alpha300 A
Atomic Force Microscope

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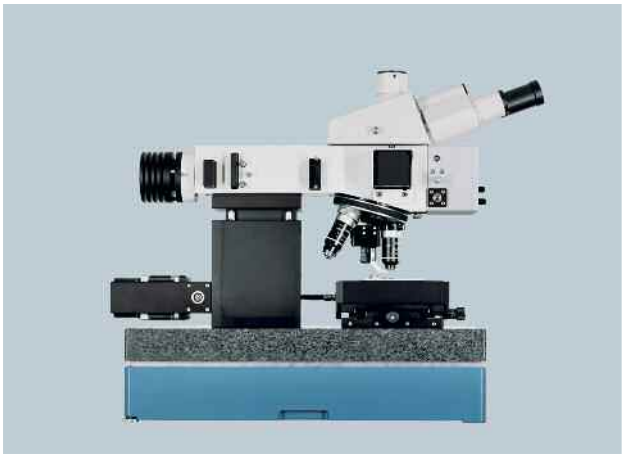
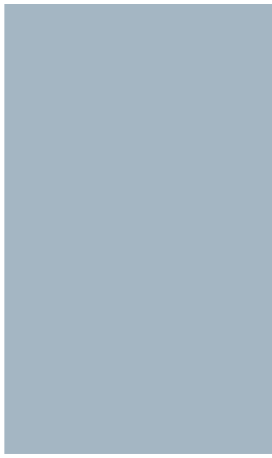
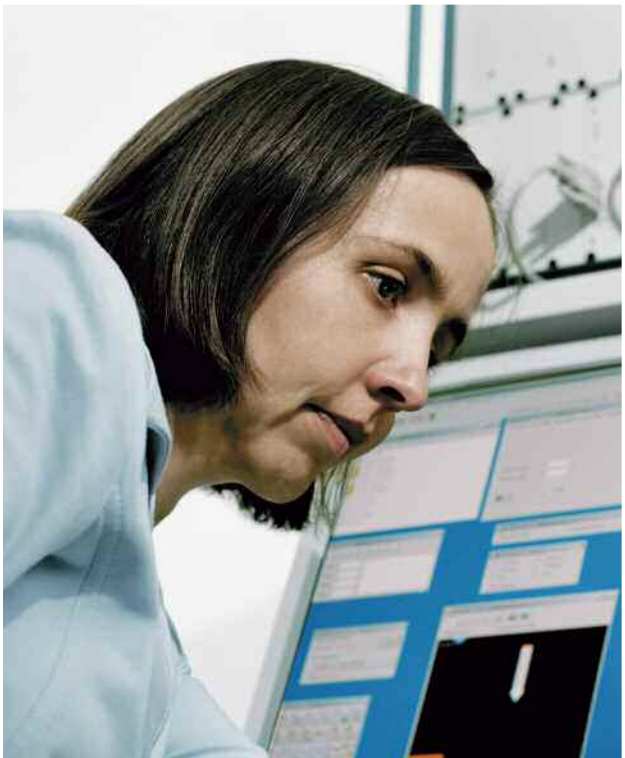
WITec
focus innovations

alpha300 A

AFM system for Materials Research, Life Science, and Nanotechnology
The *alpha300 A* is a modular, user-friendly Atomic Force Microscope designed specifically for Materials Research, Nanotechnology, and Life Science. It integrates a scientific-grade optical microscope for superior optical access, easy cantilever alignment, and high resolution sample survey. All standard AFM modes are supported, ensuring high flexibility throughout the full range of AFM applications. Upgrade possibilities to Confocal Microscopy and Confocal Raman Microscopy, as well as Scanning Near-field Optical Microscopy (SNOM), offer extraordinary opportunities for expansion. Local surface properties can be investigated with the *Pulsed Force Mode* along with topographic structures on the nanometer scale.







01

Simplicity
Simply rotate the objective turret to select AFM or optical mode. The optical mode combined with the advanced video camera system is the key to high resolution sample survey and the quick selection of areas of interest. The WITec AFM Objective used for the AFM Mode provides a direct sample and cantilever view for easy and precise tip positioning.
The *alpha300 A* system uses an extremely linear and precise capacitive feedback-controlled scan stage featuring TrueScan™ for exceptional accuracy over the entire scan range. The extent of the scan range is 100 x 100 x 20 µm and it can accommodate large samples.

