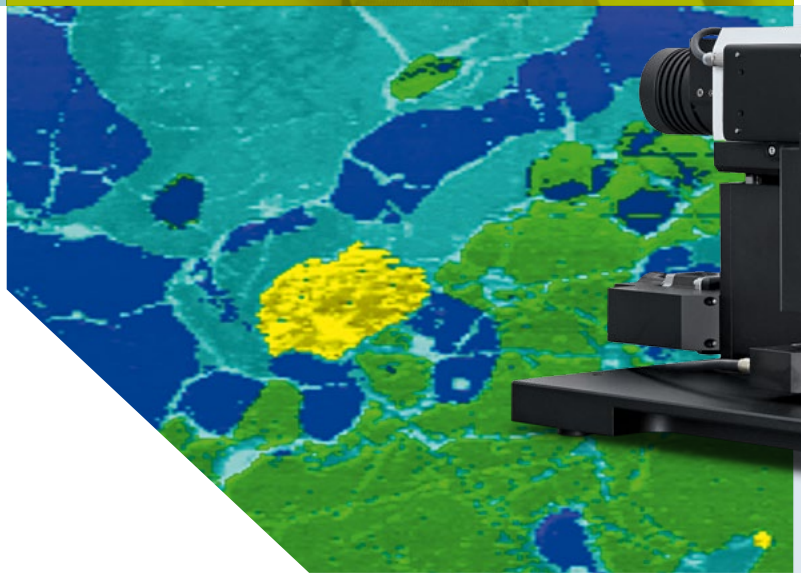
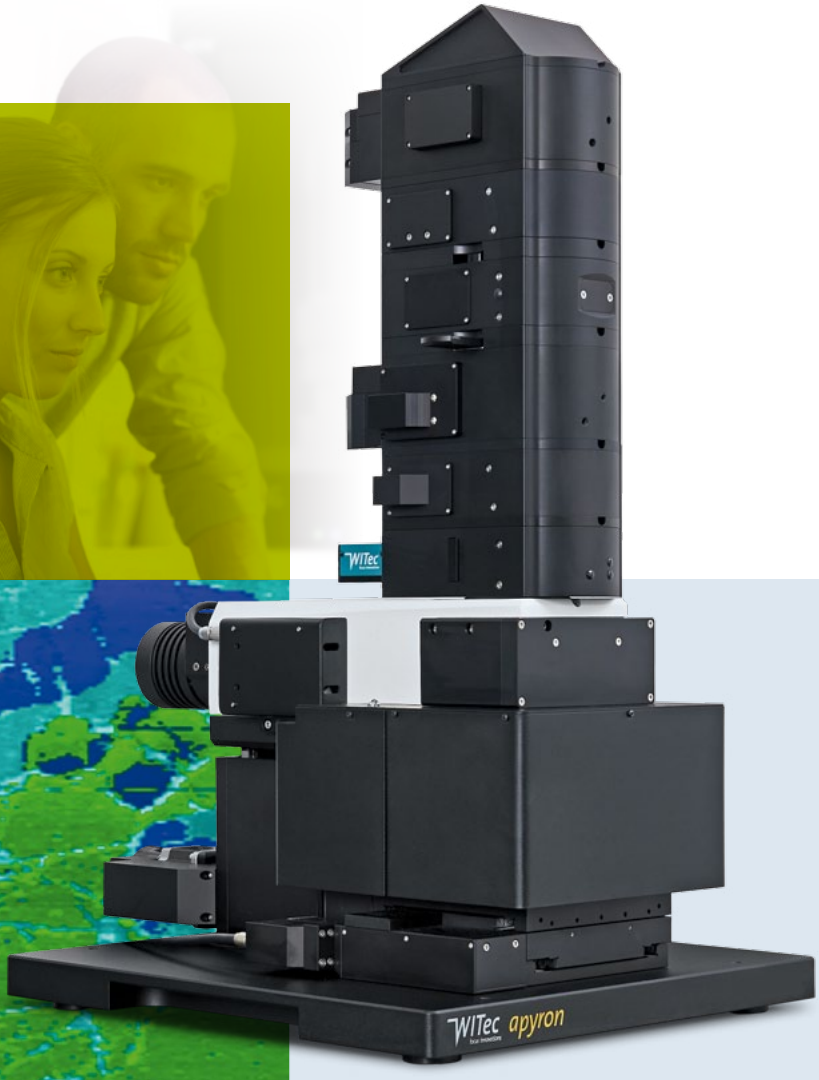
WITec
focus innovations

