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Nanoscale metal thermometry using a radiofrequency single electron transistor LOREN SWENSON, University of California, Santa Barbara, DAVID WOOD, ANDREW CLELAND — We report on the development of single electron transistors for thermometric readout of nanoscale normal metal volumes. Due to the weak electron-phonon interaction at low temperatures, the electron gas in a normal metal can be heated to a temperature significantly greater than that of the surrounding lattice. Below 100 mK, the electron-phonon coupling time is on the order of microseconds to milliseconds, making direct measurements of the electron temperature's time dependence possible. Achieving sensitive and high frequency readout of this system is of critical importance for applications in nanocalorimetry and nanobolometry. We will describe the use ofa radiofrequency single electron transistor to time-resolve the temperature of the electron gas in a submicron scale normal metal volume.

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