The integrated active vibration isolation table in conjunction with highly focused, ultra-stable optics for the beam deflection laser guarantees high precision, low noise measurements.

Pulsed Force Mode
Pulsed Force Mode (PFM) is a nonresonant, intermediate-contact mode for Atomic Force Microscopy. A wide variety of sample properties can be extracted from force-distance curves, such as adhesion, stiffness, viscosity, energy dissipation, contact-time, long range forces, and many more. These properties can be analyzed and imaged simultaneously along with topography.

The *PFM* is specifically suited for delicate and soft samples investigated in air or liquids at a high scanning speed. State-of-the-art, high-end digital components enable real-time processing of digitized force curves. Additionally, storage of the complete measurement provides unlimited access to all data through extensive post-processing data evaluation.

key features

02

Operating Modes
- Contact Mode/Lateral Force
- Pulsed Force Mode
- AC-Mode/Phase Imaging
- Magnetic Force Mode
- Nanolithography/Nanomanipulation
- Temperature-controlled measurements
- Air and liquid measurements
- Virtually unrestricted experimental set-up

Optical Microscope Capabilities
- Integrated high resolution scientific-grade research microscope
- Easy and precise cantilever allignment
- High resolution sample survey
- Color video camera system
- Direct and simultaneous sample and cantilever viewing

Vibration Isolation
- Integrated active vibration isolation table
- Extremely low noise level

Linear Scan Stage
- Sample scanning
- Highly linear piezo-driven scan stage
- Capacitive feedback-control on all axes to eliminate hysteresis, creep and non-linearity
- TrueScan™ Dynamic Position Control
- Scan Range: 100 x 100x 20 µm (200 x 200 x 20 µm optional)
- Capacity for large samples
- No image distortion
- Exceptional accuracy over entire scan range

Controll Unit alphaControl
- Fully digital system-on-a-chip concept for the highest speed, flexibility, accuracy, expandability and timing precision
- Complete access to internal signals

Software
- WITec Control for measurement control and data acquisition
- Includes specialized routines and default safety features
- Control Window for immediate access to various parameters
- WITec Project for data evaluation and post-processing

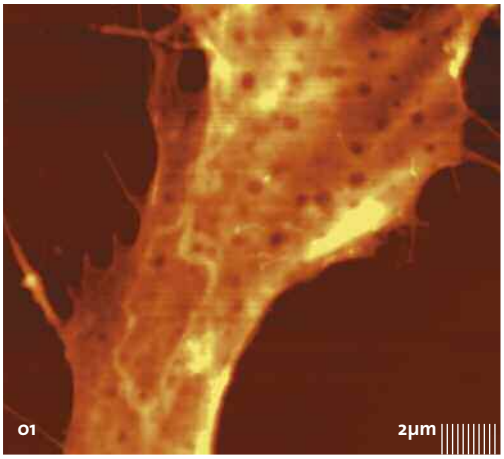
Beam-deflection Laser
- Low noise, highly focused optics for beam deflection laser
- Low interference
- Ultra-low laser noise

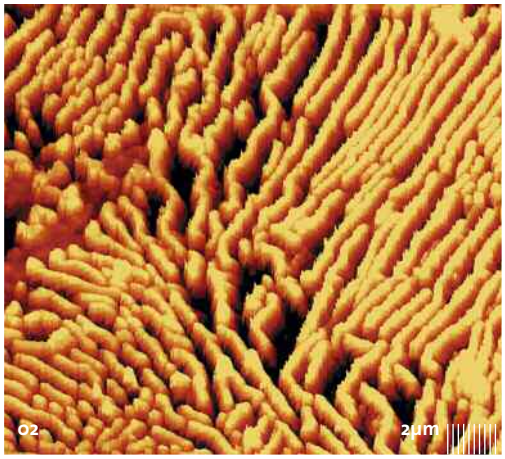
Modular Design
- Upgrade possibilities to Confocal/ Raman and Scanning Near-field Optical Microscopy (SNOM)
- Cost effective
- Flexible
- Scalable

