

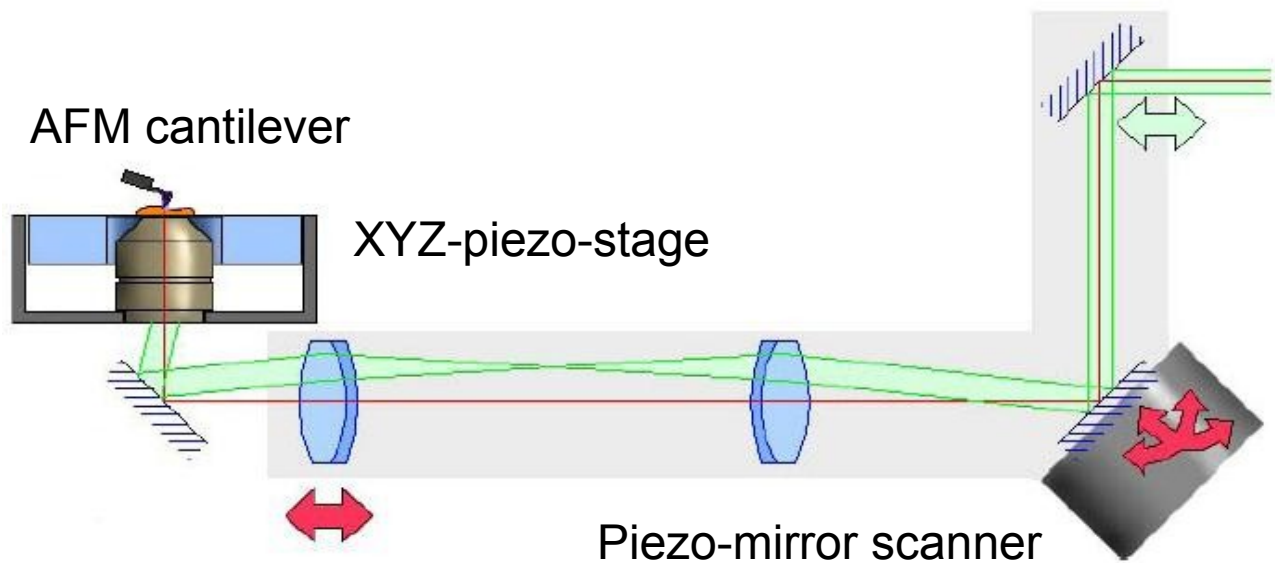
Nanofinder[®] 30 - CombiScope[™] 1000

Confocal Raman / AFM combined system

Joined development by Tokyo Instruments, Inc. and AIST-NT

TERS (Tip Enhanced Raman)

«Transmission Geometry»



Important features:

- AFM head motorized XY-positioning (rough alignment AFM tip and laser spot on the sample);
- Piezo-mirror scanner (fine scanning and positioning of AFM tip apex in specific location of laser spot);
- Sample scan with XYZ piezo-stage (with simultaneous AFM topography & Raman spectroscopy data acquisition).

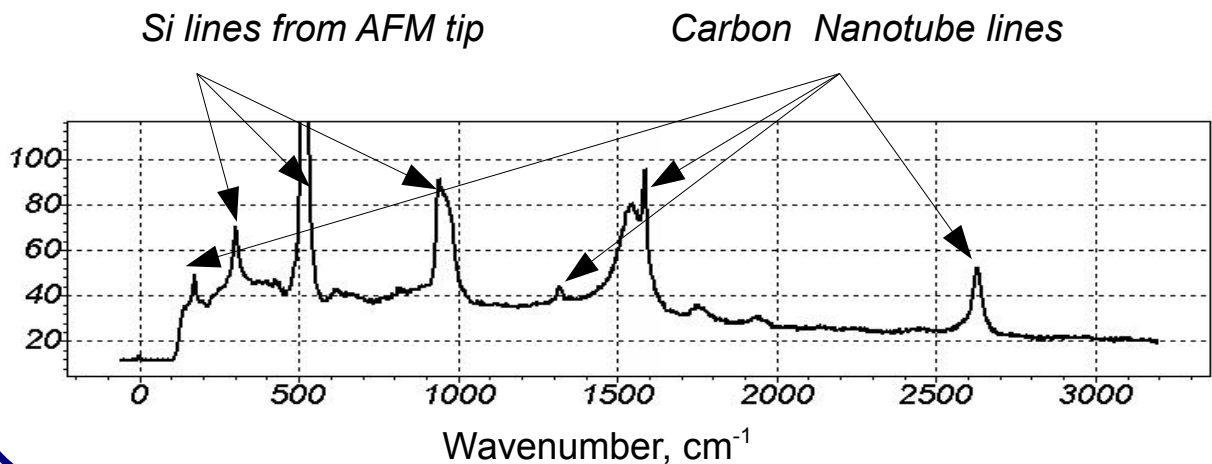
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Confocal Raman / AFM combined system

