

The Nano-Workbench

Standard Application Packages

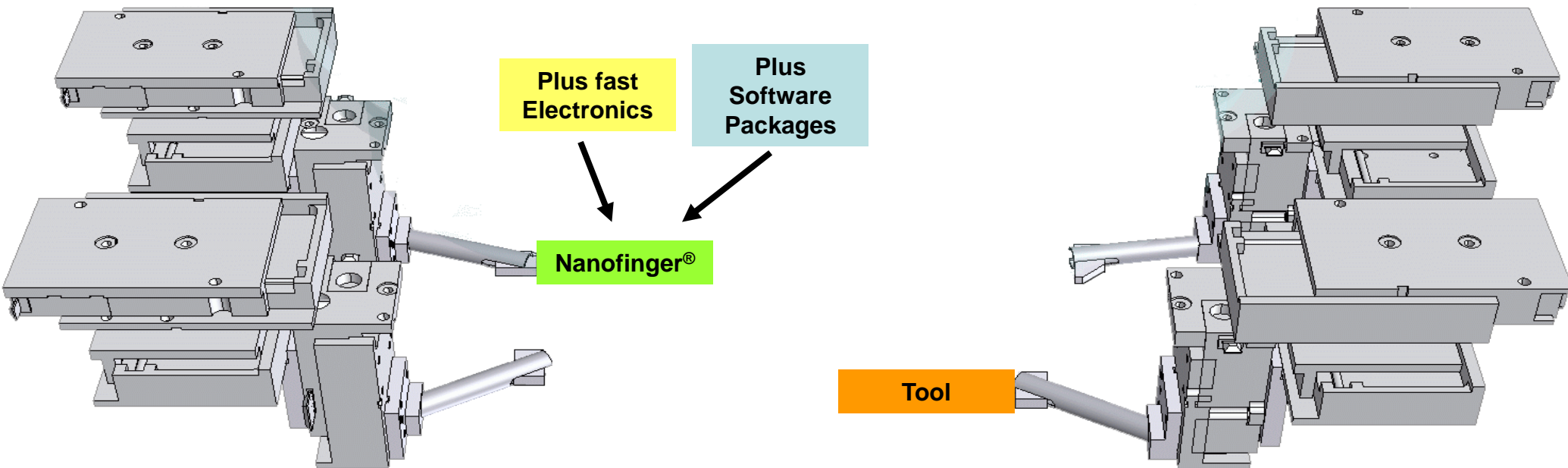
3D-Nanofinger:



***Measurement of structures with
Nanorobotics and Wizards
from Klocke Nanotechnik***

3D-Nanofinger®

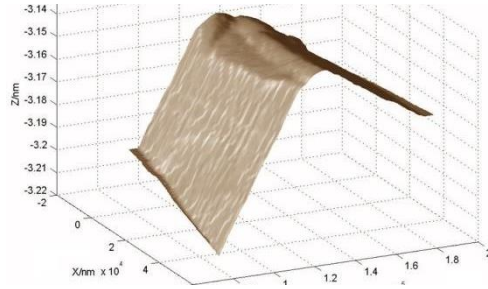
Nanoworkbench Configuration:



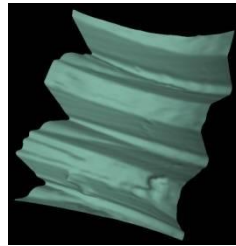
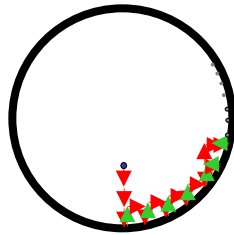
- 1. Nanomanipulator equipped with:** 3D-Nanofinger® for topography measurements and as Scout for the second tool
 - 2. Nanomanipulator equipped with:** Application specific Tool, e.g. cutter, wear tester, etc.
- Standard Software Package: Macro Executor, Live Image Positioning, Assistants, Sequencer

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• 3D Topography

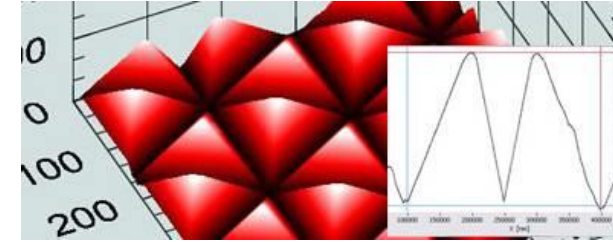


• Contours

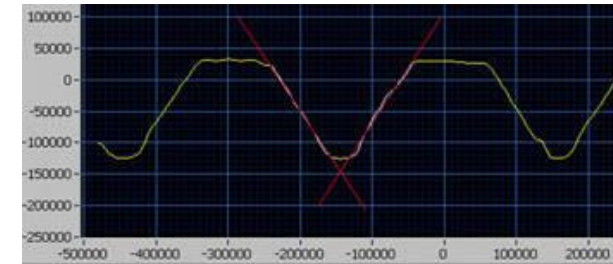


- **Standard stroke:**
20 mm in XY and 10 mm in Z
- **Resolution of movement:** 1 nm
Sensor resolution: 0.5 nm
Smallest structure size: < 100 nm
- **Automation**

