

attoSHPM

Technical Specifications

| General Specifications | |
|---|---|
| type of instrument | Scanning Hall Probe Microscope with STM tip for tip-sample distance control |
| sensor head specifics | MBE grown hall cross sensor (GaAs/AlGaAs heterostructure) on a 2-axis tiltable sensor mount |
| Operation Modes | |
| imaging modes | constant height |
| slope compensation | 2 axis scan plane correction |
| z feedback | STM distance tracking (usually only for autoapproach) |
| Resolution | |
| size of Hall cross on sensor | 400 nm (high resolution), 250 nm (ultra high resolution) |
| field sensitivity @ 4 K | 1500 V/AT |
| noise-equivalent magnetic field (theoretical) | 15 nT/vHz @ 4 K and 40 μ A Hall current, 80 nT/vHz @ 77 K and 40 μ A Hall current |
| typical attainable field detection limit (measured) | 15 μ T typ. (bandwidth 10 Hz @ frequency 277 Hz) |
| z bit resolution @ 4 K | 57 μ m at 15 μ m scan range |
| Sample Positioning | |
| total travel range | 5 x 5 x 5 mm ³ (open loop) |
| step size | 0.05..3 μ m @ 300 K, 10..500 nm @ 4 K |
| fine scan range | 50 x 50 x 24 μ m ³ @ 300 K, 30 x 30 x 15 μ m ³ @ 4 K |
| closed loop scanning | optional |
| sample holder | ASH/QE/4CX quick-exchange sample holder with 8 electrical contacts |
| 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 | 80 x 80 μ m ² @ 300 K, 125 x 125 μ m 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) field of view approx. 3 mm x 2 mm, resolution approx. 20 μ m (depending on cryostat) |
| closed loop upgrade for coarse positioners | resistive encoder, range 5 mm, sensor resolution approx. 200 nm, repeatability 1-2 μ m |

