

## attoSHPM

low temperature scanning Hall probe microscope

Microscope Setup	
SHPM sensor unit	ultra-stable SHPM head
titanium housing diameter	47 mm (others on request)
Operation Modes	
feedback	STM distance detection, tuning fork detection on request
imaging modes	STM tracking, constant height, or dual pass mode
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 .. 15T+ (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	attoLIQUID1000, attoLIQUID2000, attoLIQUID3000, attoLIQUID5000 attoDRY1000, attoDRY2000, attoDRY3000, attoDRY5000
Hall Sensors	
design	MBE grown GaAs/AlGaAs heterostructure Bi sensors for RT operation on request
active area	400 nm (high resolution) 250 nm (ultra high resolution)
field sensitivity	1500 V/AT
noise-equivalent magnetic field	15nT/sqrt(Hz) at 4K and 40μA Hall current 80nT/sqrt(Hz) at 77K and 40μA Hall current
typical attainable field detection limit	15μT typ. (LockIn bandwidth 10Hz at frequency 277Hz)
Resolution	
control electronics	16 bit over selected scan range (virtually unlimited bit resolution)
lateral (xy) bit resolution at 300 K	0.61 nm at 40 μm scan range
z bit resolution at 300 K	0.36 nm at 24 μm scan range
lateral (xy) bit resolution at 4 K	0.45 nm at 30 μm scan range
z bit resolution at 4 K	0.23 nm at 15 μm scan range
Scan Controller and Software	
ASC500 SPM controller	for detailed specifications please see attoCONTROL section