Premier Solution for Automated
3D Confocal Raman Imaging

alpha300 *apyron*

Optimized Performance and Workflow





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apyron

with AutoBeam opto-mechanical components

The alpha300 *apyron* is the top of the line in WITec's series of Raman imaging microscopes. It has been developed to combine ease-of-use and ultimate capability by automating hardware control and offering pre-configured measurement routines. This streamlines the experimental workflow and generates reproducible results with unrivaled speed, sensitivity and resolution.

apyron [άπειρον] is derived from the ancient Greek word for infinity

Automation helps during every step of Raman imaging measurements

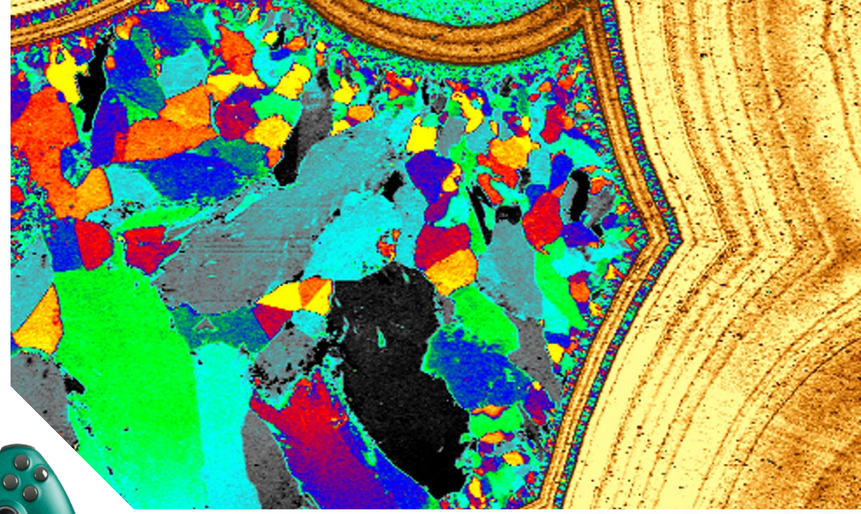
NEW

Setup

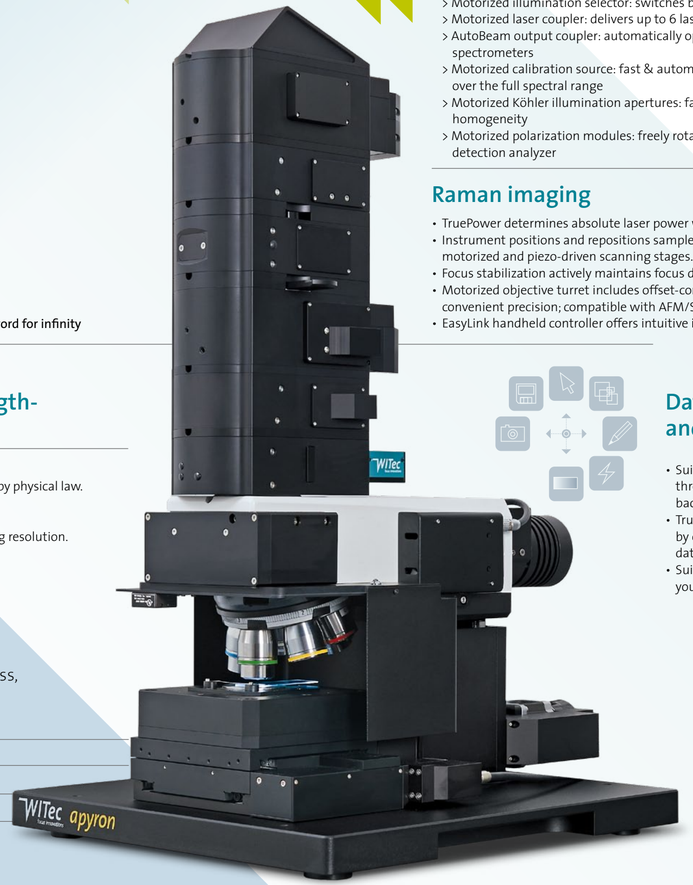
- TrueCal executes pre-configured calibration routines.
- Laser safety class 1 (or 1M) compliant.
- AutoBeam concept for automatic and motorized beam path alignment includes:
  - > Motorized 6-position objective turret: positions selected objective and compensates offsets
  - > Motorized illumination selector: switches between all microscopy illumination options
  - > Motorized laser coupler: delivers up to 6 laser wavelengths from UV to NIR
  - > AutoBeam output coupler: automatically optimizes signal & resolution and selects spectrometers
  - > Motorized calibration source: fast & automatic multi-point spectrometer calibration over the full spectral range
  - > Motorized Köhler illumination apertures: facilitate focusing and optimize contrast and homogeneity
  - > Motorized polarization modules: freely rotatable automated excitation polarizer and detection analyzer

Raman imaging

- TruePower determines absolute laser power with <0.1 mW accuracy.
- Instrument positions and repositions sample automatically with motorized and piezo-driven scanning stages.
- Focus stabilization actively maintains focus during entire measurements.
- Motorized objective turret includes offset-compensation for convenient precision; compatible with AFM/SNOM objectives.
- EasyLink handheld controller offers intuitive instrument operation.