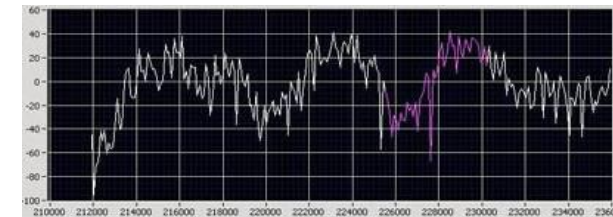
• Dimensions



• Angles

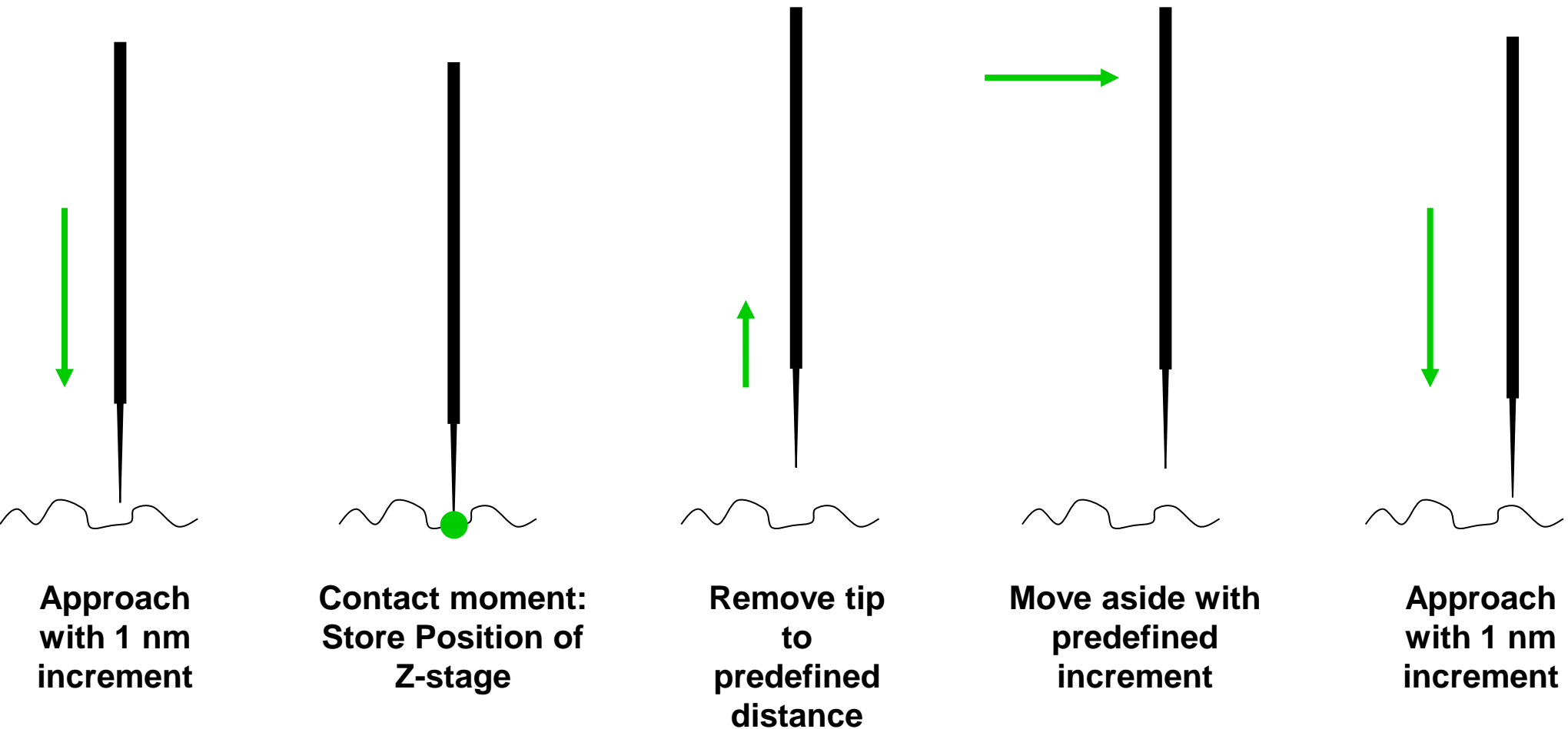


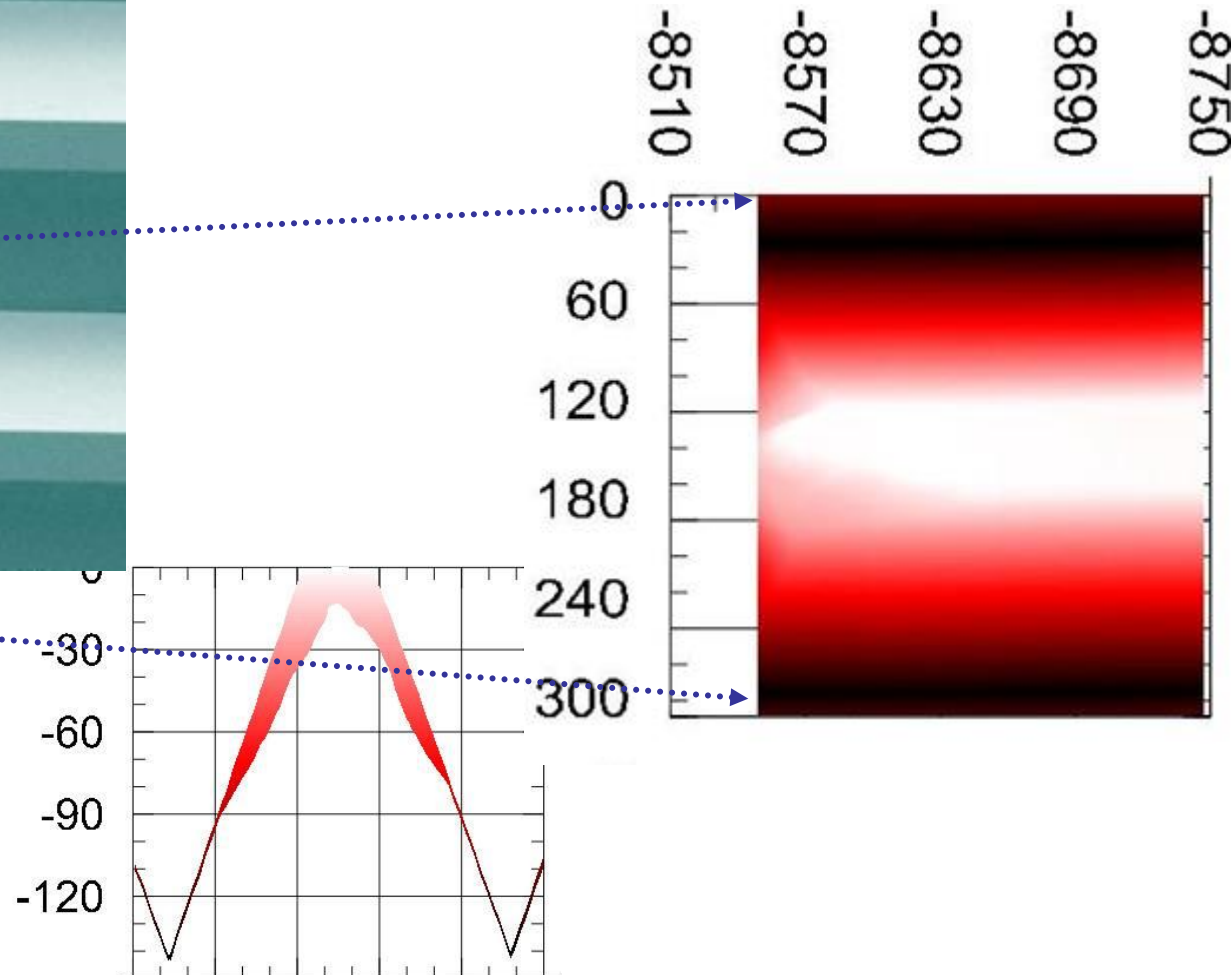
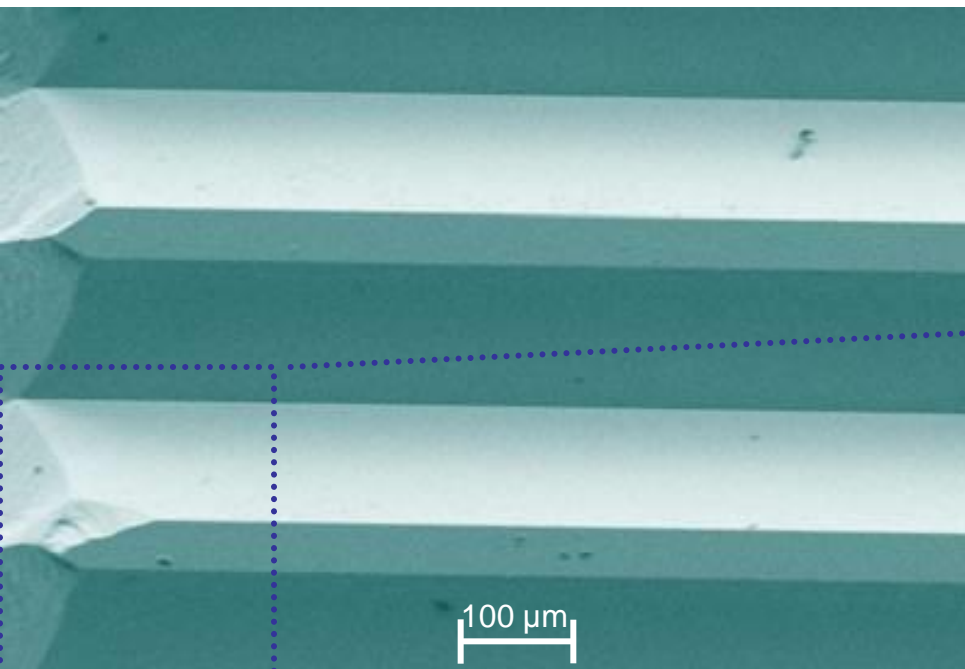
• Roughness

