

attoAFM Ixs

low temperature atomic / magnetic force microscope, interferometric sensor

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	25 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 ANPxyz51 with piezo scanner ANSxyz50
coarse range	3 x 3 x 2.5 mm ³
step size	0.025 .. 2 µm @ 300 K, 10 .. 500 nm @ 4 K
fine scan range	30x30x4.3 µm ³ @ 300 K, 12x12x2 µm ³ @ 4 K
Operating Conditions	
temperature range	mK .. 400 K (dependent on cryostat)
magnetic field range	0 .. 16 T (depending on cryostat)
operating pressure range	1E-6 mbar .. 1 bar (designed for exchange gas atmosphere)
Cooling Specifications	
bore size	designed for a 1" or 25.4 mm cryostat/dewar 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 (contact mode @ 4 K, 5ms pixel integration time)	0.05 nm (expected) 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
Resolution	
lateral (xy) bit resolution at room temperature	16 bit over selected scan range; 0.46 nm for 30 µm
z bit resolution at room temperature	16 bit over selected scan range; 0.075 nm for 5 µm
lateral (xy) bit resolution at 4 K	16 bit over selected scan range; 0.075 nm for 5 µm
z bit resolution at 4 K	16 bit over selected scan range; 0.009 nm for 0,6 µm
MFM resolution @ 300 K and 4.2 K	20 nm
Sample Size	
sample size	10 mm
Scan Controller and Software	
ASC500 SPM controller	for detailed specifications please see attoCONTROL section

