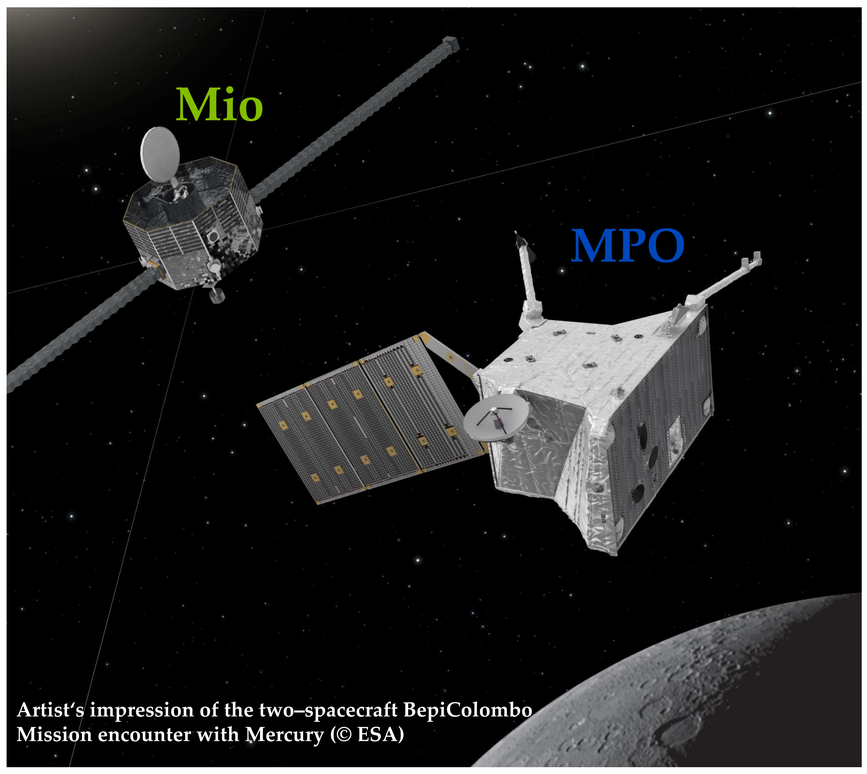
ÖAW — ÖSTERREICHISCHE AKADEMIE DER WISSENSCHATEN

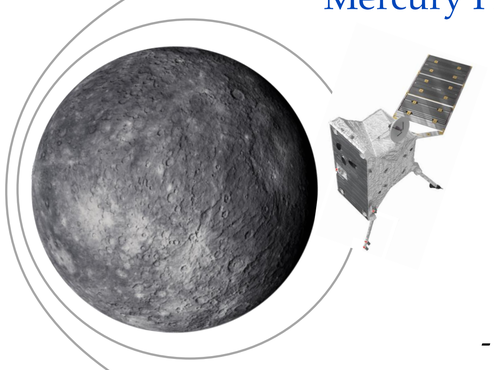
ÖAW IWF

BEPICOLOMBO
EXPLORING THE MYSTERIES OF MERCURY



Artist's impression of the two–spacecraft BepiColombo Mission encounter with Mercury (© ESA)

BepiColombo is Europe's first mission to Mercury, the smallest and least explored terrestrial planet in our Solar System. It is a joint endeavour between European Space Agency, ESA, and the Japan Aerospace Exploration Agency, JAXA, and consists of **two scientific orbiters**:



esa

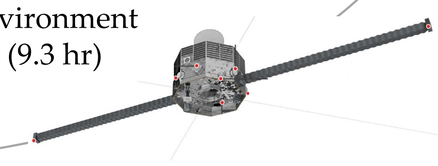
Mercury Planetary Orbiter (MPO)

- focus on surface and interior science
- 480 km × 1500 km polar orbit (2.3 hr)
- 11 science instruments/instrument suites
- 3-axis stabilized

JAXA

Mercury Magnetospheric Orbiter (Mio)

- focus on the planetary space environment
- 590 km × 11,640 km polar orbit (9.3 hr)
- 5 instrument suites
- spinning spacecraft (15rpm)



