CPP 37: Poster: Focus: Van der Waals at soft matter interfaces: structure and dynamics

Time: Wednesday 16:30–18:30 Location: Poster C

CPP 37.1 Wed 16:30 Poster C

Structure and Dynamics in Frustrated Liquid Crystal Films Influenced by Subsurface Substrate Material — •Kathrin Radscheit, Daniela Täuber, and Christian von Borczyskowski — nanoMA, TU-Chemnitz, Institut für Physik

Liquid crystals are known to be very sensitive to chemical and topological properties of confining interfaces. Recently we found an influence of the subsurface substrate composition on the structure in thin frustrated 8CB liquid crystal films on Si with native or 100 nm thermal oxide [1]. Observation in polarization resolved reflected light during heating from the smectic A to the nematic phase and subsequent cooling, reveales different timescales of the phase transition of thin 8CB films on the two types of substrate. We ascribe the observed differences to van der Waals interactions with the underlying silicon in case of the native oxide, whereas the thermal oxide suffices to shield those interactions. Additional information about the dynamics in thin liquid crystal films is obtained from correlations of s- and p-polarization resolved fluorescence intensities from diffusing tracer molecules, extending previous studies in unpolarized light [2].

[1] B. Schulz, D. Täuber, J. Schuster, T. Baumgärtel and C. von Borczyskowski, Soft Matter 7 (2011) 7431. [2] B. Schulz, D. Täuber, F. Friedriszik, H. Graaf, J. Schuster and C. von Borczyskowski, PCCP 12 (2010) 11555.

CPP 37.2 Wed 16:30 Poster C

Bimodal MUSIC Mode Atomic Force Microscopy on Polymers — •Eike-Christian Spitzner[1], Christian Dietz[2], and Robert Magerle[1] — [1]Chemische Physik, TU Chemnitz, D-09107 Chemnitz — [2]Center of Smart Interfaces, TU Darmstadt, D-64287 Darmstadt

Multi-set point intermittent contact (MUSIC) mode atomic force microscopy (AFM) is based on point wise recording amplitude and phase of an AFM cantilever as the tip sample distance is reduced (APD curves). The technique emulates intermittent contact mode AFM without a feedback loop that causes artifacts in height and phase images. Here, we demonstrate multifrequency MUSIC mode AFM by simultaneous excitation of the first two eigenmodes of the cantilever. Furthermore, the frequency of the first eigenmode is kept at resonance during approach to prevent damping of the amplitude caused by attractive interactions. Thus, the attractive regime in the APD curves is suppressed. This enables a straight forward calculation of the tip indentation also on surfaces that exhibit strong attractive interactions between tip and sample. We show results for collagen fibrils in bovine tendon as well as other polymeric surfaces. Furthermore, enhanced contrast in the phase images of the second eigenmode is demonstrated.