# **QTC Trilayer Cantilever Probes**

Silicon Nitride-Polymer AFM probes: for low temperature experiments

#### **General description**

The QTC (Quantum/Cryogenic) Trilayer Cantilevers feature a unique structure with Silicon Nitride films and a polymer core, resulting in increased thickness without excessive stiffness. This design significantly amplifies force sensitivity ( $\mu$ V/nN), surpassing standard single-crystalline Silicon cantilevers by a factor of 4x. Additionally, the electrical insulation of electronic sensors within the SiN/Polymer interface ensures robustness and reliability even in harsh conditions. Pt traces are deposited onto the cantilever surface of the QTC Trilayer cantilever to transfer electrical signals to the tip. The traces are electrically insulated from the encapsulated Wheatstone bridge to avoid crosstalk and are optimized for experiments in low temperature environments.

Specifications			
Model	QTM Trilayer cantilevers		
Material	SiN with a polymer core		
Tip material	-tipless-		
Pt metal coating	Up to 6 traces to the tip (thickness 70 nm)		
Modes	Low Temperature compatible		
Possible dimensions*	Res. Freq.	Spring constant	Deflection sensitivity**
μm x μm x μm	KHz	N/m	μV/nm
300x90x4	50	5	1
Deflection sensing	on-chip piezoresistive bridge		
Actuator	external shaker		
Electrical	Unbonded		
connections			
* Nominal values. For more dimensions, contact us.			

\*\* Not amplified (signal direct at the chip), 1 V bridge supply.

### **Applications:**

- Low Temperature-AFM/KPFM
- Quantum Twisting Microscopy

## What about your application? Contact us!

#### **References**:

Hosseini, N., Neuenschwander, M., Adams, J.D. et al. A polymer– semiconductor–ceramic cantilever for high-sensitivity fluid-compatible microelectromechanical systems. Nat Electron (2024). DOI:<u>10.1038/s41928-024-01195-z</u>

**C-Sense** 

Nanotechnology

Image of 6 Pt-trace QTC Trilayer Cantilever



Image of 4 Pt-trace QTC Trilayer Cantilever



Image of 2 Pt-trace QTC Trilayer Cantilever



Image of front of 4 Pt-trace QTC Trilayer Cantilever

