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MERCURY IMAGING X-RAY SPECTROMETER (MIXS) IN BEPICOLOMBO MISSION:
ENVIRONMENTAL TESTS

Abstract

The Mercury Imaging X-ray Spectrometer (MIXS) onboard ESA's mission BepiColombo to Mercury will measure X-rays emitted from the surface and the magnetosphere.

BepiColombo will journey to Mercury during a 6 years long cruise, gravitationally assisted by the Earth, Venus and Mercury itself. It will enter in orbit around Mercury in 2020, starting an observational programme planned for at least 2 years, with 2 dedicated spacecraft:

- Mercury Planetary Orbiter (MPO), built by ESA,
- Mercury Magnetospheric Orbiter (MMO), provided by JAXA in collaboration with ESA.

One of the main instruments of the BepiColombo mission will be MIXS, with its complementary instrument "Solar Intensity X-ray and particle Spectrometer" (SIXS). MIXS+SIXS will allow to map the chemical composition of the Mercury surface with a large spatial resolution (few tens of km), by observing the X-ray photons generated by the surface materials by fluorescence induced by the incident solar X-rays and particles.

MIXS is being developed by a European Consortium led by University of Leicester (UL). INTA-CAB is responsible for the Spanish contribution to MIXS. The Spanish team has assumed very significant responsibilities within the consortium. University of Helsinki (UH) and Max-Planck Institut fur extraterrestrische Physik (MPE) are the other partners of the MIXS consortium.

The INTA facilities are being used to perform the complete qualification of MIXS at instrument level. The qualification will be very critical, due to the harsh environment around Mercury, the lack of redundancy and the long cruise phase (6 years) required to arrive to the final orbit around Mercury. The testing activities at INTA are performed following the requirements indicated in the ESA EID-A, and include:

- Mechanical vibration
- Thermal vacuum cycling

- Electromagnetic Compatibility

Functional tests of the FM and FS models will be performed before, during and after each of the tests, by using a radioactive source illuminating the detectors.