



attocube

WITTENSTEIN group



Technology Partners



attoNVM

cryogenic scanning NV magnetometer

CRYOGENIC INSTRUMENTS

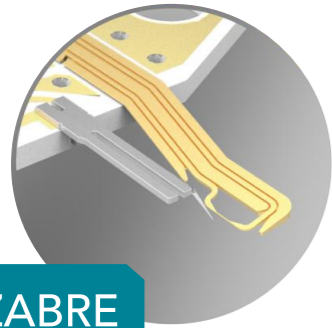
cool tools for cold science

World-class NV microscopy

cryogenic scanning NV magnetometer

attoNVM

advanced quantum sensing made easy



Robust NV tips with integrated MW antenna

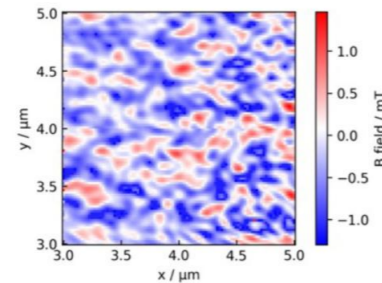
MW line and the diamond probe are integrated on the same chip carrier and aligned to facilitate the measurement and the tip exchange. To minimize the heating and drift, the MW line is not in direct contact with the tuning fork.

attocube and QZabre have combined forces to bring to the market the first commercial cryogenic scanning NV magnetometer in a dry cryostat. The seamless integration between attocube and QZabre state-of-the-art hardware and software enables users to efficiently perform magnetic imaging at various temperatures and truly quantitatively. There is no need for the calibration of sensor, because of using its quantum properties for imaging.

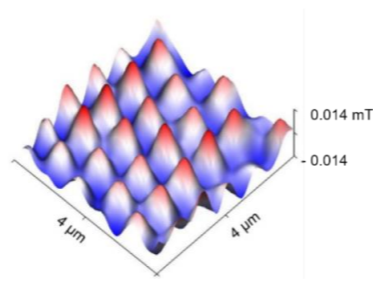
Demonstrated performance

First commercial cryogenic NVM, *al pari* with best-in-class NV imaging achievements, has the foundation in more than a decade-long heritage of collaboration with NVM pioneers. The left image shows ferromagnetic domains and the right image Abrikosov vortices, both being paradigmatic features of nanomagnetism.

Ir/Fe/Co/Pt sample @ 2.9 K



BSCCO 2212 sample @ 71 K

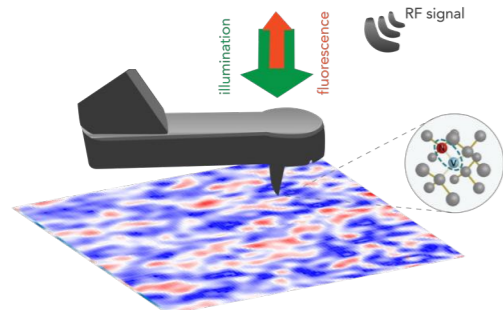


- unmatched magnetic field sensitivity & photon count rate
→ breakthrough in magnetic imaging & fully quantitative
- ultra-low vibrations and drift tuned for quantum applications
→ ultimate stability over long measurement cycles
- swiftly and safely exchangeable NV tips with integrated MW antenna
→ advanced user-friendliness for advanced scanning microscopy

Superior technical features accessible through user-friendly operation

Ultimate versatility

Motorized control of the optics, wide-field imaging, conventional scanning NV protocols (cw-ODMR, quench mode, ISO-B, AFM) & advanced pulsed modes (pulsed-ODMR, Rabi, Ramsey, Spin-Echo, CPMG, XY4, XY8).



General Specifications

imaging modes	ODMR, AFM, CFM, widefield, MOKE
ODMR contrast at base temperature	≥ 8 %
excitation	default 515 nm (others on request)
confocal unit	motorised steering mirror for combined beams. Long-term stability: drift of <100 nm/24h within $\Delta T=2K$
field of view	~ 55 μm
RMS z-noise (BW = 200 Hz)	< 0.4 nm @ RT, < 2.5 nm @ LT
positioning step size	0.05..3 μm @ 300 K, 10..500 nm @ 4 K
fine scan range	30 x 30 x 4.3 μm^3 @ 300 K, 18 x 18 x 2 μm^3 @ 4 K
temperature range	< 1.8...300 K in quench mode" (AFM scan with optical readout, MW off), < 4...300 K in cw-ODMR
magnetic field range	9/1/1 or 1/1/1 Tesla
scanning protocols	NV scanning mode (cw-ODMR), quench mode, iso-B mode, AFM in contact and fixed height
pulsed protocols	Rabi, Ramsey Spin-Echo, CPMG, XY4, XY8

Check out
comprehensive
characterization
in our whitepaper

