R009-14
B 会場 ：9/27　AM1 （9:00-10:30）
9:00〜9:15

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Ion and magnetic field observations planned by Martian Moons eXploration (MMX)

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Martian Moons eXploration (MMX) is a sample return mission planned by JAXA, targeting the Martian moons (Kuramoto et al., 2022). The MMX spacecraft is scheduled to be launched in 2024, inserted into Mars orbit in 2025, carry out close-up observations of Phobos and multiple flybys of Deimos, collect samples from Phobos, and return to the Earth in 2029. In addition, during the 3-year Mars orbiting phase, MMX will perform remote observations of the Martian atmosphere and in situ measurements of ions escaping from Mars (Ogohara et al., 2022).

Mass Spectrum Analyzer (MSA) (Yokota et al., 2021) aboard MMX will perform in situ measurements of ions and magnetic fields around the Martian moons to investigate the origin of the two moons as well as the evolutionary processes of both moons and the Martian surface environment. MSA consists of an ion energy mass spectrometer and two magnetometers, which will measure mass/charge and velocity distributions of low-energy ions and magnetic field vectors, respectively. To achieve a high mass resolution of m/dm $>$100, the TOF chamber of MSA for MMX is designed to be longer than previous analyzers such as IMA for Kaguya and MSA for BepiColombo/MIO.

MSA observations correspond to three of the six medium objectives of MMX: (MO1.1) Reveal whether Phobos originated as a captured asteroid or resulted from a giant impact, (MO2.1) obtain a basic description of the elementary processes of surface evolution for moons in the circum-Martian environment, and (MO2.2) add new findings and constraints on the history of changes in the Martian surface. To accomplish these medium objectives, MSA has four observation targets: For MO1.1, (1) measure refractory ions (Si+, Ca+, Fe+, etc.) emitted from the Phobos surface and (2) measure water-related ions (O+, OH+, H2O+, etc.) originating from inside Phobos (if they exist); for MO2.1, (3) measure incident ions to Phobos (H+ and He++ of the solar wind and O+ and O2+, etc. of the escaping ions from the Martian atmosphere), scattered ions, and emitted ions with monitoring the surrounding magnetic field; and for MO2.2, (4) measure O+, C+, N+, Ar+, and their key isotopes in the escaping ions from the Martian atmosphere. In this presentation, these planned observations will be explained, along with possible collaborations with other MMX instruments, sample analyses, and plasma observations by MAVEN, MEx, and ESCAPADE.