Estimados colegas, tenemos el agrado de invitarlos a la presentación del
Dr. Wolfgang Fritzsche
del Leibniz Institute of Photonic Technology (IPHT).

Título de la Presentación:

"Bioanalytics using single plasmonic nanostructures"

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Bioanalytics using single plasmonic nanostructures

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Novel requirements for bioanalytical methods emerge due to trends such as personalized medicine or pathogen detection in environment and food. Here, novel tools for diagnostics are needed, to be used outside of dedicated laboratories and with less qualified personnel, and with minimal costs. Plasmonic nanostructures promise to provide sensing capabilities with the potential for ultrasensitive and robust assays in a high parallelization. Upon binding of molecules, the localized surface plasmon resonance (LSPR) of these structure is changed, and can be used as sensoric readout. Here the use of individual nanostructures (such as gold nanoparticles) for the detection and manipulation of biomolecules (e.g. DNA) based on optical approaches is presented [1].

The change in LSPR of individual metal nanoparticles is utilized to monitor the binding of DNA directly or via DNA-DNA interaction. The influence of different size (length) as well as position (distance to the particle surface) is thereby studied [2] using a dark-field approach developed a century ago [3]. The established serial approach is now further developed into a parallel readout using imaging spectrometric sensing based on interferometry and Fourier transformation.

Besides sensing, individual plasmonic nanostructures can be also used to manipulate biomolecular structures such as DNA. Attached particles can be used for nanolocal destruction [4] or cutting as well as coupling of energy into (and guiding along) the molecular structure [5]. The resonance of these particles can not only manipulated by their inherent properties (material, geometry) or their surrounding, but also by interferometric approaches [6].

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