Seminarkündigung

15:00 Uhr
WSI, Seminarraum S 101

“Infrared vibrational nanospectroscopy via molecular expansion force detection”

I will present a technique for very sensitive mid-infrared vibrational nanospectroscopy based on observing a deflection of an atomic force microscope cantilever due to mechanical forces exerted by molecules excited with laser pulses. Spectra are obtained by recording the cantilever deflection amplitude as a function of excitation laser wavelength. Tip-enhancement of light intensity and mechanical cantilever resonance enhancement are used to achieve nanoscale spatial resolution and ultrahigh sensitivity. Non-destructive mid-infrared spectroscopy and imaging of molecular monolayer islands is demonstrated in air with high signal-to-noise ratio and better than 30 nm spatial resolution. Approximately 300 molecules contribute to cantilever deflection in our current experiments and spectra of as few as 30 molecules would be detectable. Recent progress towards extensions of this method to operation in aqueous environment and its application to imaging Ohmic losses in plasmonic nanostructures will be discussed as well.

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