Raman image of a cut agate with various phases of silica and silicon oxides identified by their Raman spectra.



Extensive automation

- Simplifies operation of the instrument.
- Requires less human input.
- Reduces potential sources of error.
- Enables complete remote control for use in environmental enclosures such as glove boxes.
- Enhances reproducibility.

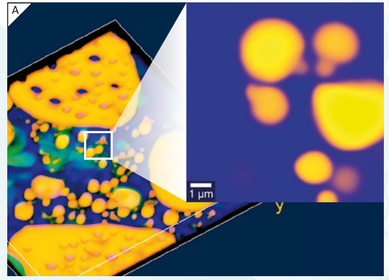
True confocality and wavelength-optimized design

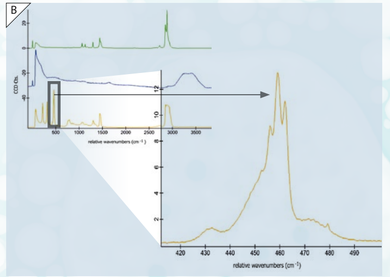
- Guarantees maximum throughput.
- Provides sharp images with resolution limited only by physical law.
- Yields spectral resolution down to 0.1 relative wavenumbers/cm (@633 nm).
- Supports FAST RAMAN IMAGING without sacrificing resolution.

Data processing, export and display

- Suite FIVE software wizard guides the user through the processing of Raman spectra, from background reduction through image generation.
- TrueMatch software helps to identify molecules by comparing measured spectra with existing databases.
- Suite FIVE facilitates the export and display of your data.

High spatial and spectral resolution simultaneously: CCl_4 in an emulsion





(A) 3D confocal Raman image of an emulsion, with a zoomed-in view of the inset. **(B)** shows the corresponding spectra: Green: alkane; blue: water; yellow: CCl_4 and oil. Due to the high spectral resolution of the spectroscopic system, the CCl_4 band at 460 relative wavenumbers (cm^{-1}) can be resolved at room temperature into three peaks, as shown in the zoom-in. These peaks reflect the isotopic variations of the molecules.

Image parameters: 200 x 200 x 20 pixels, 100 x 100 x 10 μm^3 scan range, 6 ms integration time per spectrum, 532 nm excitation wavelength.