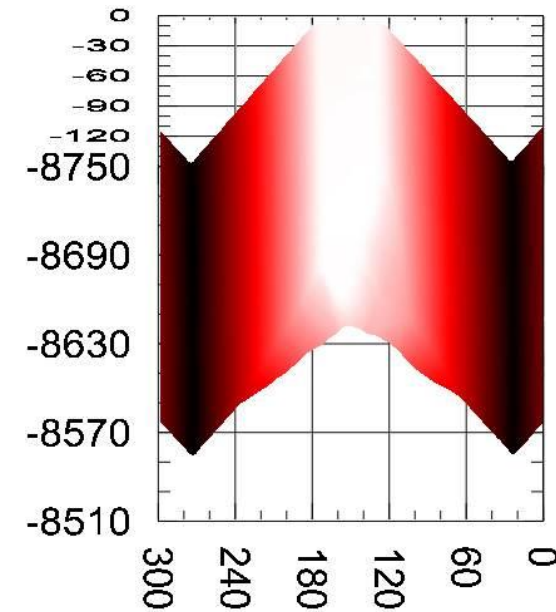
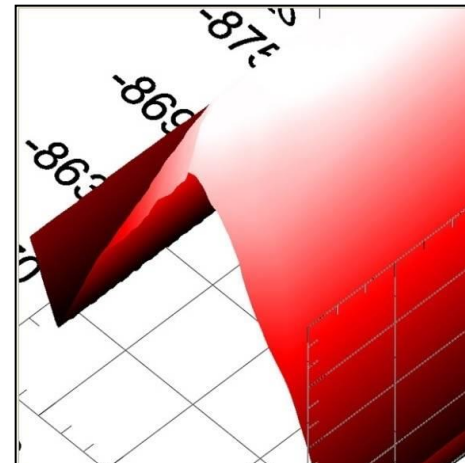
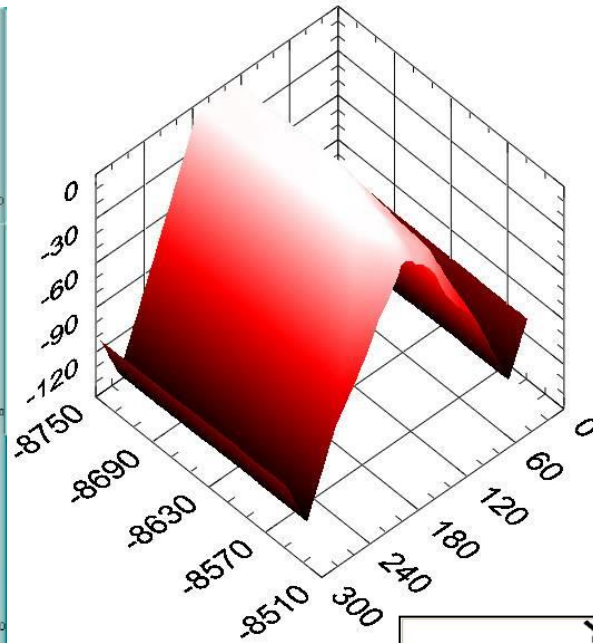
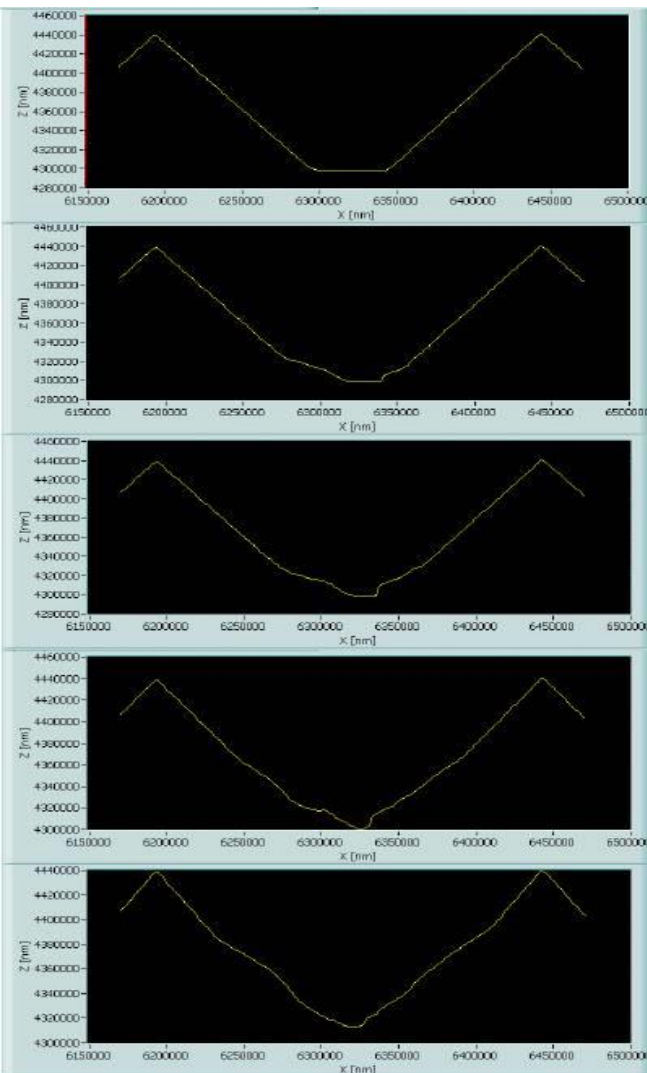


Measurement Principle

of Line Scans

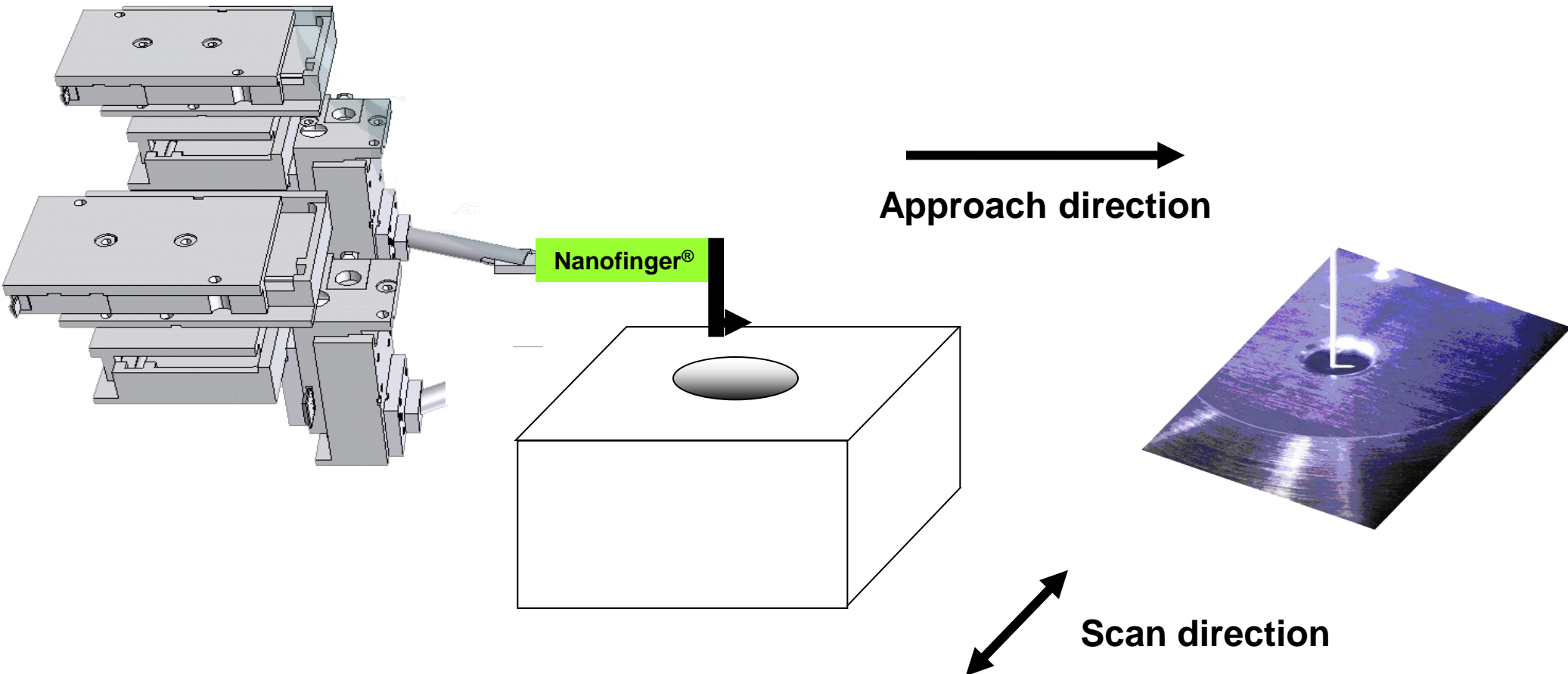






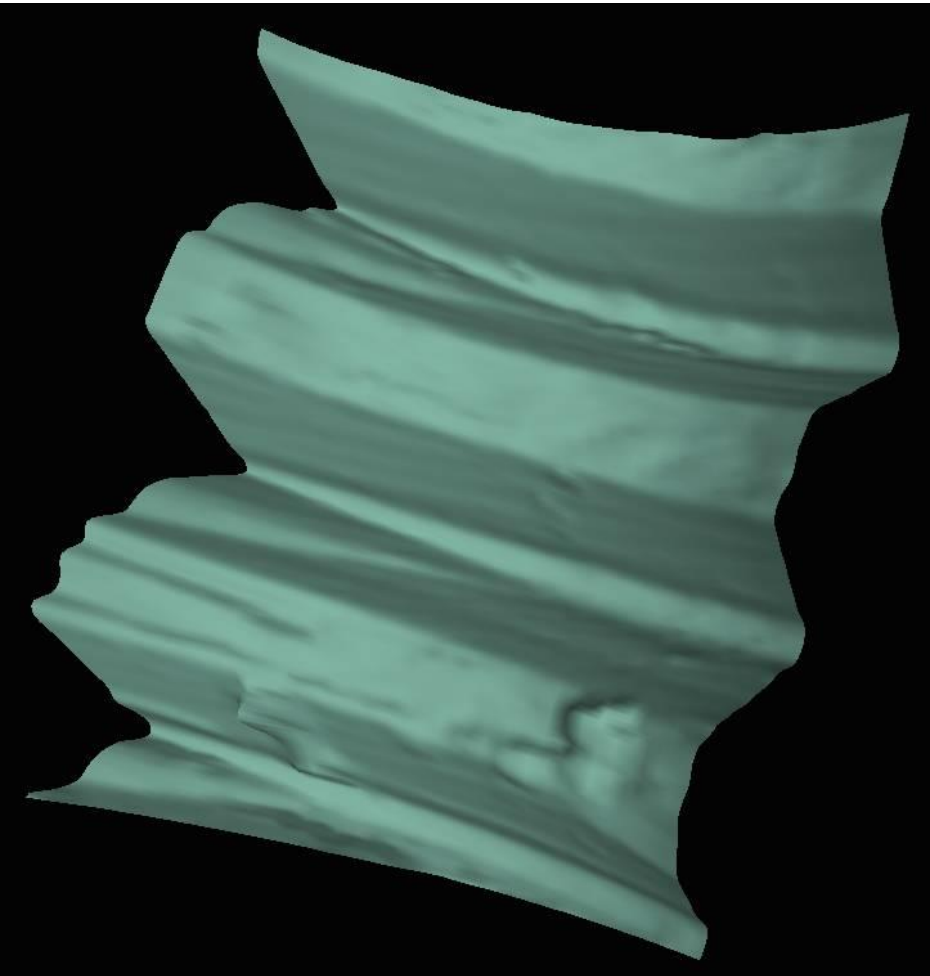
3D-Nanofinger®

Flexible Configurations:

