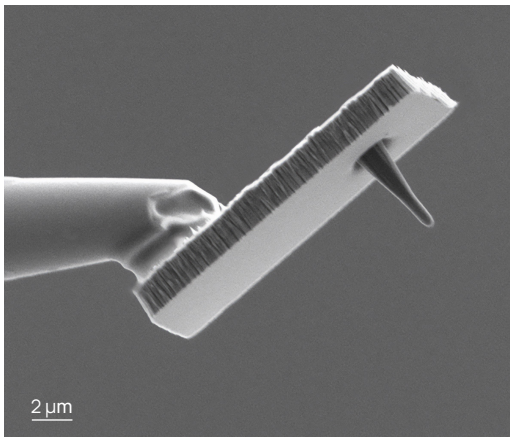
New Product Release
November 2022

Quantilever™ MX+

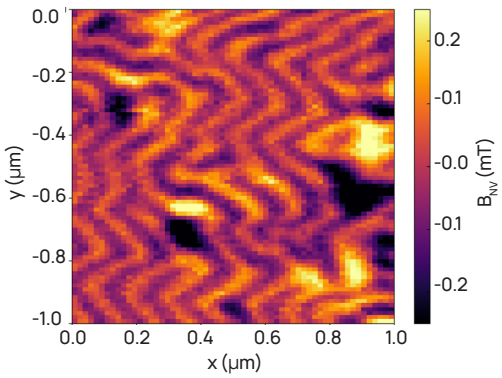
Quantilever™ MX+ represents the state-of-the-art diamond tips that deliver the highest demonstrated signal-to-noise ratio for scanning NV magnetometry measurements. The innovative tip design maximizes the light collection efficiency while ensuring an optimal distance between the NV center and the sample surface.



- **Groundbreaking Design**
  The latest cutting-edge design advancement in diamond tips made commercially available to everyone*.
- **Highest Precision**
  Up to 3 times higher SNR compared to conventional tip designs. Nanoscale spatial resolution preserved.
- **Highly Efficient Measurements**
  Record-low laser powers (<50 µW)
  Photon emission into minimal numerical aperture (NA~0.5).

*The design is the result of a fruitful collaboration with the Quantum Sensing Lab (Prof. P. Maletinsky) at the University of Basel.
Peer-reviewed paper: Phys. Rev. Applied 14, 064007. **Patent family:** WO2021151796A1.

Unlocking applications – Weak stray fields and low T measurements



Measure weak magnetic stray fields

The high signal-to-noise ratio and sensitivity of Quantilever MX+ further facilitate the characterization of materials with extremely weak stray fields such as antiferromagnets or multiferroics.

"Quantilever MX+ tips significantly decreased our data acquisition time. The improved collection efficiency will enable us to fully characterize many more samples per day, even those with extremely weak stray magnetic fields."

Dr. Paul Stevenson, Northeastern University

Sample: $BiFeO_3/GdScO_3$ **Courtesy** of Dr. P. Stevenson (NEU) and Dr. R. Ramamoorthy (UCB)

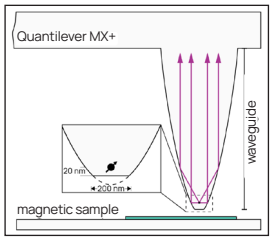
NV magnetometry at cryogenic temperatures

Quantilever MX+ enables higher photon count rates and directional photon emission with minimal losses allowing to use objective lenses with small NA and relaxing potential working distance constraints.

"Because every photon counts, our work directly benefited from the increased fluorescence count rate of the Quantilever MX+ tips compared to the conventional design. Especially at low temperatures, where high-quality objectives with high NA and large working distance are difficult to find, the reduced NA of the Quantilever MX+ makes life a lot easier. "

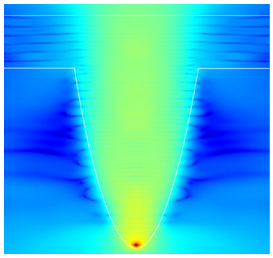
Dr. Rainer Stöhr, University of Stuttgart

Our approach – Patented optimized geometry



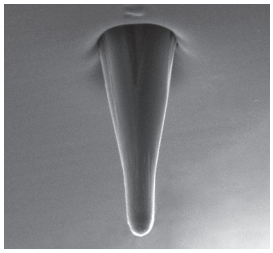
Optimized pillar geometry to effectively guide photons toward optics

- The parabolic shape effectively guides emitted photons toward the collection optics.
- The flat end facet ensures the proximity between the NV center and the sample surface preserving the high spatial resolution in magnetometry measurements.



