



Measuring Mercury's surface temperature - the MERTIS Microradiometer

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The MERTIS (Mercury Thermal Infrared Spectrometer) instrument onboard ESA's BepiColombo planetary orbiter measures the emitted flux from the surface of the planet in the wavelength region 7-40 μm . In addition to the imaging spectrometer 2 broadband radiometric channels are incorporated into the design which are aimed at the accurate determination of the surface temperature of Mercury in the temperature range 100-700 K. From these measurements a thermal inertia map of the planet can then be derived.

The radiometer concept is based on a thermopile double line array of 2x15 pixels placed close to the spectrometer slit into the focal plane of the MERTIS entrance optics. This concept is realized as a customized single detector chip design (by IPHT Jena) which also incorporates the spectrometer slit in the central part of the chip. This unusual design fulfills the requirements of a highly miniaturized instrument and minimization of the heat input via the entrance optics. The thermopile signals are then transferred differentially via a dedicated interface flex-board to the low noise radiometer front-end-electronics (FEE). The FEE accomplishes the tasks of multiplexing, amplification, and A/D conversion of the signals which are then digitally transferred to the MERTIS instrument controller. First results from the evaluation of the newly developed detectors and the FEE are presented.