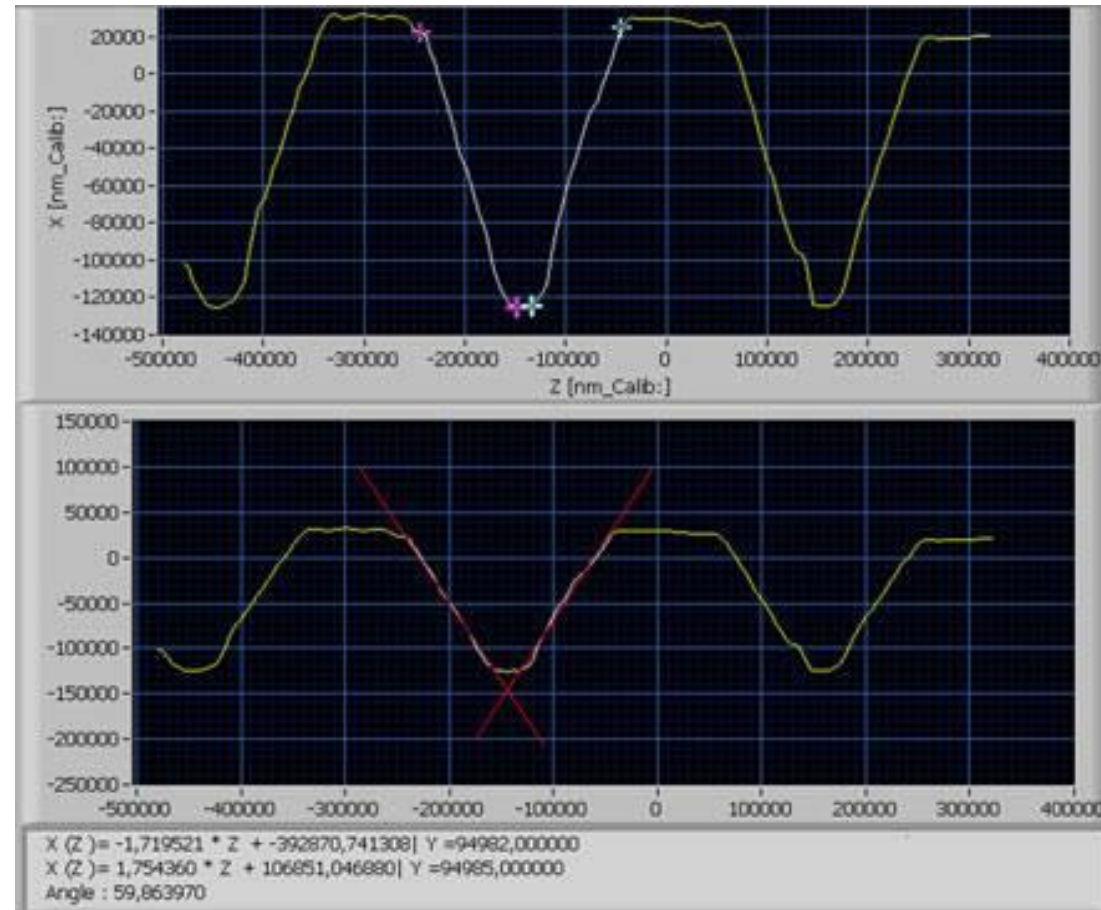


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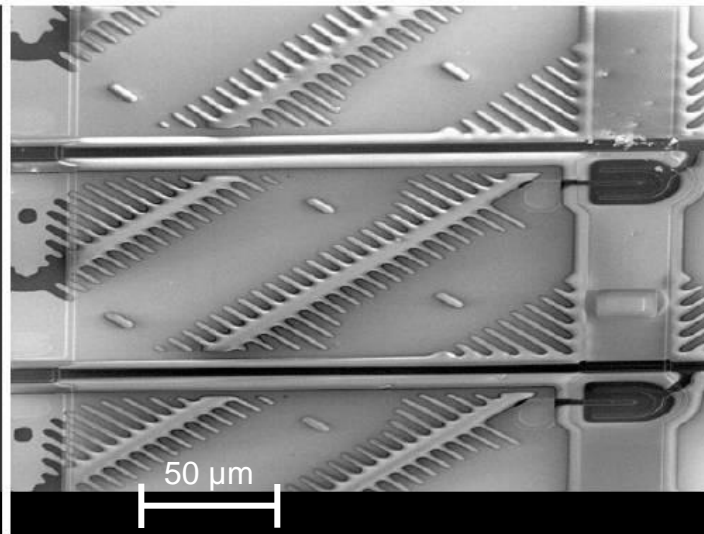
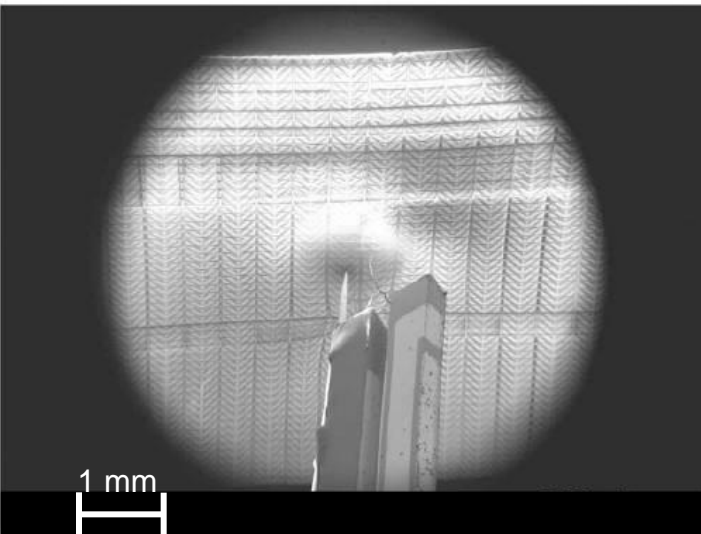
„impossible Measurements“



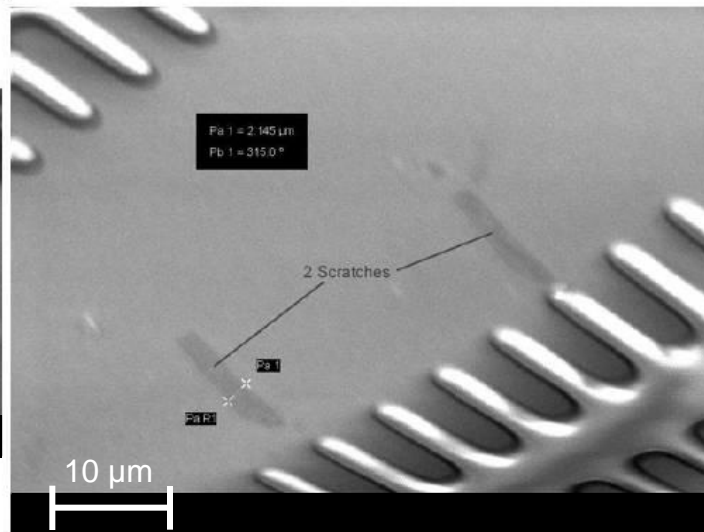
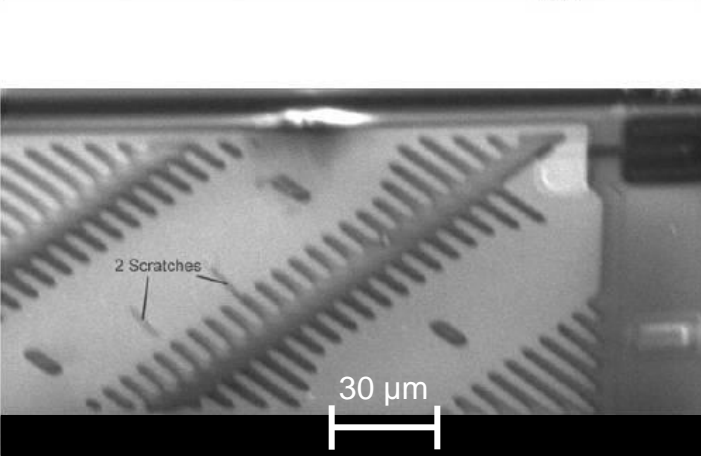
Internal screw thread with 1.4 mm diameter



