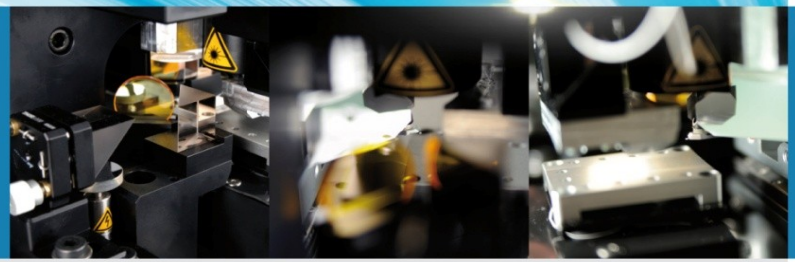
s-SNOM Microscopy – A Breakthrough in Material Research and Photonics on the Nanoscale

Hannover, 05. April 2011.

neaspec.com

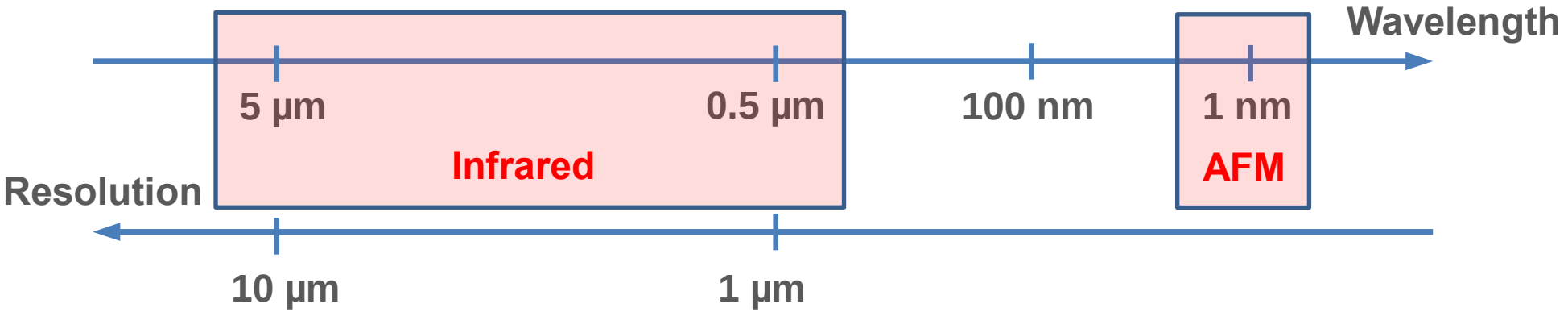


Dipl.-Ing. Roman Jordan

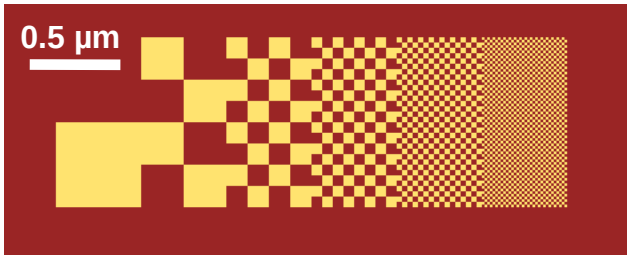
see the nanoworld
nea spec

- Spin-off in 2007 from Max-Planck-Institute of Biochemistry (Munich)
- After 15 years of R&D now introducing the NeaSNOM microscopy platform
- The only supplier of commercial apertureless NSOM microscopes
- Unique expertise in near-field microscopy as well as near-field theory
- Several key-patents in apertureless NSOM technology

Problem: Diffraction Limit in Optical Microscopy



original pattern



λ = "0"

