



Polymers under multiple constraints:
restricted and controlled molecular
order and mobility

Kolloquium

Thursday,
28th June 2012

at: 5.00 pm

Theoretischer
Hörsaal im
Physikalischen
Institut,
Linnéstraße 5,
04103 Leipzig

*Coffee will be served from
4.30 pm!*

Prof. Dr. Matthias Ballauff

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“Interaction of Proteins with Soft Polymeric Layers”

The interaction of proteins with solid surfaces is one of the central problems of modern biotechnology: On the one hand, adsorption on proteins must be prevented in many circumstances in order to prevent bacterial growth or biofouling, on the other hand, immobilization of enzymes on suitable solid supports is of considerable technical importance. Polymeric layers are often used to mediate protein adsorption. Thus, a precise understanding of the interaction of proteins with such a layer is of central importance. In my lecture I shall discuss this problem in detail. In particular, the role of hydrophobic attraction and of charge-charge interaction will be analysed quantitatively using well-defined colloidal particles. Two types of soft layers will be considered: 1. Polyelectrolyte brushes in which long chains of a linear polyelectrolyte are densely grafted to the surface of the spherical colloidal particles [1], and 2. charged gels consisting of crosslinked poly(N-isopropylacrylamide) in collaboration with J. Dzubiella [2,3]. All results obtained so far demonstrate that the interaction of proteins with surfaces can be understood in a semi-quantitative fashion by now.

1. K. Henzler, B. Haupt, K. Lauterbach, A. Wittemann, O. Borisov, M. Ballauff, Adsorption of beta-Lactoglobulin on Spherical Polyelectrolyte Brushes: Direct Proof of Counterion Release by Isothermal Titration Calorimetry, *J Am Chem Soc*, 2010, 132, 3159-3163.

2. N. Welsch, A. L. Becker, J. Dzubiella, M. Ballauff, Core-shell microgels as „smart“ carriers for enzymes, *Soft Matter*, 2012, in press

3. N. Welsch, J. Dzubiella, A. Graebert, M. Ballauff, Interactions between Proteins and Well-defined Microgels: The Vroman Effect Revisited, submitted