Linescan to determine the winding angle

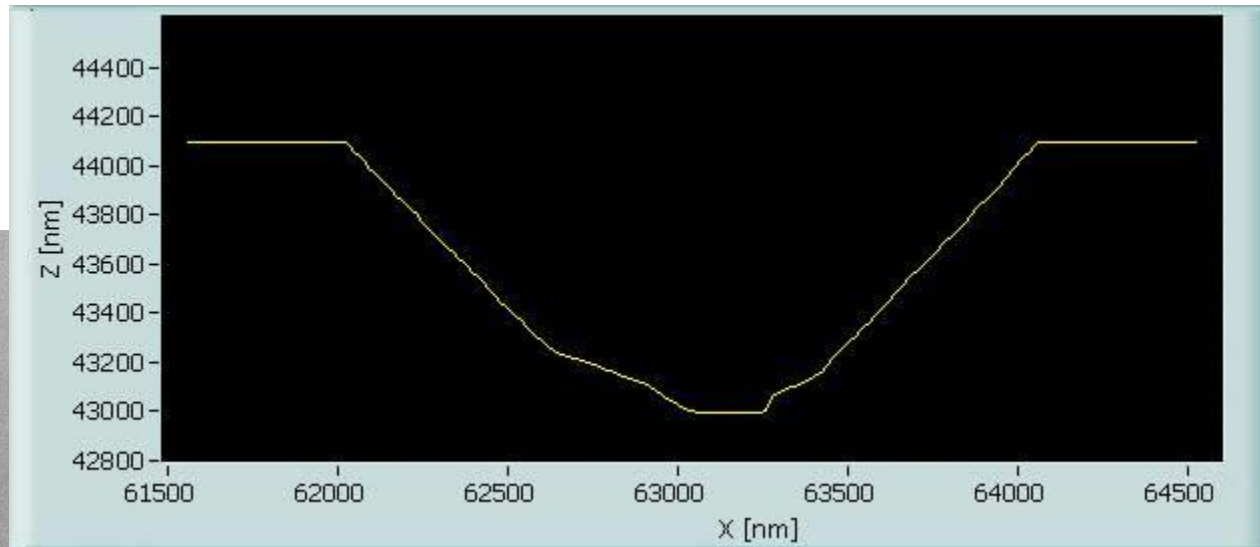
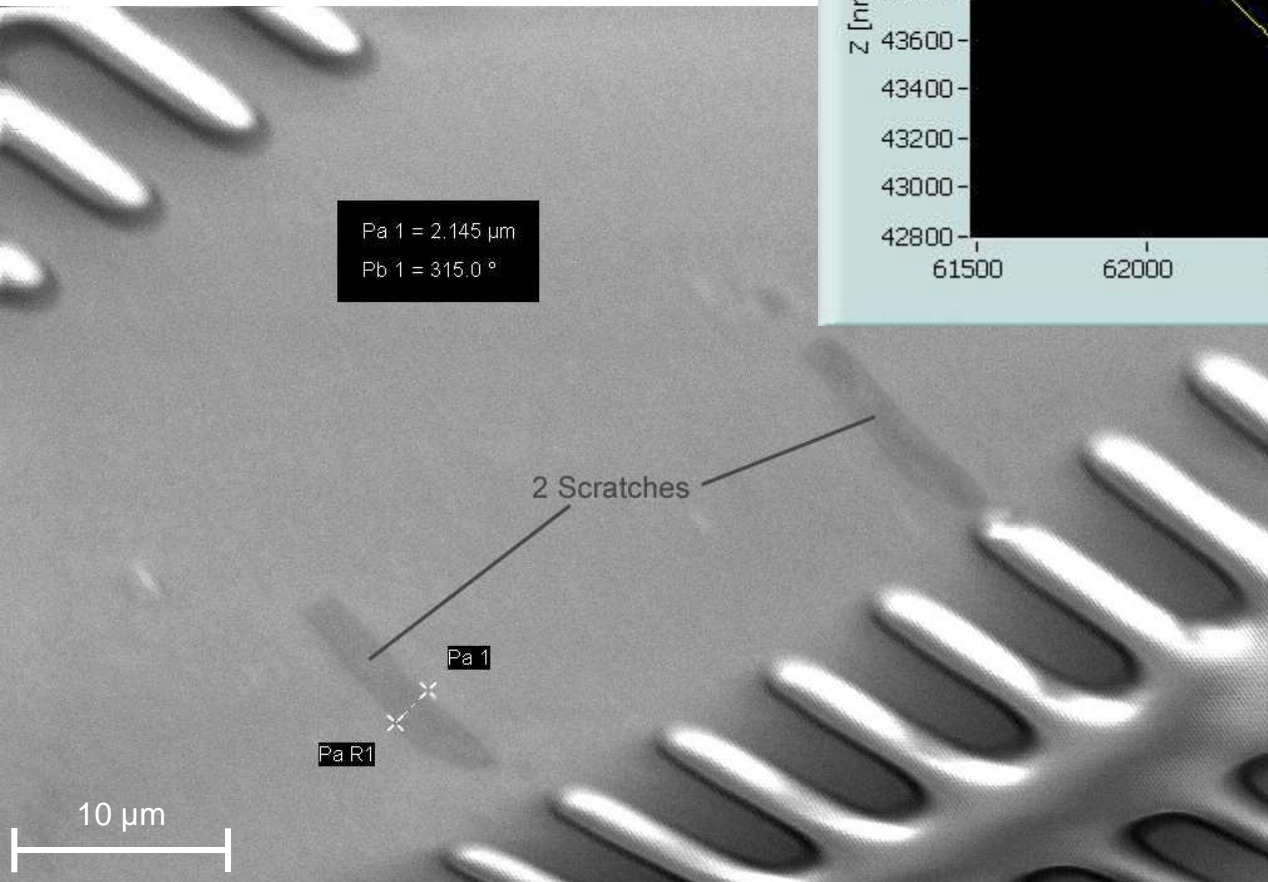


**Dimensional
measurements at
small structures:**

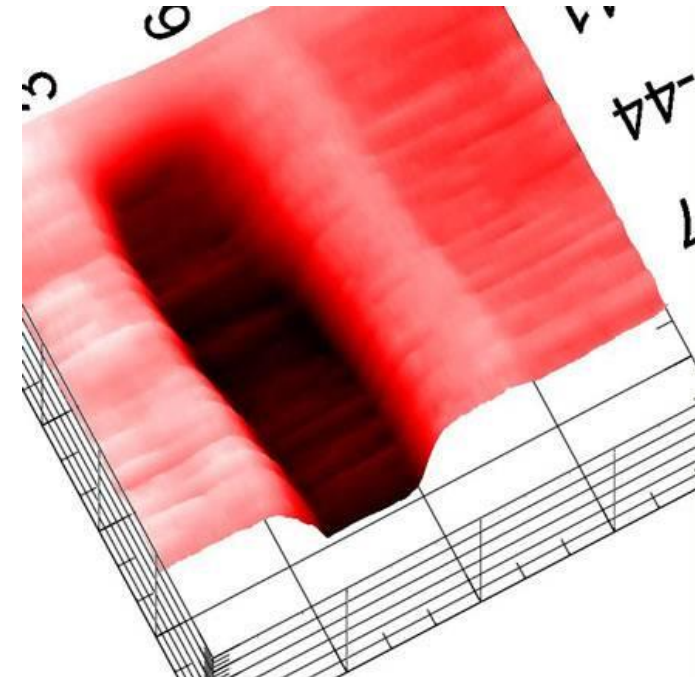
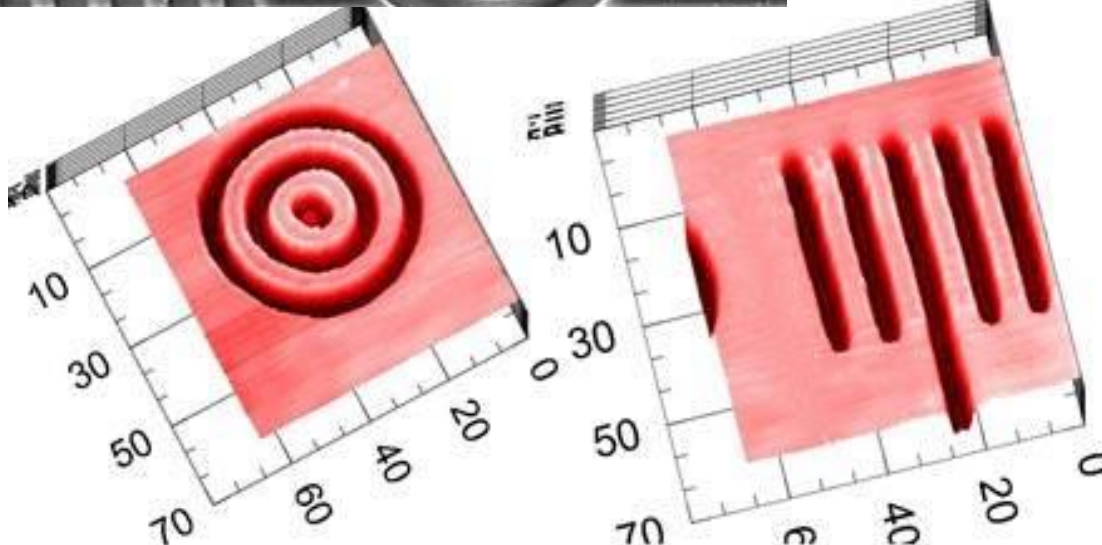
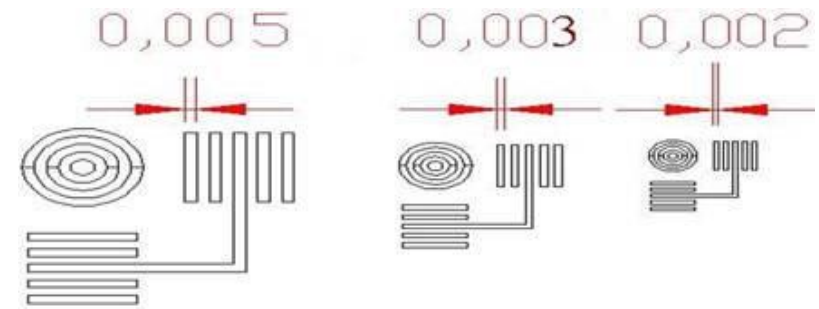