Improved photonic waveguide to maximize signal collection

- The parabolic reflector guides on average 80% of the emitted photons toward the collection optics.
- The concentrated photon flux allows the use of objectives with small NA (< 0.5) and relaxes potential working distance constraints.



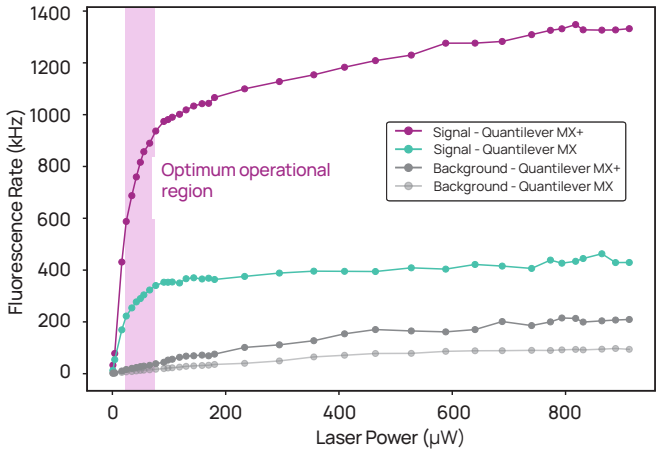
State-of-the-art fabrication techniques to increase SNR

- Signal-to-noise ratio enhanced - parasitic background fluorescence is minimized by optimal nanofabrication.
- Integration times in the sub-ms range are unlocked through high NV signal and minimized noise leading to improved statistics.

Enhanced Performance – Highest demonstrated SNR

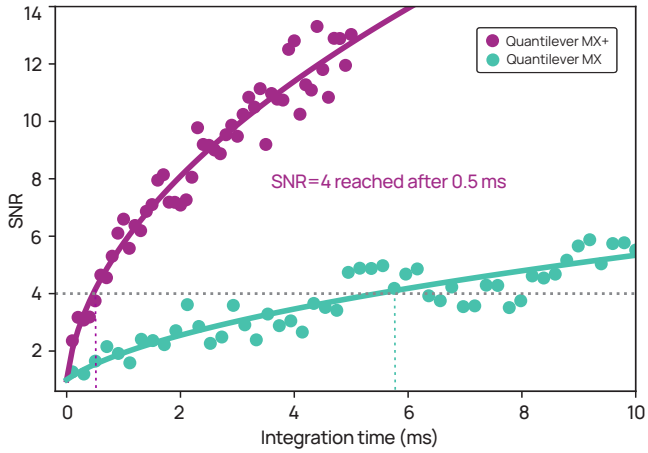
Brightness

Get a higher fluorescence rate and the highest demonstrated SNR.



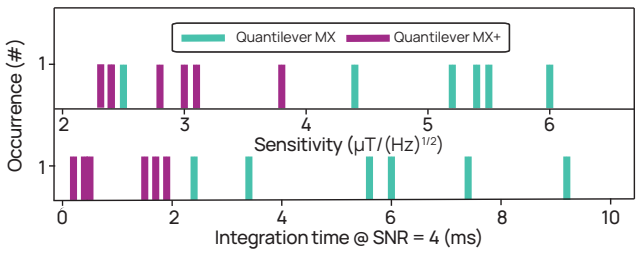
Speed

Achieve SNR = 4 in sub-ms integration times.



Reproducibility

With Quantilever MX+ tips, you can consistently achieve sensitivities < 3 µT/(Hz)$^{1/2}$.



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