

Observation Plans and Development Status of MIRS: MMX Infrared Spectrometer on the MMX Spacecraft

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The Martian Moons Exploration (MMX) is a probe which will be launched by the Japanese launch vehicle H-III, and it will navigate the quasi satellite orbit of Phobos and will make a fly-by of Deimos. MIRS (MMX InfraRed Spectrometer) is a push-broom imaging spectrometer in the wavelength range of 0.9 to 3.6 micrometers which is one of the candidate instruments to be installed on the MMX spacecraft. It has a field-of-view (FOV) of 3.3 deg width with instantaneous-FOV (IFOV) of 0.35 mrad, which can be scanned by inner along track scan mirror in the range of ± 20 deg.

MMX aims to elucidate the evolution of our solar system by investigating the migration process of primitive bodies in the early stage. MIRS will observe absorptions of hydroxide or hydrated minerals on Phobos and Deimos in the wavelength range of 2.7-3.2 micrometers. By analyzing the behavior of the spectra, we will distinguish between structural water in hydrous silicate minerals, and water ice particles. MIRS will also try to detect the absorption of organic matters in the wavelength range of 3.3-3.5 micrometers. These results will be crucial evidence to answer the question of the origin of the Martian satellites and identify whether they are satellites formed by a giant impact or primitive asteroids captured by Mars gravitational field. MIRS will observe Phobos to survey the sampling site candidates, to investigate the sampling site precisely at the touch-down mode, and to make global mapping. The global mapping of Phobos to select prior areas and landing sites will be performed on the quasi satellite orbit. Precise mapping for candidate landing sites will be followed on the lower altitude. Observations for Deimos will be basically executed from the fly-by orbit. MIRS will also monitor the Martian atmosphere with particular attention to spatial and temporal changes as clouds, dust and water vapor. We will report and discuss on the observation plans and the development status of the MIRS instrument.

キーワード：MMX、フォボス、デイモス、赤外線分光計、含水鉱物、火星大気

Keywords: MMX, Phobos, Deimos, infrared spectrometer, hydrated mineral, Martian atmosphere