Geophysical Research Abstracts, Vol. 8, 04186, 2006
SRef-ID: 1607-7962/gra/EGU06-A-04186

Seeing Mercury in a new light - MERTIS on BepiColombo

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The ESA-JAXA mission Bepi-Colombo consists of two probes - a planetary and a magnetospheric orbiter. The mission will be launched in 2013 and will reach Mercury in 2017. MERTIS (MERcury Thermal infrared Imaging Spectrometer) is part of the payload of the planetary orbiter, focused on understanding the surface and interior of Mercury. Mercury is the smallest of the terrestrial planet, has the highest density, probably the oldest surface heavily gardened by space weathering, and shows large daily surface temperature variations. The composition and density distribution of its exosphere might be linked to the surface composition. The scientific goal of MERTIS is to provide detailed information about the mineralogical composition of Mercury's surface layer by measuring the spectral emittance of different locations in the spectral range from 7-14 microns at a high spectral resolution of up to 90nm. The latter can be adapted depending on the actual surface properties to optimize the S/N ratio. MERTIS will globally map the planet with a spatial resolution of 500m and a S/N of at least 100. For a typical dayside observation the S/N ratio can exceed 1000 even for a fine grained and partly glassy surface. MERTIS will map 5-10% of the surface with a spatial resolution higher than 500m. The flexibility of the instrumental setup will allow to study the composition of the radar bright polar deposits with a S/N ratio of $>$50 for an assumed surface temperature of 200K. To support the instrument development and to test data deconvolution algorithms we have defined a set of Mercury analog materials which we currently studied in our emissivity laboratory.