

QCT Cantilever Probes

Silicon Nitride-Polymer AFM probes for low-temperature experiments

General description

The Quantum Cryogenic Trilayer (QCT) Cantilevers are engineered with an innovative trilayer structure combining silicon nitride films with a polymer core. This design increases thickness without adding excessive stiffness, delivering up to 4x higher force sensitivity ($\mu\text{V}/\text{nN}$) compared to standard single-crystalline silicon cantilevers. The SiN/Polymer interface provides excellent electrical insulation, ensuring sensor reliability and durability—even in demanding environments. Platinum traces on the cantilever surface efficiently transfer signals to the tip, while remaining electrically isolated from the integrated Wheatstone bridge.

Optimized for low-temperature experiments, QCT Cantilevers offer unmatched sensitivity, robustness, and performance for advanced research applications. The V-shaped triple-beam TLCQCT3-V is custom-engineered to provide improved mechanical stability and signal transfer.

Applications:

- Low-temperature-AFM / KPFM
- Probing quantum coherence, tunneling phenomena, and spin dynamics
- Quantum Twisting Microscopy
- Sensitive force detection in cryogenic environments

What about your application?

Contact us!

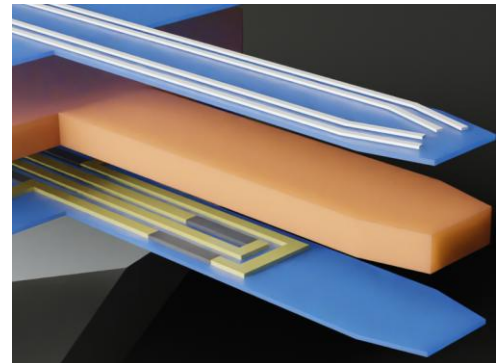
Specifications				
Model	TLCQTC1	TLCQTC2	TLCQTC3	TLCQTC3 - V
Material	SiN with a polymer core			
Tip material	-tipless-			
Modes	low-temperature compatible			
No. of Pt traces to tip	2	4	6	
Pt metal thickness	70 nm			
Dimensions* (length x width x thickness)	300 μm x 80 μm x 4 μm			
Support beam width	-	-	-	40 μm
Nominal res. freq.	50 kHz			
Nominal spring const.	5 N/m			
Deflection sensitivity**	1 μV/nm			
Deflection sensing	on-chip piezoresistive bridge			
Actuator	external shaker			
Electrical connections	unbonded (bare chip)			

* Dimensions of the main beam.

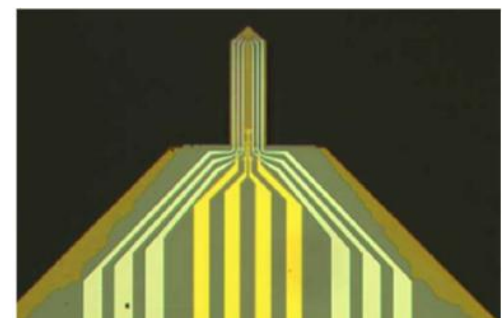
** Nominal value. Not amplified, 1 V bridge supply.

References: Hosseini, N., et al. Nature Electronics

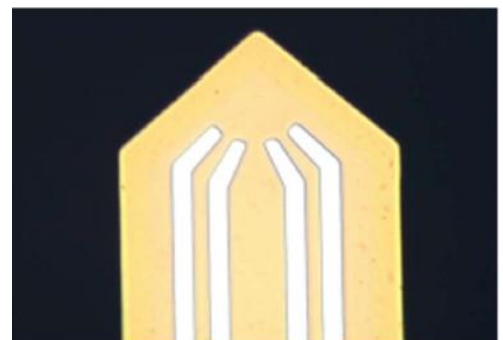
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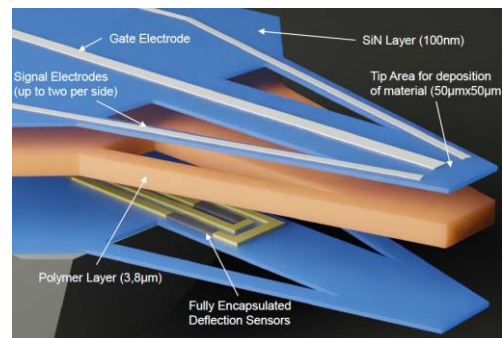
Schematic of TLCQCT2 cantilever with 4 Pt-traces



TLCQCT3 cantilever with 6 Pt-traces



Close-up of TLCQCT2 cantilever tip



Schematic of the TLCQCT3-V cantilever.

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