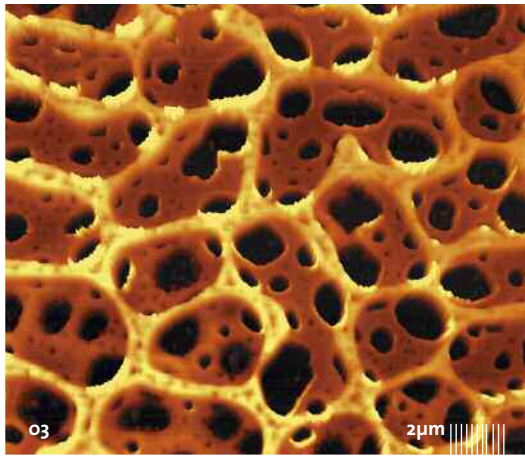
Focusing on innovations, WITec uses only state-of-the art, high quality, precise, and optimized components. This philosophy leads to one of the best and most flexible pieces of equipment available for your experimental setup, enabling ground-breaking results and fundamentally new discoveries. With such a convenient and flexible instrument on hand, you can focus on your applications.

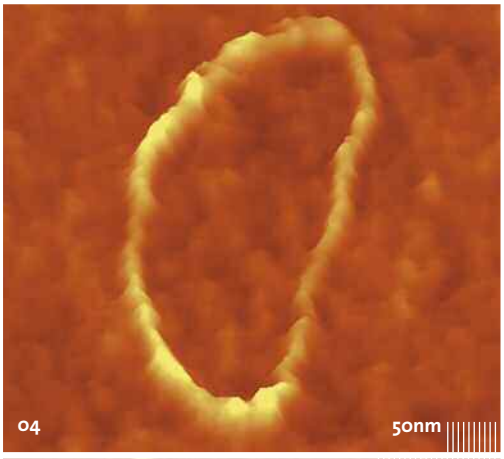
applications

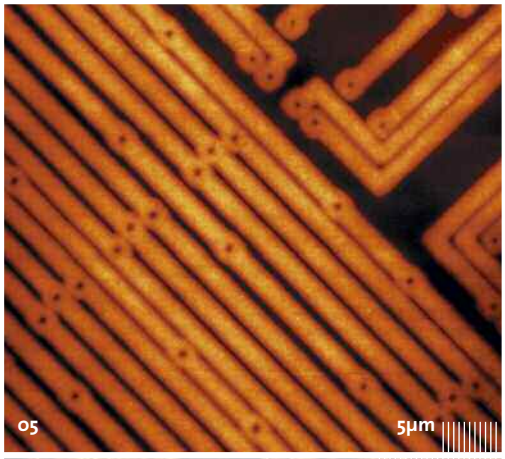
Examples of typical applications for the *alpha300 A* are Materials Science, Geology, Life Science, Semiconductor Research, Polymer Science, or Nanotechnology and all applications in which precise cantilever positioning is a necessity. With the *Pulsed Force Mode*, investigation of material properties on the nanometer scale is also possible. The modular design even allows the combination of AFM with Confocal Raman Microscopy or Scanning Near-field Optical Microscopy (SNOM), providing also chemical and optical information about your sample.

