

V255a Grating-SAFARI – A SPICA far-IR spectrometer with improved capabilities

土井 靖生 (東大総文), Peter R. Roelfsema and the SAFARI consortium

The primary goal of the SPICA mission is to reveal the main drivers of galaxy evolution from the early universe to the present. To achieve this goal, it is important to make a systematic observation of galaxies up to $z=3$, not only the tip of the bright end but the whole galaxy populations including main-stream galaxies, and characterise their physical properties.

SAFARI (SpicA FAR-infrared Instrument) is a powerful spectrum mapping machine that covers 34–210 μm , where we can observe many important gas diagnostic lines, with a high sensitivity of $< 5 \times 10^{-20} [\text{Wm}^{-2}]$ and can observe a large number of galaxies to achieve sufficient statistical samples within a reasonable observation time. According to the revisit of the satellite configuration (Shibai et al., this meeting) and a strategic target selection by combination with the mid-infrared instrument on-board SPICA (Kaneda et al., this meeting), we plan to make SAFARI as a grating spectrometer ($R \sim 300$) with ultra-low noise ($\text{NEP} < 2 \times 10^{-19} [\text{W}/\sqrt{\text{Hz}}]$) TES detector arrays to maximise the instrument capability within the limited resources of the satellite system. SAFARI is also efficient to observe spatially extended sources (e.g., nearby galaxies) by having a beam-steering mirror to map $\sim 2' \times 2'$ with a fixed satellite attitude. A higher spectral resolution ($R \sim 3000$) is achieved by inserting a Fabry-Pérot into the optical path for observations of protoplanetary discs and so on.

We present the current technology development status and the planned activities for the ESA M5 proposal.