

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

P. Khosropanah^{1*}, R.A. Hijmering¹, M. Ridder¹,
M.A. Lindeman¹, L. Gottardi¹, M. Bruijn¹, J. van der Kuur¹,
P.A.J. de Korte¹, J.R. Gao^{1,2}, H. Hoevers¹

¹*SRON Netherlands Institute for Space Research, Sorbonnelaan
2, 3584 CA Utrecht, The Netherlands*

²*Kavli Institute of NanoScience, Delft University of Technology, Lorentzweg
1, 2628 CJ Delft, The Netherlands*

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 $2\text{--}3 \times 10^{-19} \text{ W}/\sqrt{\text{Hz}}$ to take full advantage of the cooled mirror. SRON has developed TiAu TES bolometers for the short wavelength band (30-60 μm). 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 $4.2 \times 10^{-19} \text{ W}/\sqrt{\text{Hz}}$ and a saturation power of about 10 *fW*.

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