visible

λ ≈ 0.5 µm

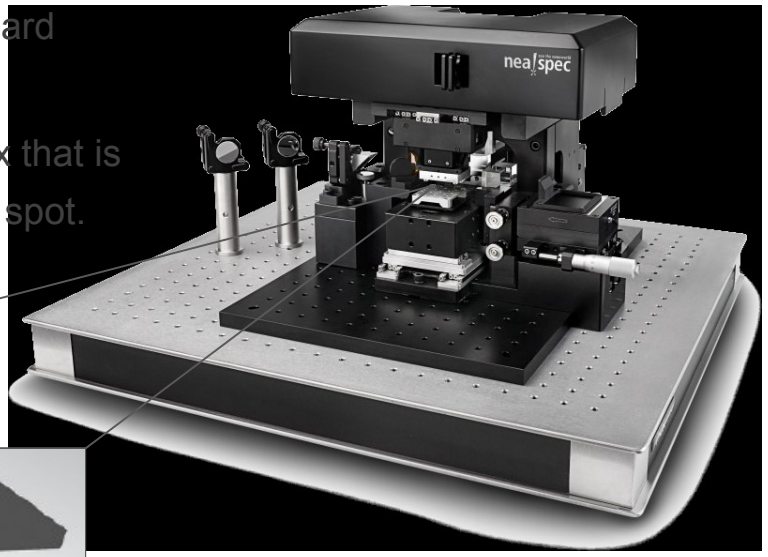
mid-infrared

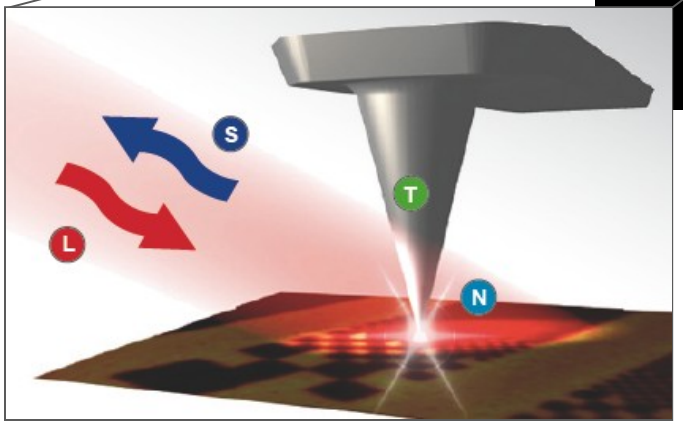
λ ≈ 10 µm

Nanotechnology demands optical nearfield microscopy with nm resolution

Solution: NeaSNOM Microscope

- A focused laser beam (L) illuminates a standard metal-coated AFM probing tip (T).
- The tip generates a nano-focus (N) at its apex that is much smaller than the diffraction-limited laser spot.



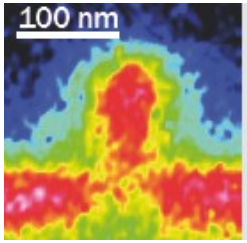


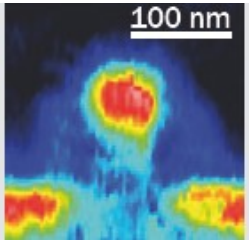
- The nano-focus (N) is used to locally probe the sample.
- Optical imaging is performed by recording the light scattered (S) by the probing tip while scanning the sample surface.

Optical resolution of better than 20 nm – even in infrared and terahertz

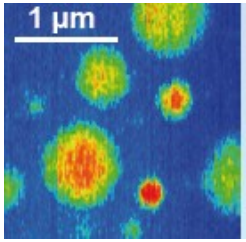
Animation of s-SNOM Microscopy

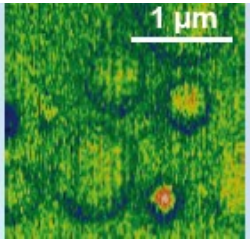
NeaSNOM – Optical Imaging & Spectroscopy at the Nanoscale



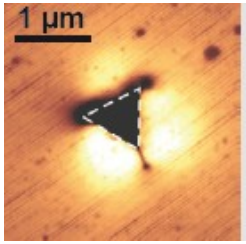


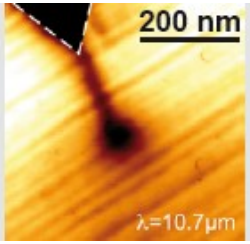
Semiconductor Free Carrier Distribution Maps



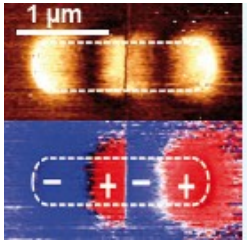


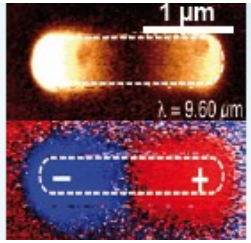
Chemical Nano-Composition Maps





Nanoscale Stress/Strain Fields





Nano-Plasmonic Fields

… and many more

NeaSNOM – A ready-to-use System

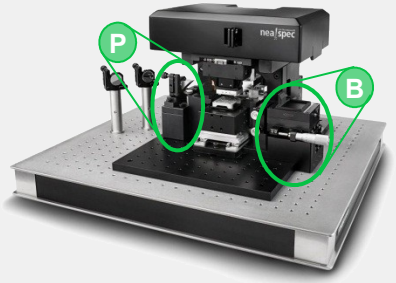
NeaSNOM System

1 NeaSNOM Microscopy Platform

The NeaSNOM Microscopy Platform includes the base components of a NeaSNOM System:

- A — NeaSNOM Atomic Force Microscope (AFM)
- L — NeaSNOM Light Focusing & Collection Unit
- D — NeaSNOM Digital Scan Controller
- U — User PC incl. 3 screens with preinstalled NeaScan software

2 Choose NeaSNOM options



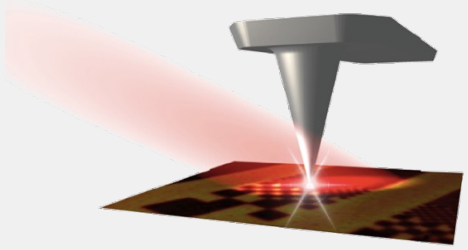
2.1 Depending on the light source, at least one of the detection modules is required:

- P — Pseudo-Heterodyne Detection Module for single line lasers
- B — Broadband Near-Field Detection Module for broadband light sources

2.2 For specific applications, we offer various options including:

- Transmissive illumination for transparent samples – Available as fixed or synchronously moving focus
- Side camera imaging system for precise targeting of small structures

3 Choose NeaSNOM Light Source



Neaspec offers a wide range of certified and ready-to-use light-source systems with guaranteed performance:

- Visible HeNe laser system
- CO_2 infrared laser system tunable from 9,2µm – 11,2µm wavelenght
- A selection of quantum cascade lasers (QCLs) with central wavelenghts between 3.8 and 10.5µm and 100cm^{-1} tuning range

NeaSNOM – The Flexible Nanoanalytic Platfrom

- Unique patented optical near-field signal detection with background suppression
- Engineered to offer the highest flexibility for your application
- Accepts a large selection of light sources throughout the visible, infrared and THz spectrum for illumination
- Optical imaging & spectroscopy at better than 20 nm resolution - Even in infrared & terahertz
- Proprietary high stability AFM optimized for optical nanoscopy
- Compatible with almost all standard AFM cantilevers

Thank you for your attention

Questions are welcome!

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