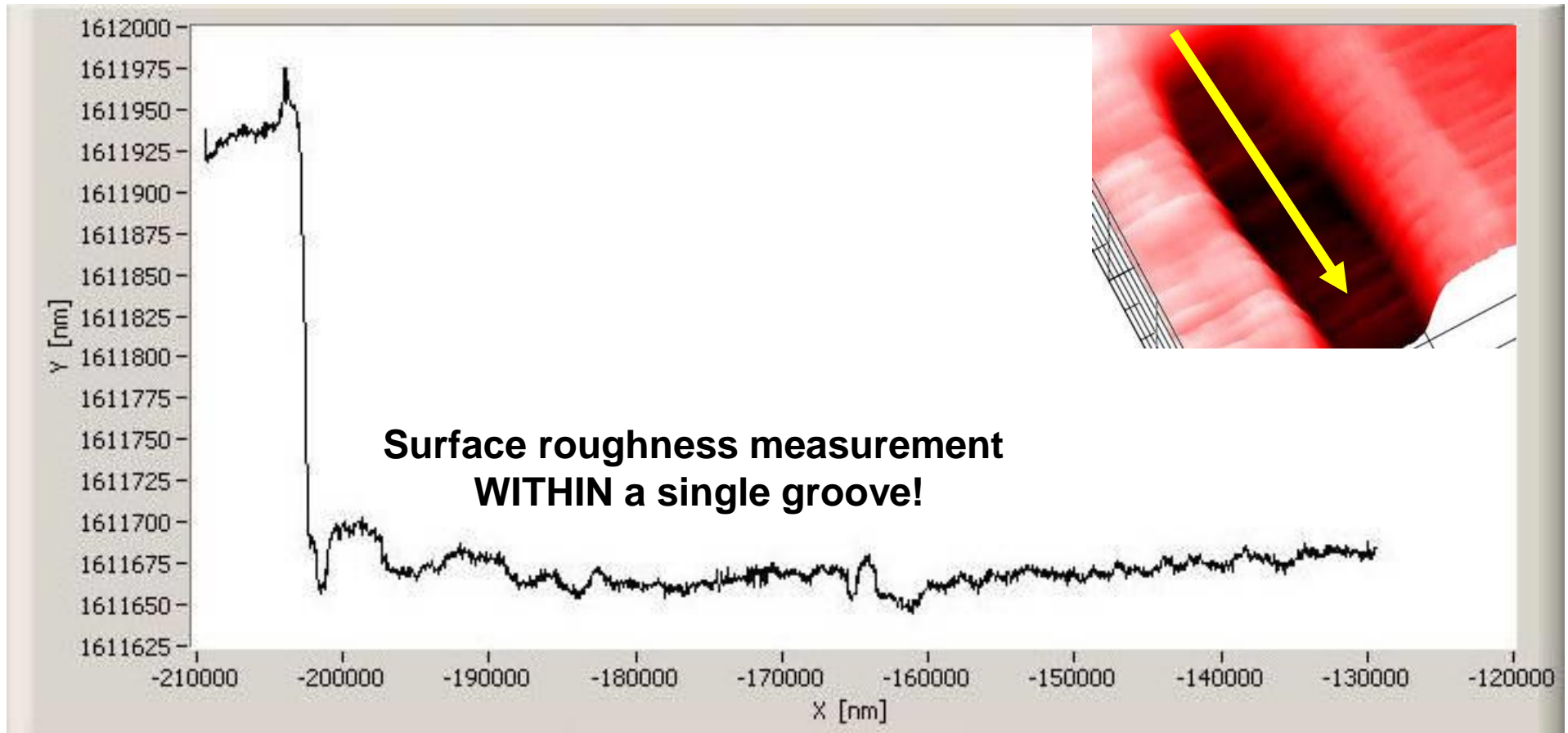
**Bits of a DVD having
two scratches that can
be measured with the
3D-Nanofinger**