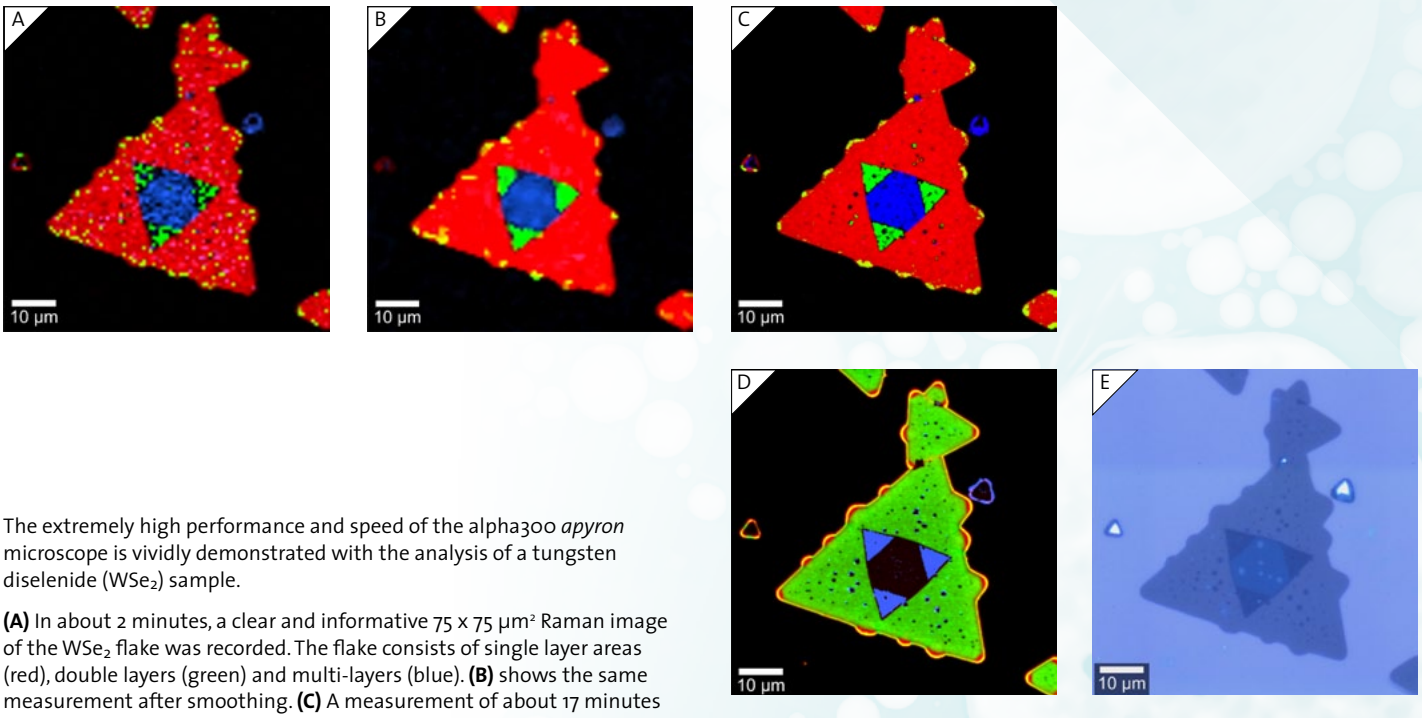
What automation means

The alpha300 *apyron's* automation supports users during every step of the imaging process, making it the ideal Raman microscope for:

- Multi-user laboratories with varying requirements and levels of user experience.
- Researchers employing remote operation, such as in enclosed environments.
- Raman newcomers with advanced imaging requirements.
- Veteran Raman microscopists seeking the next performance benchmark.
- Industry facilities with recurring experimental situations and an emphasis on time-critical turnover.

Raman image of a moisturizing shower gel with increased oil content. Red: oil; yellow: emulsifier; blue and cyan: aqueous phases.

The alpha300 *apyron* offers unrivaled data acquisition speed



The extremely high performance and speed of the alpha300 *apyron* microscope is vividly demonstrated with the analysis of a tungsten diselenide (WSe_2) sample.

(A) In about 2 minutes, a clear and informative 75 x 75 µm² Raman image of the WSe_2 flake was recorded. The flake consists of single layer areas (red), double layers (green) and multi-layers (blue). **(B)** shows the same measurement after smoothing. **(C)** A measurement of about 17 minutes produced an even sharper image. The integration time was 6 ms per pixel in both experiments. The increased signal to noise ratio was achieved by reducing the pixel size from 750 nm in **(A)** to 230 nm in **(C)**. In **(D)** the photoluminescence image of the same flake is presented, corresponding perfectly with the Raman image. **(E)** White-light image of the sample.

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WE TAKE CARE
WITec uses environmentally friendly printed materials. While this policy is only a small contribution to a healthy environment, we at WITec believe that focusing on details can effect positive change in the world.

WITec alpha300 series

alpha300
access

alpha300 R
Confocal Raman
Microscope

alpha300 *Ri*
Inverted Confocal
Raman Microscope

RISE™
Correlative
Raman-SEM Imaging

alpha300 *apyron*™
Automated Confocal Raman Miroscope

WITec Headquarters
WITec GmbH
Lise-Meitner-Str. 6
D-89081 Ulm . Germany
Phone +49 (0) 731 140700
Fax +49 (0) 731 14070200
info@witec.de
www.witec.de

WITec North America
WITec Instruments Corp.
130G Market Place Blvd.
Knoxville . TN 37922 . USA
Phone +1 865 984 4445
Fax +1 865 984 4441
info@witec-instruments.com
www.witec-instruments.com

WITec South East Asia
WITec Pte. Ltd.
25 International Business Park
#03-59A German Centre
Singapore 609916
Phone +65 9026 5667
shawn.lee@witec.biz
www.witec.de

WITec China
WITec Beijing Representative Office
Unit 1307A, Air China Plaza Tower 1
No. 36 Xiaoyun Road
Beijing, PRC., 100027
Phone +86 (0) 10 6590 0577
info.china@witec-instruments.com
www.witec.de/cn

WITec Japan
WITec K.K.
1-1-5 Furo-cho, Naka-ku,
Yokohama City, Kanagawa Pref. 231-0032
Japan
Phone +81 45 319 4277
info@witec.jp
www.witec.de/jp