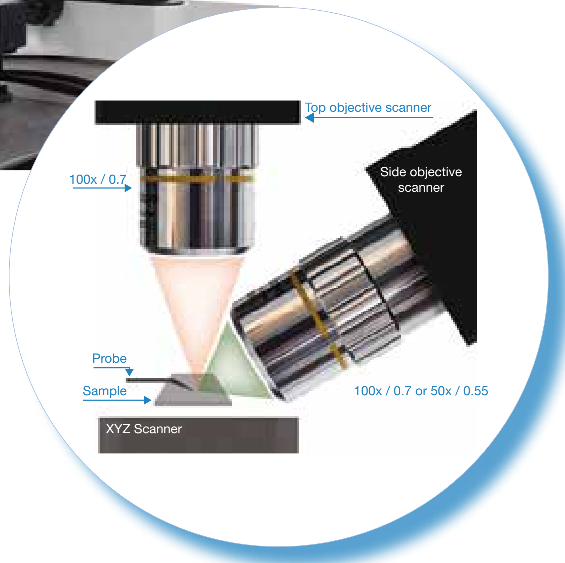
HORIBA Scientific

AIST-NT
Advanced Integrated Scanning Tools for Nano Technology

XploRA nano

Fully integrated system based on AIST-NT SmartSPM state-of-the-art scanning probe microscope and HORIBA XploRA compact and fully automated micro-spectrometer

High NA for TERS measurement with oblique illumination



High NA for co-localized measurements from top-down

JOBIN YVON Technology

SmartSPM Scanner and Base

Sample scanning range	100 µm x 100 µm x 15 µm (±10 %)
Scanning type by sample	XY non-linearity 0.05 %; Z non-linearity 0.05 %
Noise	• 0.1 nm RMS in XY dimension in 200 Hz bandwidth with capacitance sensors on • 0.02 nm RMS in XY dimension in 100 Hz bandwidth with capacitance sensors off • < 0.04 nm RMS Z capacitance sensor in 1000 Hz bandwidth
Resonance frequency	• XY 7 kHz (unloaded) • Z 15 kHz (unloaded)
X, Y, Z movement	• Digital closed loop control for X, Y, Z axes • WWActive elimination of XY phase lag, overshooting and ringing results in fast scanning without any dynamic image distortion • Motorized Z approach range 18 mm
Sample size	Maximum 40 x 50 mm, 15 mm thickness
Sample positioning	Motorized sample positioning range 5 x 5 mm
Positioning resolution	1 µm

AFM Head

Laser wavelength	1300 nm, non-interfering with spectroscopic detector
Alignment	Fully automated cantilever and photodiode alignment
Probe access	Free access to the probe for additional external manipulators and probes

SPM Measuring Modes

• Contact AFM in air/(liquid optional)	• Conductive AFM (optional)	• Nanolithography
• Semicontact AFM in air/(liquid optional)	• Magnetic Force Microscopy (MFM)	• Nanomanipulation
• Non contact AFM	• Kelvin Probe (Surface Potential Microscopy, SKM, KPFM)	• STM (optional)
• Phase Imaging	• Capacitance and Electric Force Microscopy (EFM)	• Photocurrent Mapping (optional)
• Lateral Force Microscopy (LFM)	• Force curve measurements	• Volt-ampere characteristic measurements (optional)
• Force Modulation	• Piezo Response Force Microscopy (PFM)	

Spectroscopy Modes

Confocal Raman, Fluorescence and Photoluminescence imaging and spectroscopy	Tip-Enhanced Fluorescence (TEFS)
Tip-Enhanced Raman Spectroscopy (TERS)	Near-field Optical Scanning Microscopy and Spectroscopy (NSOM/SNOM)

Conductive AFM Unit (optional)

Current range	• 100 fA ÷ 10 µA • 3 current ranges (1 nA, 100 na and 10 µA) switchable from the software

Optical Access

Capability to use simultaneously top and side plan apochromat objectives	• Up to 100x, NA = 0.7 from top or side • Up to 20x and 100x simultaneously
Cloosed loop piezo objective scanner for ultra stable long term spectroscopic laser alignment	• Range 20 µm x 20 µm x 15 µm • Resolution: 1 nm

Spectrometer

Fully automated XploRA Plus* compact micro-spectrometers,functional as stand-alone micro-Raman microscope	
Wavelength range	50 cm^{-1} to 4000 cm^{-1}
Gratings	4 gratings on computer controlled turret (600, 1200, 1800 and 2400 g/mm)
Automation	Fully motorized, software controlled operation

Detection

Full range of CCD detectors and EMCCDs

Laser Sources

Typical wavelength	532 nm, 638 nm, 785 nm. Other wavelengths available on request.
Automation	• Fully automated laser and filter switching for up to 3 simultaneous lasers • Laser polarization selection and spectral analyzer options for all wavelengths

Software

Integrated software package including full featured SPM, spectrometer and data acquisition control, spectroscopic and SPM data analysis and processing suite, including spectral fitting, deconvolution and filtering, optional modules include univariate and multivariate analysis suite (PCA, MCR, HCA, DCA), particle detection and spectral search functionalities.

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