

Technical Specifications

General Specifications	
type of instrument	combined confocal (CFM) and atomic force microscope (AFM)
sensor head specifics	AFM: Akiyama probe (quartz tuning fork combined with a micromachined cantilever); CFM: attoCFM I external optics head and low temperature apochromatic objective
Modes of Operation	
imaging modes	optically detected magnetic resonance (ODMR), AFM, CFM
slope compensation	2 axis scan plane correction
z feedback	AFM: PI feedback loop for amplitude modulation (AM), phase modulation (PM) or frequency modulation (FM) using included PLL
Resolution	
z bit resolution @ 4 K	7.6 pm at 2 µm scan range
Confocal Unit	
configuration	compact and modular design, two or more optical channels; standard configuration: one excitation and one detection channel
key benefits	quick and reliable alignment of each channel, steering mirror for combined beams long-term stability
quick-exchange of optical components	beamsplitters, filter mounts for up to 4 filters/polarizers, (1" diameter); optional piezoelectric rotator with filter mount
pinhole configuration	two pinholes (fiber apertures), different illumination and collection wavelength possible
pinhole size	dependent on fibers, typically 3 .. 9 µm mode field diameter
compatible LT-objective	LT-APO/VIS, LT-APO/VISIR, LT-APO/NIR (see accessory section for more information)
inspection unit	sample imaging with large field of view: ~54 µm (depending on cryostat and the distance from top-flange to field center)
Illumination	
excitation wavelength range	400 .. 1000 nm, default 650 nm (others on request)
illumination port specification	FC/ APC-connector for single mode fibers or free-beam configuration
Detection	
detection mode	e.g. optically detected magnetic resonance (ODMR), luminescence, fluorescence
detection wavelength range	detector upon user's choice, typically Si detector (coupling of the light to other detectors)
detection port specification	FC/ APC-connector for single mode fibers or free-beam configuration
Sample Positioning	
total travel range	independent degrees of freedom for tip and sample of 2 mm x 3 mm x 2.5 mm (closed loop)
step size	0.05 .. 3 µm @ 300 K, 10 .. 500 nm @ 4 K
fine scan range	30 x 30 x 4.3 µm ³ @ 300 K, 12 x 12 x 2 µm ³ @ 4 K (open loop)
closed loop scanning	optional
sample holder	Ti plate with integrated heater and calibrated temperature sensor
Suitable Operating Conditions	
temperature range	1.8 K .. 300 K (dependent on cryostat); mK compatible setup available on request
magnetic field range	0..15 T+ (dependent on magnet)
operating pressure	designed for He exchange gas (vacuum compatible version down to 1E-6 mbar on request)
Suitable Cooling Systems	
titanium housing diameter	48 mm
bore size requirement	designed for a 2" (50.8 mm) cryostat/magnet bore
compatible cryostats	attoDRY2200, attoDRY1000
Compatibility with Electronics	
scan controller and software	ASC500, Nanonis Mimea
Options and Upgrades	
closed loop scanning & global sample coordinates	interferometric encoders for scan linearization and closed loop sample navigation
closed loop upgrade for coarse positioners	resistive encoder, range 3 mm, sensor resolution approx. 200 nm, repeatability 1-2 µm

