

Primary CBT thermometer technology.

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Coulomb Blockade Thermometer (CBT) is a primary thermometer based on electric conductance of normal tunnel junction arrays¹. One limitation for CBT use at the lowest temperatures has been due to environmental noise heating. To improve on this limitation, we have done measurements on CBT sensors fabricated with different on-chip filtering structures in a dilution refrigerator with a base temperature of 10 mK. The CBT sensors were produced with a scalable ex-situ tunnel-junction process, defined by optical lithography². We will present how the different on-chip filtering affects the limiting saturation temperatures and show that CBT sensors with proper on-chip filtering work at temperatures below 20 mK and are tolerant to noisy environment.

¹J. P. Pekola, K. P. Hirvi, J. P. Kauppinen, and M. A. Paalanen, Phys. Rev. Lett. **73**, 2903 (1994).

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