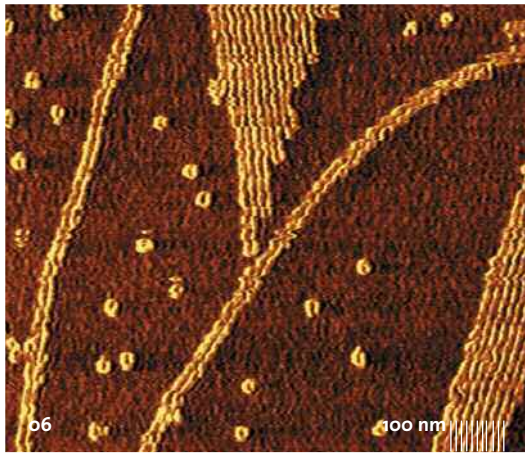


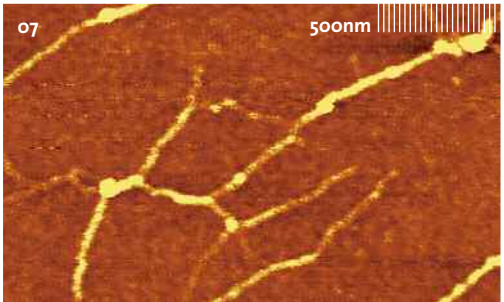


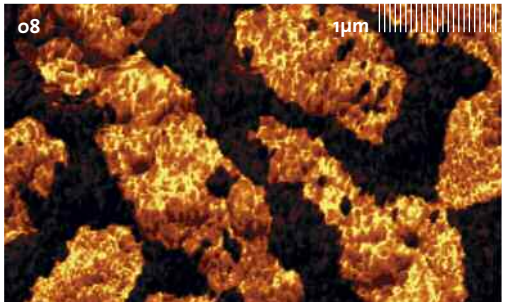












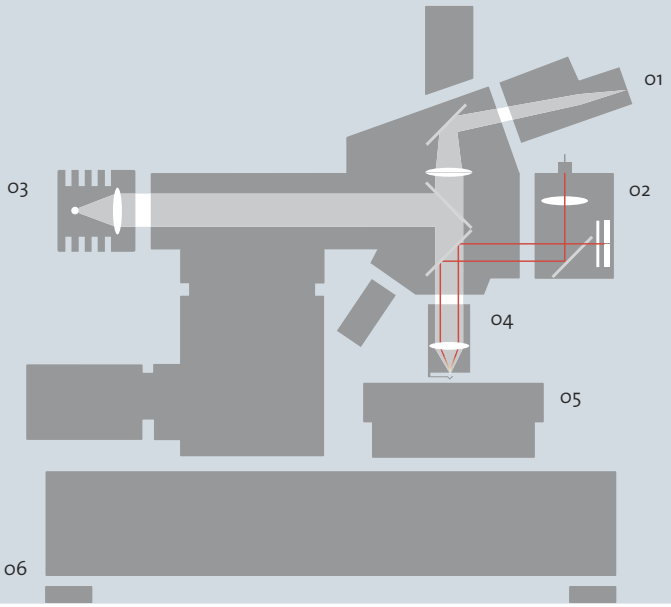
01. Cell surface
02. Steel surface
03. Polymer blend on glass
04. Carbon nanotube on silicon substrate
05. Integrated circuit
06. Long chain polymer molecules
07. DNA
08. Fossilized bacteria

For more details please visit our download page at www.witec.de.

flexible platform

The modular design of the *alpha300 A* and all WITec Microscopy systems guarantees easy and cost effective upgrade possibilities to Confocal Microscopy, Confocal Raman Microscopy, and Scanning Near-Field Optical Microscopy (SNOM).

By combining different techniques, a more comprehensive understanding of a sample can be attained. Not only structural and surface information, but also optical and chemical information can be acquired at the same time and on the same sample area using a single instrument.



alpha300 A Beam Path
01. Video camera system
02. Beam deflection unit
03. White light illumination
04. AFM objective with cantilever
05. Scan table
06. Active vibration isolation table

Upgrades
Our modular product line provides nearly all scanning probe and optical microscopy techniques to meet your individual requirements.

In Scanning Near-field Optical Microscopy (SNOM), represented by the WITec *alpha300 S*, optical resolution below the optical diffraction limit can be achieved. The *alpha300 S* uses unique micro-fabricated cantilever SNOM sensors with extraordinarily high transmission, user-friendliness, and reliability. The near-field optical information is acquired simultaneously with topography and the instrument also integrates a confocal microscope.

All WITec microscopes are built rock-solid and modular. Upgrades are possible at any time. You can, for example, start with the alpha300 A and upgrade later to Confocal Raman Microscopy (alpha300 R) or vice versa. This modularity gives you a universal tool for almost any optical or scanning probe microscopy applications you may encounter.

03

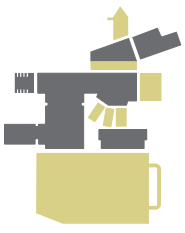
The WITec Confocal Raman Microscopy system *alpha300 R* combines an ultrahigh throughput confocal microscope with an extremely sensitive spectroscopy system for unprecedented chemical sensitivity. Raman images of chemical properties with resolution down to 200 nm laterally and down to 0,02 wavenumbers spectrally can be easily acquired. The confocal setup reduces unwanted background signals, enhances contrast, and provides depth information.

alpha300 S

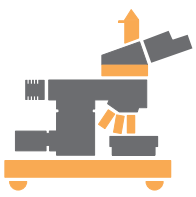
alpha300 R

alpha300 A

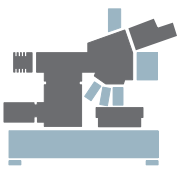
basic modules



alpha300 S
SNOM



alpha300 R
Raman



alpha300 A
AFM

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