

W05a **A SPICA far-IR imaging spectrometer SAFARI – current status of component development and overall designing**

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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  $\mu\text{m}$  with selectable spectral resolution modes of  $R = 1000 \sim 6000$  (1000 at 200  $\mu\text{m}$ , 2000 at 100  $\mu\text{m}$  and 6000 at 34  $\mu\text{m}$ ),  $R \sim$  few hundred and  $20 < R < 50$ . A high sensitivity of  $\sim 3 \times 10^{-19} \text{ Wm}^{-2}$  at 48  $\mu\text{m}$  ( $5\sigma$ , 1 hour) can be achieved by utilising full advantage of SPICA's cooled telescope mirrors ( $\sim 6 \text{ K}$ ) with highly sensitive TES detector arrays of  $\text{NEP} = 2 \times 10^{-19} [\text{W}/\sqrt{\text{Hz}}]$ .

The development of a high-sensitivity detector system is thus the key to realise the full potential of the instrument. An NEP of  $\sim 4 \times 10^{-19} [\text{W}/\sqrt{\text{Hz}}]$  is already demonstrated and further development is ongoing.

The detector arrays need to be large-formatted ones to achieve a wide field of view ( $2' \times 2'$ ) as well as high spatial resolution (3.6  $\sim$  11.5 [arcsec]), giving another technical challenge of reducing its heat dissipation to be accommodated with an overall restriction of the SPICA satellite.

A wide variety of science cases are to be covered by SAFARI, including galaxy evolution, planetary system formation and tracing the transmigration of interstellar matter.

We present the best expected performance of the SAFARI instrument and describe its scientific potential.