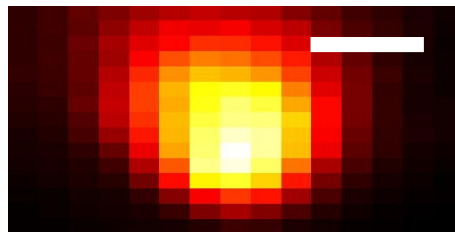
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TERS (Tip Enhanced Raman) «Transmission Geometry»

Raman spectrum (sample — Carbon Nanotubes)



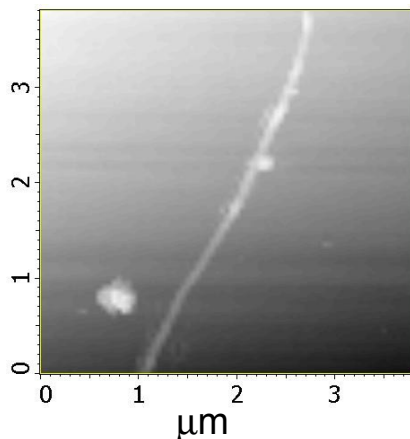
Mapping by piezo-mirror with Si line at 520 cm^{-1} imaging
(for fine AFM tip — laser spot positioning).



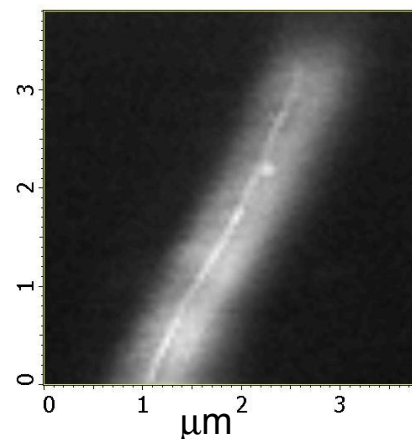
Scale bar 500 nm

Mapping by XYZ piezo-stage.

