



Sonderforschungsbereich 631
Festkörperbasierte Quanteninformationsverarbeitung



SEMINARANKÜNDIGUNG

Dienstag, 27. Mai 2008

17:15 Uhr

WSI, Seminarraum S 101

“Interfacing biology with electronics at the nanometer scale”

A living cell is a beautiful example of a highly sophisticated, controlled system of nature’s nanomachines, proteins and other biomolecules, which self-assemble into various supramolecular architectures and interact in a well-defined manner at the nanometer scale.

Recent advancements in nanotechnology have created a variety of top-down techniques that can reach feature sizes of 100 nm or less, thus approaching a size range very relevant to biology. At the same time a number of self-assembly based techniques have been developed and can be used to create artificial nanostructures mimicking biological systems with similar or even superior performance.

The combination of these novel top-down and bottom-up approaches enables us to interact with complex biological systems: tissues, cells, proteins and DNA in an unprecedented manner. In addition, new tools, such as arrays of nanoparticles and nanowires can be created on a large scale with promising applications in electronic and optical biosensing.

Examples for the handling of natural and artificial macromolecular complexes at the nanometer scale will be presented. Proteins, vesicles, macromolecular assemblies, and nanoparticles specifically placed onto predefined artificial patterns can trigger defined functions in cells, reveal the details of cell-surface interactions and allow for the ultimate miniaturization of array-type sensors down to the single molecule level.

Recently, we have put a lot of efforts into achieving not only spatial but also a dynamic control over the properties of biointerfaces. Surfaces that change upon external stimuli provide us with new research tools for studying complex biological problems and for tissue engineering. Highlights for the use of novel, electronically- or photo-active surfaces for controlling the growth of neurons and for applications in biosensing and local drug delivery will also be presented.

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