Abstract of Presentation

Presentation Title:

Probing Matter at the Atomic Scale

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Abstract :

Nanoscale Science is strongly driven by Scanning Probe Techniques such as scanning Tunnelling Microscopy (STM) and Atomic Force Microscopy (AFM) which allow us to investigate and manipulate individual atoms and molecules, thus complementing electron- and ion beam techniques as well as laser spectroscopy. While the imaging capabilities of techniques such as STM, SFM, and near field optics (SNOM) etc. dominated the application of these methods at their early development stages, the physics of probe-sample interactions, and the quantitative analysis of elastic, electronic and magnetic surface and transport properties became recently of increasing interest. Force spectroscopy allows us, for example, to gain information about folding and unfolding processes of individual protein molecules and other biologically relevant systems. Beyond that we can do quantitative imaging of the potential landscape of surfaces at the atomic scale thus getting valuable data for the understanding of the atomic scale mechanisms underlying friction- and wear processes. In combination with ab-inito calculations completely new insights are obtained opening new research field such as mechano-chemistry. Recent developments of some of these techniques will be presented.

References:

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