AFM topography



TERS at 1590 cm^{-1} (G-band) line



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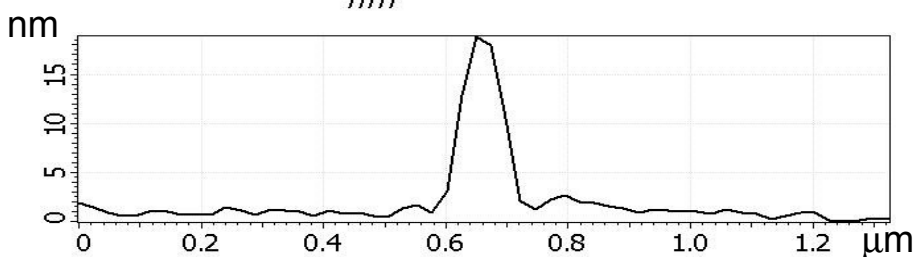
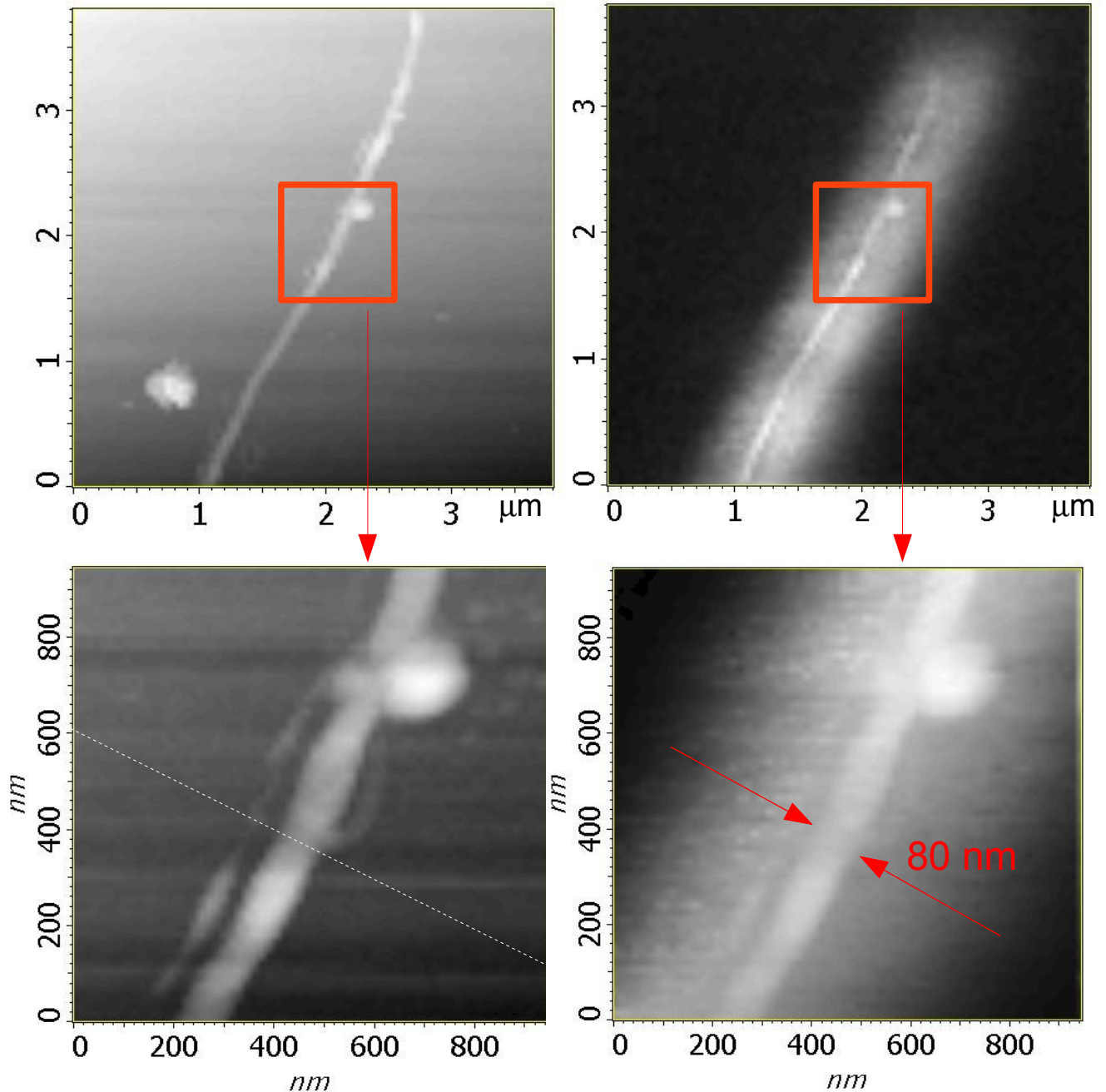
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TERS (Tip Enhanced Raman) «Transmission Geometry»

AFM topography

TERS image at 1590 cm⁻¹ (G-band) line



AFM topography
cross-section

* Data obtained with DEMO system at TII office (Tokyo)

