



# Only the potential is immeasurable

It's here. The future of sensors.

Observing quantum effects usually requires large, cooled and expensive setups. With the microwave-free quantum magnetometer, Quantum Technologies has achieved a real coup in collaboration with duotec. Our sensor solution is **small, coolingless, cost-effective** and nanometers-length more precise than anything previously known – simply sensorial.

## Precise and spot-on — QT-RH105 fiber-coupled quantum sensor

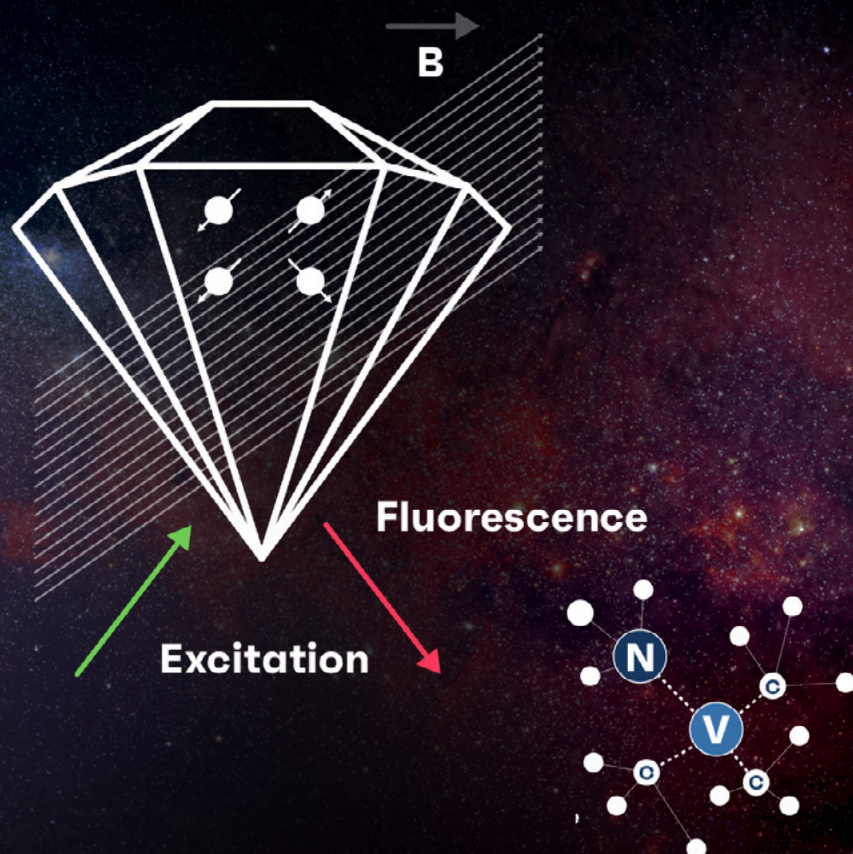
It is particularly well suited for:

- Non-contact measurement of current flows
- Automotive battery management systems
- Measurement of electric motor commutation for optimized switching operations
- Position measurement and visualization of (minimally) invasive medical instruments (e.g. catheters)
- Galvanically isolated in low, medium and high voltage networks, AC and DC
- Harsh-environment measurements

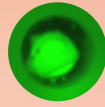
### This is how the future works:

Our quantum sensor measures magnetic fields purely optically.

The quantum sensor uses the magnetic field dependence of the spin states of NV centers in the diamond and their fluorescence.



## Design – Sensor head with nanodiamonds



Excitation

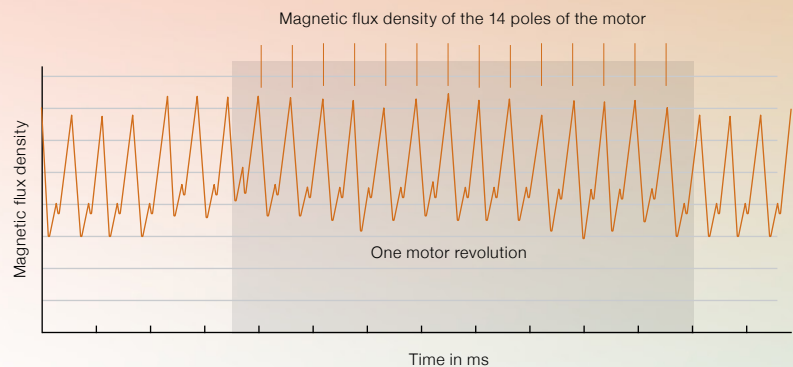


Fluorescence

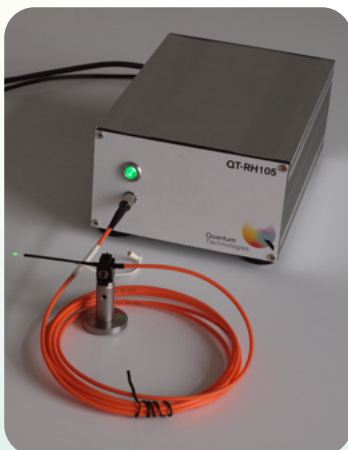
- The facet of the optical fiber is coated with nanodiamonds
- Embedded and set in a ceramic ferrule
- Measurement signal is read out via the optical fiber

## Application – Magnetic field inside electric motor

- The extremely small footprint of our sensor allows measurements inside electric motors
- Due to the high bandwidth, it is possible to precisely determine the magnetic field variation within one motor revolution
- The dielectric sensor head does not influence the motor and is insensitive to electromagnetic interference



## Technical data



- Magnetic measuring range:  $|B| = 5 - 50 \text{ mT}$
- Isotropic measurement of  $|B|$
- Galvanic isolation: fiber length  $> 100 \text{ m}$  possible
- Pure dielectric sensor head (non-conductive and non-magnetic)
- Small sensor footprint:  $\varnothing 1.25 \text{ mm} / 125 \mu\text{m}$  (ferrule / fiber diameter)  
*(Sample distance to sensing volume  $< 1 \text{ mm}$ , sensing volume: approx.  $\varnothing 100 \mu\text{m} \times 50 \mu\text{m}$ )*
- Suitable for harsh environments (diamond + fiber)  
*(Vacuum suitable, coating and encapsulation of sensor head possible)*

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