

Design Specification of SPICA/MCS/MRS and Examination of its Science Cases on a Lifecycle of Matter in Space

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Mid-infrared Medium Resolution Spectrometer (MRS) is one of the key spectroscopic modules of SPICA Mid-Infrared Camera and Spectrometers (MCS). MRS is an Echelle Grating spectrometer designed to observe a number of fine structure lines of ions and atoms, molecular lines, and band features arising from solid particles and dust grains in the mid-infrared with a spectral resolution of $R=1000-3000$. MRS consists of two channels; MRS-S covers 12.2-23.2 micron and MRS-L covers 23.0-37.5 micron. By means of the beam splitter, the same 12"x8" field of view is shared between the two channels. MRS employs the small format image slicer as the integral field unit. These functions enable us to collect continuous 12-38 micron spectra of both the point-like and diffuse sources reliably with a single exposure pointed observation. In this presentation, the latest design specification and the expected performance of SPICA/MCS/MRS are introduced. We also have started examination of science cases targeted with SPICA/MCS in a framework of MCS science working group activities. We plan to introduce some of the unique science cases on the life cycle of matter in space that will be achieved by SPICA/MCS.

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