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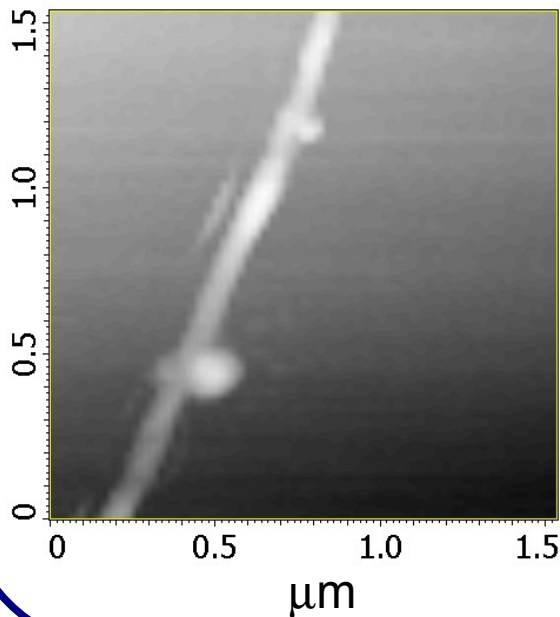
Confocal Raman / AFM combined system

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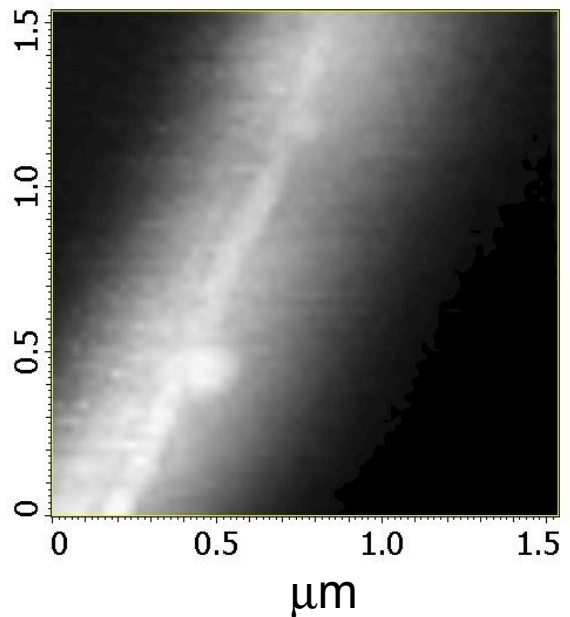
TERS (Tip Enhanced Raman) «Transmission Geometry» Carbon Nanotubes

Laser spot is positioned on the AFM tip apex

AFM topography

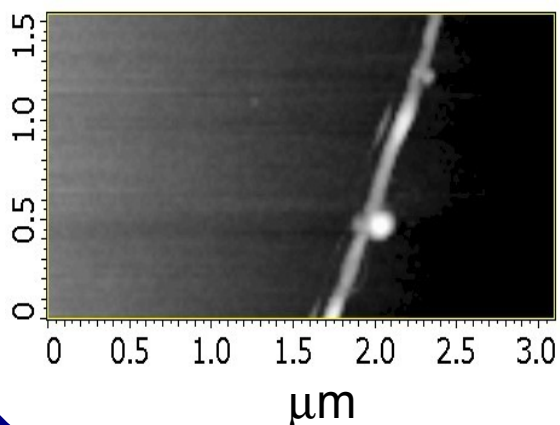


TERS image at 1590 cm^{-1} (G-band)

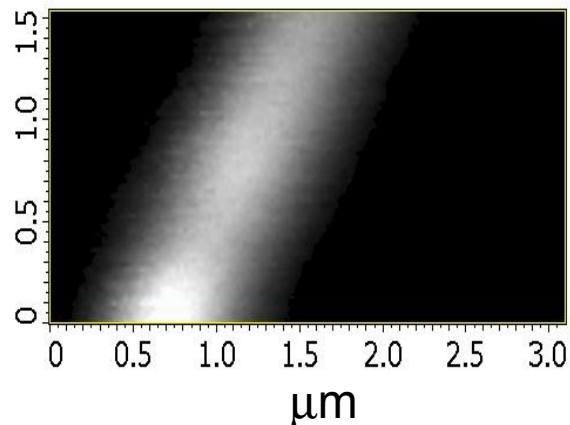


Laser spot is shifted by $1\ \mu\text{m}$ relative to AFM tip apex

AFM topography



Raman image at 1590 cm^{-1} (G-band)



Below diffraction limit TERS image appears only when laser spot is carefully adjusted on the AFM tip apex.

* Data obtained with DEMO system at TII office (Tokyo)