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SAFARI: a far-IR imaging spectrometer for SPICA

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We present an outline of a study that is being undertaken by a consortium of European, Canadian and Japanese institutes, along with JPL, for a far-IR instrument for the proposed JAXA-led Japanese-ESA mission, SPICA.

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

To meet these requirements, four detector technologies (TES bolometers, Ge:Ga photoconductors, Si-bolometers and KID detectors) are undergoing development and the final detector selection is being undertaken. The best estimate scientific capability of the SAFARI instrument, which covers a wide variety of vital science cases including galaxy evolution, planetary system formation and tracing the history of interstellar matter, is then to be settled.

We present the hardware design and its development status, and highlight the technical challenges that need to be met in order to realise the full potential of the instrument.