

## attoAFM I

low temperature atomic force microscope, interferometric sensor

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Microscope Setup	
AFM sensor unit	ultra-stable AFM head, interferometric deflection detection
cantilever sensor adjustment	fixed, stable adjustment of the cantilever sensor
titanium housing diameter	47 mm (others on request)
Operation Modes	
feedback	PI feedback loop with additional PLL
imaging modes	contact mode, non-contact mode MFM, EFM, SGM, ct-AFM (conducting tip AFM)
Sample Positioning	
positioners and scanners	coarse positioners ANPxyz101 with piezo scanner ANSxyz100
coarse range	5 x 5 x 5 mm <sup>3</sup>
step size	0.05 .. 3 µm @ 300 K, 10 .. 500 nm @ 4 K
fine scan range	40 x 40 µm <sup>2</sup> @ 300 K, 30 x 30 µm <sup>2</sup> @ 4 K
sample monitoring	sample / tip monitoring via CCD camera and mirror (optional)
Operating Conditions	
temperature range	mK .. 300 K (dependent on cryostat)
magnetic field range	0 .. 15 T+ (dependent on magnet)
operating pressure range	1E-6 mbar .. 1 bar (designed for exchange gas atmosphere)
Cooling Specifications	
bore size	designed for a 2" (50.8 mm) cryostat/magnet bore
cryostat	LTSYS-He4, LTSYS-He3, LTSYS-HeDIL on request
Probes	
probe design	compatible with standard commercial cantilevers
functional probes	compatible with coated and non-coated probes, magnetic probes, ...
Noise	
measured RMS z-noise	0.05 nm (expected)
(contact mode @ 4 K, 5ms pixel integration time)	0.12 nm (guaranteed)
deflection noise density	0.5 pm/√Hz (dependent on laser system)
measured force noise (bandwidth 1 kHz, 0.2 N/m)	< 100 pN
z bit resolution full range mode	7.6 pm
z bit resolution small range mode	0.12 pm
Scan Controller and Software	
ASC500 SPM controller	for detailed specifications please see attoCONTROL section