Line profile measurement



Display Industry: Laser pattern

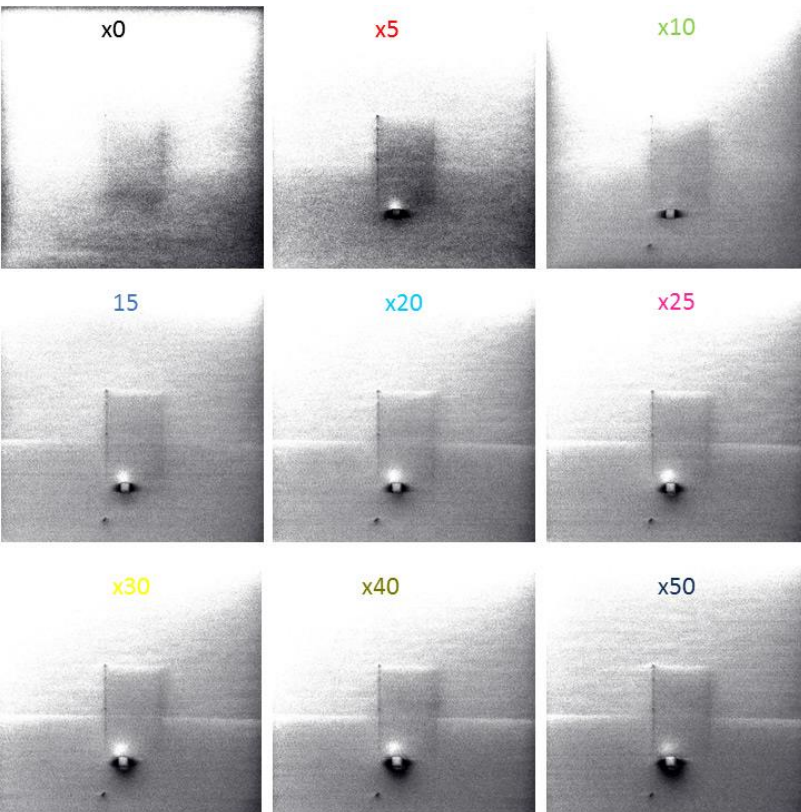




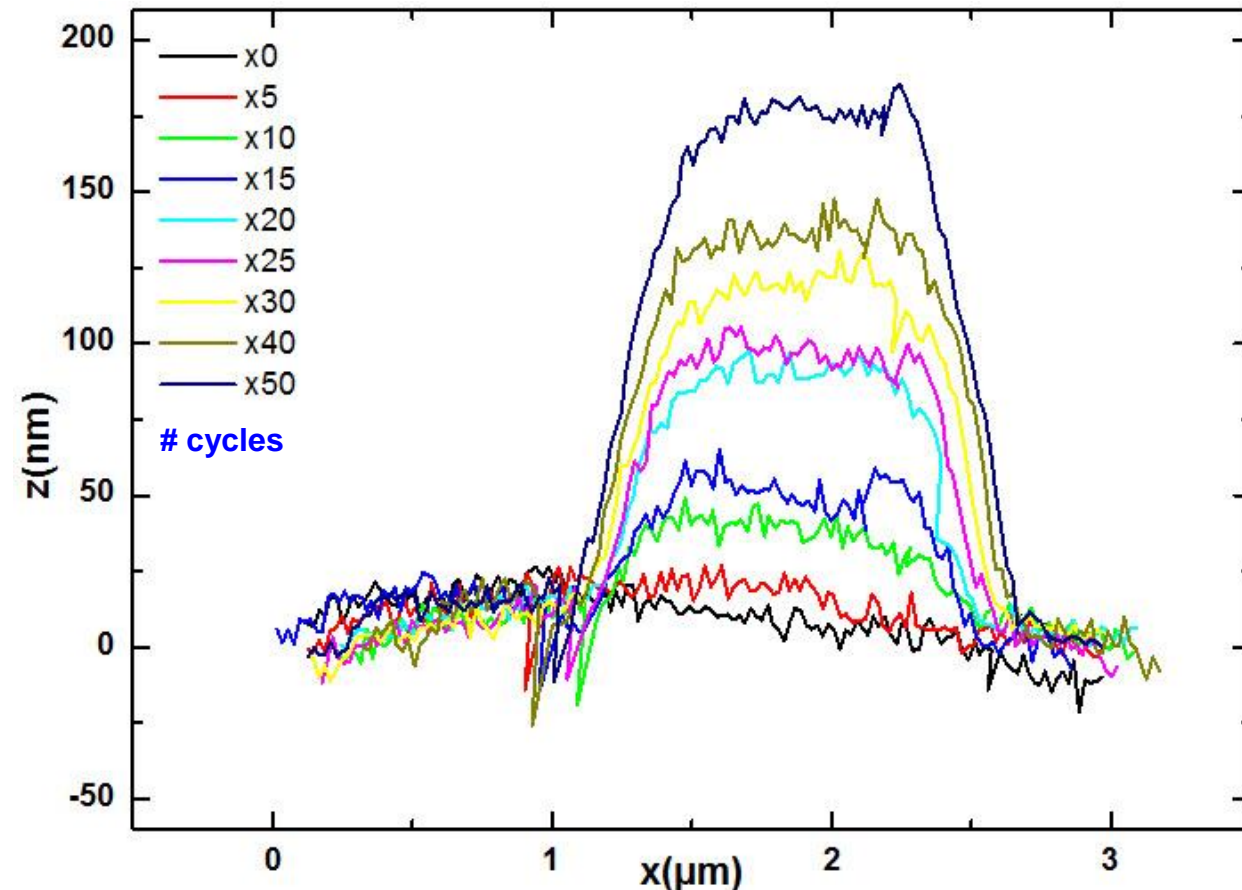
Calculated roughness values:

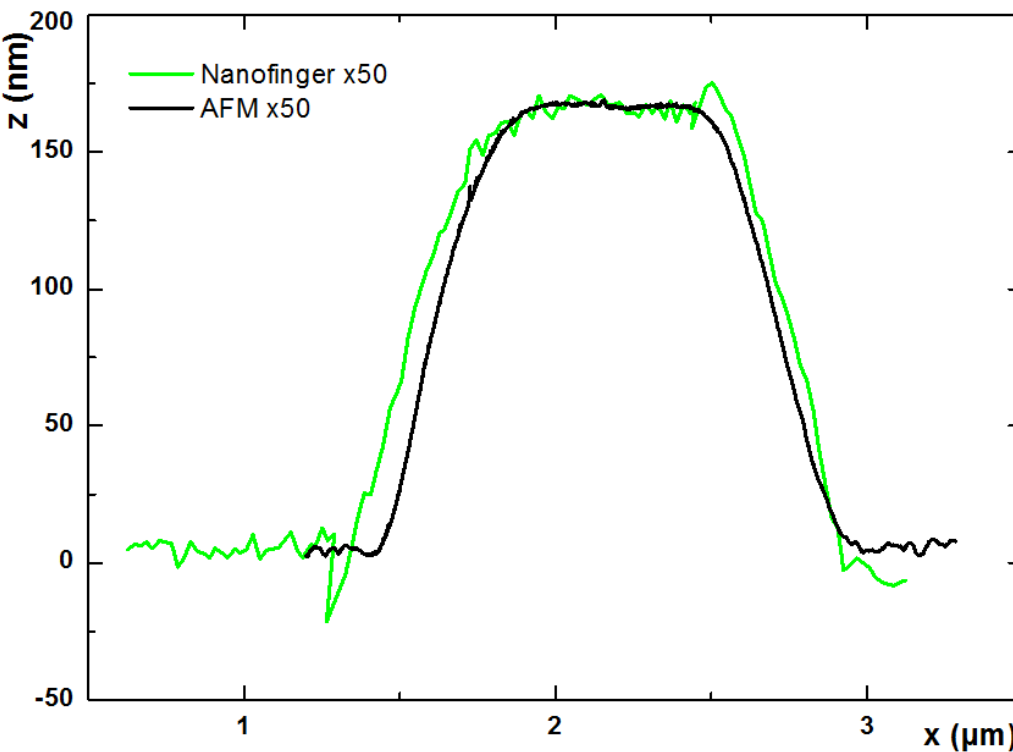
Ra: 8.0 nm, Rq: 8.8 nm, Rz: 20.1 nm, Rt: 35.5 nm

Growth of EBID structure, 1 cycle = 3,35 nm



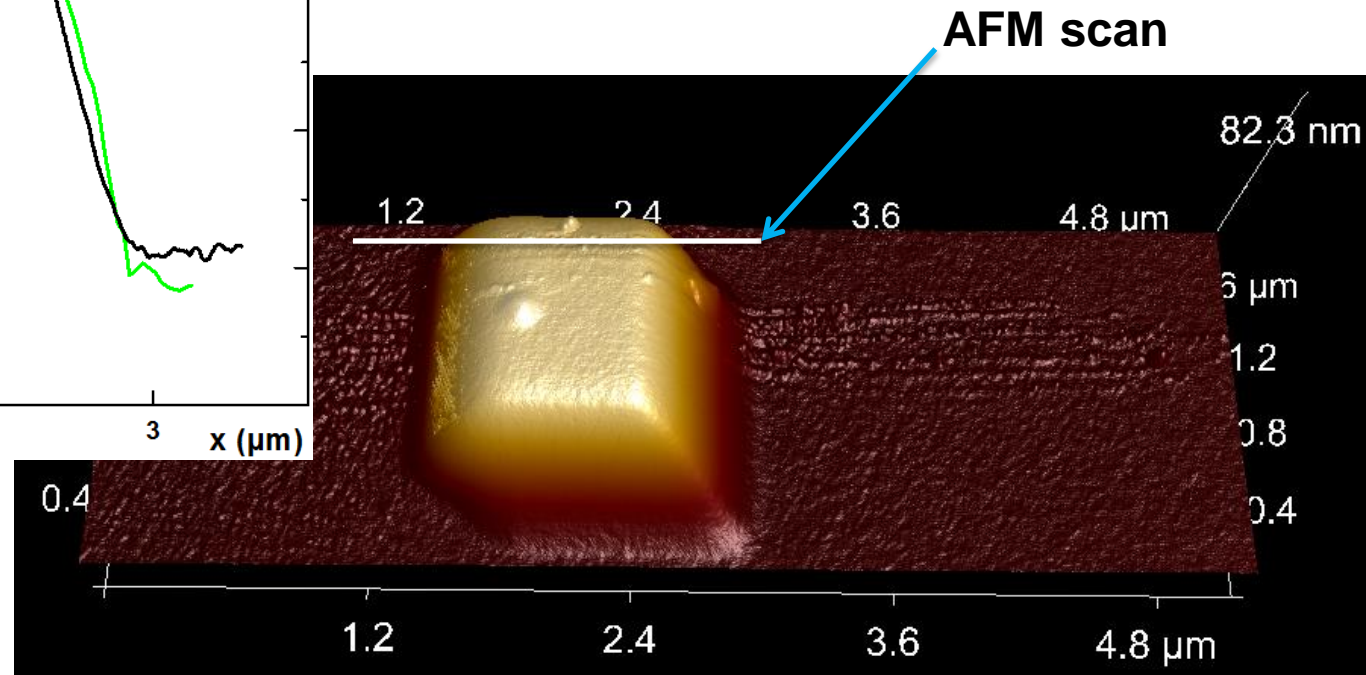
Nanofinger Lienscans in-between





Comparison of Nanofinger® Scan with AFM:

