

A SPICA far-IR imaging spectrometer SAFARI – current development status and expected scientific capabilities

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SAFARI (SpicA FAR-infrared Instrument) is an imaging Fóurier Transform Spectrometer designed to provide continuous spectral coverage in photometry and spectroscopy from 34 to 210 μm with a high sensitivity of $\sim 3 \times 10^{-19} \text{ Wm}^{-2}$ at 48 μm (5σ , 1 hour). A high spectral resolution of $R = 1000 \sim 6000$ (~ 1000 at 210 μm , ~ 2000 at 100 μm , and ~ 6000 at 34 μm) will be achieved with selectable spectral resolution modes of $R \sim$ few hundred and $20 < R < 50$.

To accomplish SAFARI's superior capability, large-formatted arrays of highly sensitive TES detector (NEP = $2 \times 10^{-19} [\text{W}/\sqrt{\text{Hz}}]$), which cover a wide field of view ($2' \times 2'$) with high spatial resolutions ($3.6 \sim 11.5$ [arcsec]), have been developed. Currently a full-scale 384-pixel array as well as 160-channel frequency-domain multiplexing are being fabricated and under tested.

We present the current technology development status and expected performances of the SAFARI instrument. A wide variety of science cases that are to be covered by SAFARI, including galaxy evolution, planetary system formation and tracing the transmigration of interstellar matter, are also discussed.