



Electron Thermometry

QFilter-II

The performance and accuracy of quantum electronics is substantially degraded when the temperature of the electrons is too high. The electron temperature can be reduced with appropriate thermal anchoring and the use of a good filter for both DC and RF lines. Ultimately, for high performance filters, the electron temperature can approach the phonon temperature (indicated by resistive thermometers) in a dilution refrigerator to within 10 mK.

In this webinar we will discuss a method for measuring the electron temperature using Coulomb blockade thermometry and apply this technique to find the readily achievable electron temperature when using the QFilter, provided by QDevil.

We present all the details of the experiment, including building up the experimental setup, connecting and tuning the required equipment, coding the measurements, and analyzing the data. Further, we will show that using other QDevil products, a 24 channel ultra-low noise D/A converter (QDAC), a breakout box (QBox) and a sample holder board (QBoard) will greatly benefit these experiments.

In our Coulomb blockade thermometry experiments on a single GaAs/AlGaAs quantum dot we measured an electron temperature of 28 mK.

Title of the webinar

Minimizing Electron Temperature with the QFilter: A Coulomb Blockade Thermometry Study

Speakers

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