

## Mercury surface and interior exploration by Japan-Europe Joint mission Bepi Colombo

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Bepi Colombo mission is being developed to investigate Mercury with two spacecrafts. MPO (=Mercury Planetary Orbiter) developed by European Space Agency will mainly observe Mercury itself, while MMO (=Mercury Magnetospheric Orbiter) developed by Japan Aerospace Exploration Agency will mainly observe Mercury environments.

Main targets for Mercury surface and interior include: 1) to clarify global geology and topography by surface imagery and altimetry, especially at unimaged areas, 2) to globally map major, volatile, and radioactive elemental composition for understanding the surface evolution, bulk composition, and the origin of the planet, as well as for information on the surface processes such as space weathering at the inner area of solar system, 3) to investigate intact magnetism driven by magneto-hydro dynamics in the molten core and related structure of mercury's interior, 4) to clarify current activity inside the Mercury in volcanism and tectonics mainly excited by solar tidal forces, 5) to understand the origin and evolution of Mercury to interpret how to build the densest planets in the solar system, 6) to investigate the solar nebula composition and structure of the innermost region and its affection by dynamical evolution of solar system. In addition, radar bright spots in polar region are also the scientific objectives of existence of water ices or not.

MPO will mainly observe and conduct investigation for these themes. Our Japan members collaborate for some limited instruments such as X-ray and gamma-ray spectrometers, laser altimeter, magnetometers and so on, although Japan has SELENE lunar orbiter mission. For imagery, no contribution is planned so far but there will be full of chances to participate as interdisciplinary sciences with scientific initiative of geology and its analytical process for lunar and small terrestrial planets. Therefore it is important to start with the science of the Mercury, in relation to lunar science.