A Distributed TES Model for Designing Low Noise Bolometers Approaching SAFARI Instrument Requirements

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Abstract - Transition edge sensors (TES) are the chosen detector technology for the SAFARI imaging spectrometer on the SPICA telescope. The TES are required to have an NEP of 2-3\times10^{-19} W/\sqrt{Hz} to take full advantage of the cooled mirror. SRON has developed TiAu TES bolometers for the short wavelength band (30-60 \textmu m). The TES are on SiN membranes, in which long and narrow legs act as thermal links between the TES and the bath. We present a distributed model that accounts for the heat conductance and the heat capacity in the long legs that provides a guideline for designing low noise detectors. We report our latest results that include a measured dark NEP of 4.2\times10^{-19} W/\sqrt{Hz} and a saturation power of about 10 fW.

PACS numbers: 85.25.Pb, 95.85.Gn

Submitted to ESNF July 28, 2011; accepted October 06, 2011. Reference ST274, Category 4
Published in Journal of Low Temperature Physics 167, Numbers 3-4, 188-194 (2012)