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Optical test facility for SAFARI bolometers

L. Ferrari[1*], M.D. Audley[1], G. De Lange[1], J. R. Gao[2,3], D. Griffin[4], G. Keizer[1], P. Khosropanah[2], and P. Mauskopf[5]

1 SRON Netherlands Institute for Space Research, Landleven 12, Groningen, 9747 AD The Netherlands*
2 SRON Netherlands Institute for Space Research, Sorbonnelaan 2, Utrecht, 3584 CA, The Netherlands
3 Delft University of Technology, Lorentzweg 1, Delft, 2628 CJ, The Netherlands
4 Rutherford Appleton Laboratory, Harwell Science and Innovation Campus, Didcot OX11 0QX
5 Cardiff University, School of Physics and Astronomy, 5 The Parade, Cardiff, CF24 3AA, Wales
* Contact: lorenza@sron.nl, phone +31-50-363 8321

***Abstract*— We have developed an optical test facility for Transition Edge Sensor (TES) bolometers for the FIR. This activity is part of the program to develop TES-detectors for the SAFARI instrument, which is an imaging spectrometer on the SPICA satellite. For SAFARI, bolometers for three bands spanning from 30 to 210 um are required to exhibit a noise performance limited by the celestial background that translates into a detector NEP requirement of $2x10^{-19}$ W/√Hz. Because of this extreme sensitivity and the limited dynamic range of the TES detectors, optical access to calibration sources operating at room temperature is excluded. We therefore have developed a low temperature, pass-band limited calibration source. Our optical test facility is set up in a dilution refrigerator providing a detector-plate base temperature of 10 mK. FIR radiation is generated by means of a black-body source that can be temperature controlled between 3 K and 35 K. Radiation is coupled to the 5 x 5 detector array using feedhorns. The radiation bands are defined by metal mesh filters. The TES signal readout is performed using lownoise SQUID current sensors. We present the mechanical and thermal design of the detector plate / black body assembly and we hope to present the optical measurements performed on low-power (fW level) TES bolometers.**