

attoAFM/CFM

Technical Specifications

General Specifications	
type of instrument	combined confocal (CFM) and atomic force microscope (AFM)
sensor head specifics	AFM
Operation Modes	
imaging modes	optically detected magnetic resonance (ODMR), AFM, CFM
slope compensation	2 axis scan plane correction
z feedback	AFM
Resolution	
measured RMS z-noise (constant force @ 4 K, 5 ms pixel time)	< 0.2 nm (expected for attoLIQUID1000), < 0.5 nm (guaranteed for attoLIQUID1000)
z bit resolution @ 4 K	7.6 µm at 2 µm scan range
Confocal Unit	
configuration	compact and modular design, two or more optical channels
key benefits	quick and reliable alignment of each channel, steering mirror for the combined beams exceptional 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
LT- compatible 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
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 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	50 x 50 x 4.2 µm ³ @ 300 K, 30 x 30 x 2 µm ³ @ 4 K
closed loop scanning	optional
sample holder	ASH/QE/4CX quick-exchange sample holder with 8 electrical contacts, integrated heater with calibrated temperature sensor
Suitable Operating Conditions	
temperature range	1.5 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	attoDRY1000/1100/2100, attoLIQUID1000/2000/3000/5000
Compatibility with Electronics	
scan controller and software	ASC500 (for detailed specifications please see attoCONTROL section)
Options and Upgrades	
closed loop scanning & global sample coordinates	interferometric encoders for scan linearization and closed loop sample navigation
ultra-large scan range upgrade	125 x 125 µm ² @ 4 K
in-situ inspection optics	tip/sample monitoring via in-situ LT-LED for illumination, mirrors, lenses and CCD camera (outside of cryostat)
closed loop upgrade for coarse positioners	resistive encoder, range 5 mm, sensor resolution approx. 200 nm, repeatability 1-2 µm
sample holder upgrade	ASH/QE/4CX quick-exchange sample holder with 8 electrical contacts and integrated heater with calibrated temperature sensor

