Mercury's magnetic field measurement by Bepi-Colombo/MMO

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Magnetic fields around Mercury is a combination of the intrinsic magnetic fields and fields caused by exterior currents, e.g., the magnetopause current and the magnetotail current. One of the major scientific objectives of Bepi-Colombo/MMO, an orbiter around Mercury we are now planning, is accurate measurement of these magnetic fields.

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Associated with planetary science, accurate evaluation of intrinsic magnetic moment is essential to discuss the history of Mercury, the interior structure, and the generation mechanism of the intrinsic magnetic moment. Associated with space science, objectives are the determination of the magnetospheric shape, studies of plasma acceleration mechanism, and the interaction of the magnetosphere with the solar wind. They must have strong seasonal dependence because the distance between the Sun and Mercury ranges from 0.3 to 0.47 AU.

Magnetic field experiment system for Bepi-Colombo MMO is designed to measure fields with good accuracy. When we measure magnetic fields by a magnetometer onboard a satellite, one of the most serious problems is the magnetic contamination caused by magnets and electric currents in the satellite. To avoid the problem we are considering to mount two three-axial fluxgate sensors on a extendable boom.