies that exhibited topological details and, in a phase contrast application, lateral variations in the mechanical features of the underlying surface [2,3]. As expected, the deposition and also the layer structure of the model membranes depends on the hydrophilicity of the support. This result must be considered for the proper design of model systems to study the adsorption and interaction of peptides and proteins with bilayer interfaces.

### REFERENCES

1. Wagner, M.L. and Tamm, L.K. **Biophys. J.** 79 (2000) 1400-1414.
2. Klösgen, B., Spangenberg, T., Gutberlet, T., Steitz, R. and Niehus, H. (2002) in Frühjahrstagung der DGP 2002, Regensburg.
3. Spangenberg, T., Klösgen, B., Rogaschewski, S. and Niehus, H. (2002) in Frühjahrstagung der DPG 2002, Regensburg.