Noise level better 5 nm
for measurements on 20x20 mm² stroke



Summary

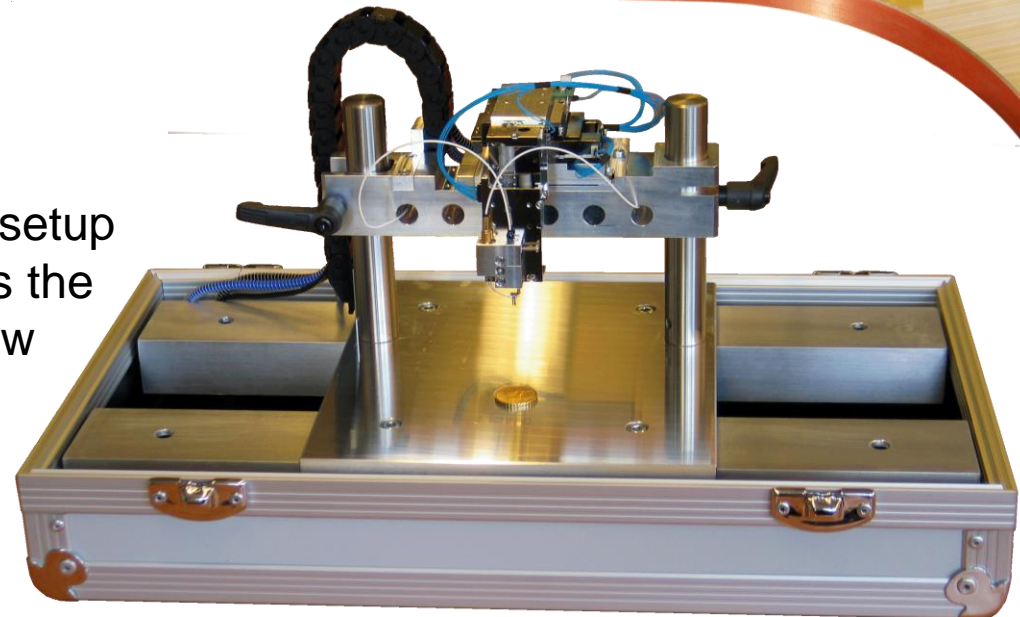
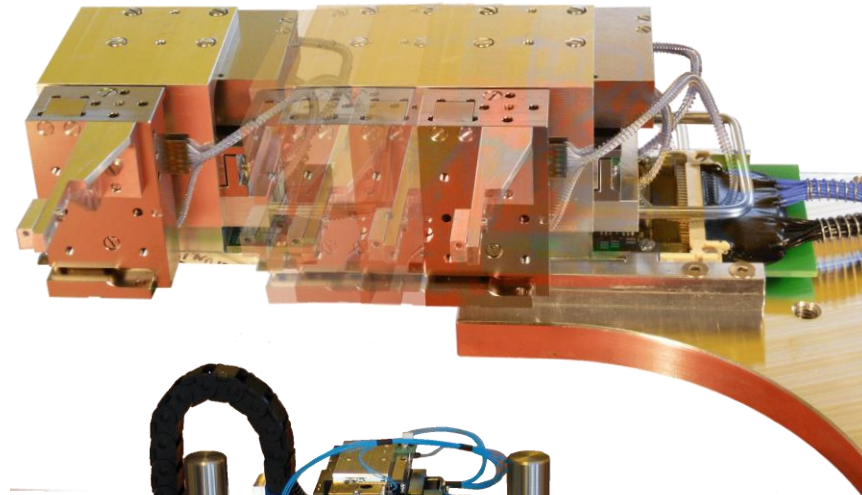
- With the Nanoworkbench from Klocke Nanotechnik 3D Topography measurements inside of SEM/FIB systems is very fast and easy.
- The Live Image Positioning module allows to direct the 3D-Nanofinger in XY to the target area just by mouse-click into the SEM image.
- The 3D-Nanofinger® can measure linescans with 2 nm resolution over the whole Nanoworkbench operation stroke of 20 x 20 x 10 mm³, see www.3D-Nanofinger.com
- The 1D-Nanofinger® part of this Nanoworkbench configuration operates as Scout for the fast and save automatic approach of the second tool to the sample, also on isolators.
- Automatic macros and absolute positioning in superior precision allow to program applications that e.g. include 3D-profiles within a process.

3D-Nanofinger®

Option external usage

Option:

- The 3D-Nanofinger® is fixed in the Nanoworkbench configuration by our patented “Docking Stations in the SEM/FIB: for an easy plug-in – and plug-out”:
- A second optional granite or Alumina frame setup with the same Docking Station port expands the 3D-Nanofinger also to ambient usages, at low additional cost and easy exchange, see www.3D-Nanofinger.com



The Nanoworkbench

and its Application Packages



The Nanoworkbench

3D-Nanofinger® ...

is one out of several “Standard Application Packages” of our [Nanoworkbench](#).

The Nanoworkbench enables the hand-eye coordination as used at Light Microscopes now in any SEM/FIB, together with automation of the SEM/FIB (@ZEISS, FEI, TESCAN)



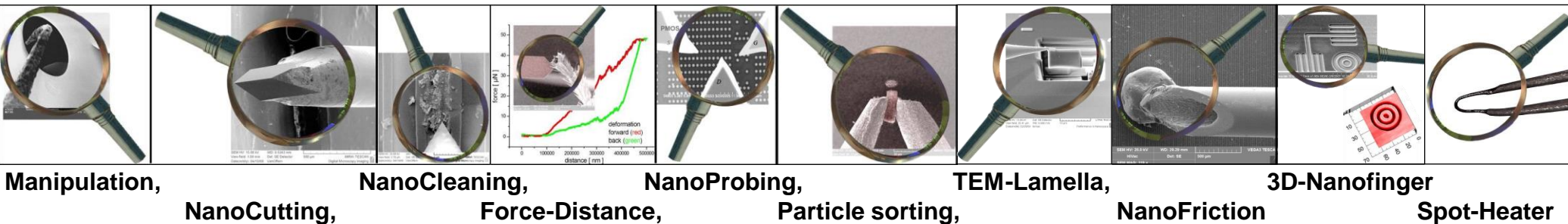
At Light Microscopes it is natural for everybody to use tool sets like tweezers, knives, hooks, probes and several different measurement tools, so it is with the Nanoworkbench.

The Nanoworkbench

One Product for all applications

The Nanoworkbench Standard Packet includes:

- The basic application package “Nanomanipulation” and
- one additional “Application Package” out of:



Each application package includes a standard tool, a standard sample and pre-defined processes as source-code and origin for own projects.

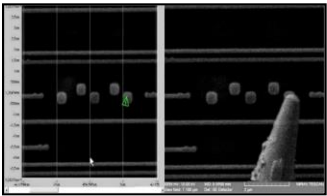
- The following set of modules for easy usage an application control:

The Standard Packet

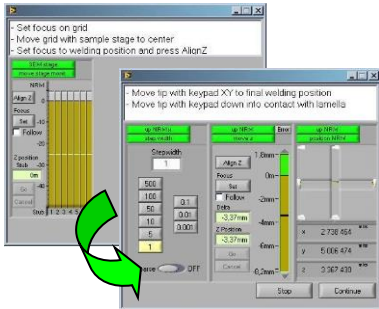
Hand-eye coordination:



Nanofinger® as Scout, guiding the
Nanoworkbench Tools,

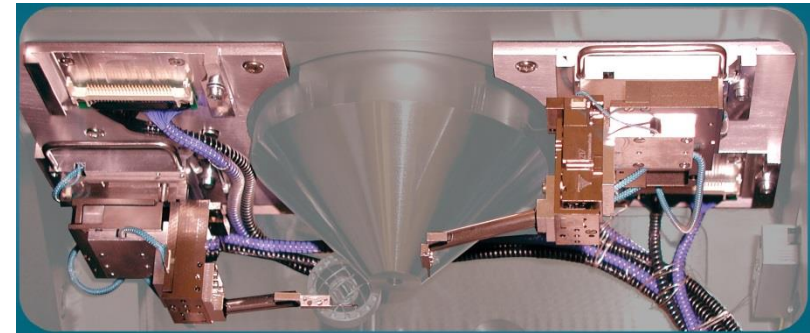
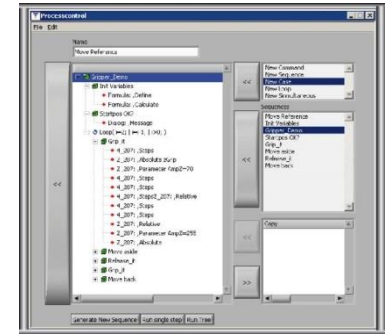


Live Image Positioning,



Assistants
(Wizards),

Sequencer for automation,
Macro Executor,
Remote Control,
...



2 Nanorobotics Manipulators
with docking stations

More information?

Please ask for the leaflet “Nanoworkbench”

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