Characterization of Ti superconducting transition edge sensors

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In this paper, we report the development of superconducting transition edge sensors (TES) based on Ti superconducting films, which are deposited on silicon substrate by DC reactive magnetron sputtering. All measurements are performed with a 0.3-K Chase He-7 cooler integrated with a two-stage 4-K Gifford-McMahon refrigerator. The critical temperature of the Ti TESs (~30nm thick) is about 420 mK. Using a commercial SQUID, we measure the current-voltage (I-V) characteristics of a Ti TES device at different bath temperatures. Its thermal conductance is found to be approximately equal to 100 pW/K. The dark noise equivalent power (NEP) is about 5×10^{-17} pW/√Hz in terms of the current noise measured at a bath temperature of 388 mK. Detailed design and measurement results will be presented.