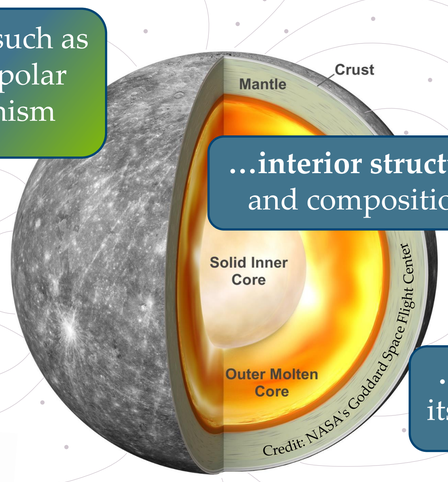
BepiColombo aims to study Mercury's…

IWF science interests

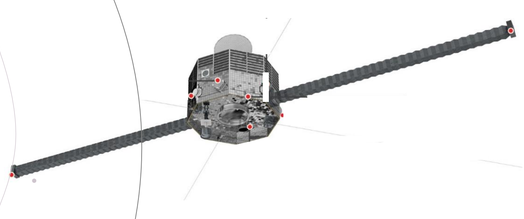
minor — major

…**surface processes**, such as cratering, tectonics, polar deposits and volcanism

…**magnetosphere**, its structure and dynamics



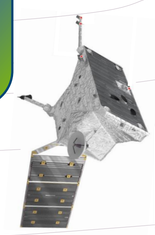
…**interior structure** and composition



…**Einstein's General Theory of Relativity**, by precise measurements of the spacecraft's orbit

…**internal magnetic field**, its characteristics and origin

…**origin and evolution** of planet so close to its parent star



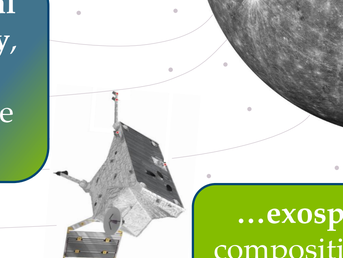
…**exosphere**, its composition, origin and dynamics

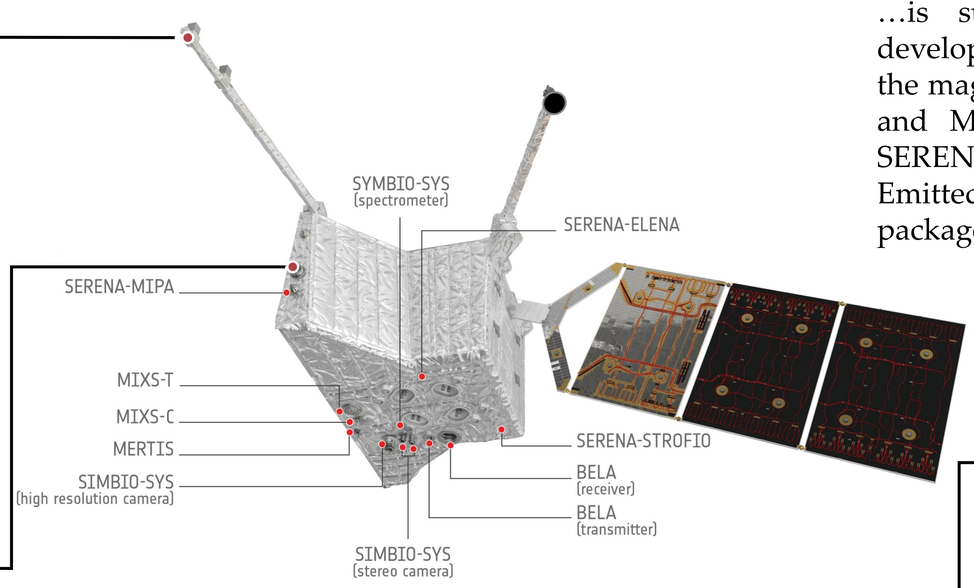
IWF Graz onboard BepiColombo…

MPO-MAG (technical lead)

Magnetic Field Investigation

Measuring Mercury's magnetic field, the interaction of the solar wind, and the formation and dynamics of the magnetosphere, and understanding the origin, evolution and current state of the planet's interior (PI: Daniel Heyner, Technische Universität Braunschweig, Germany)



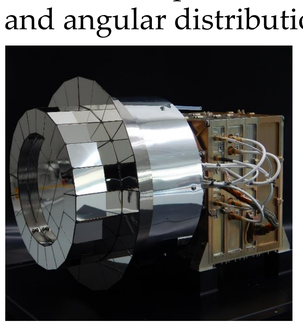


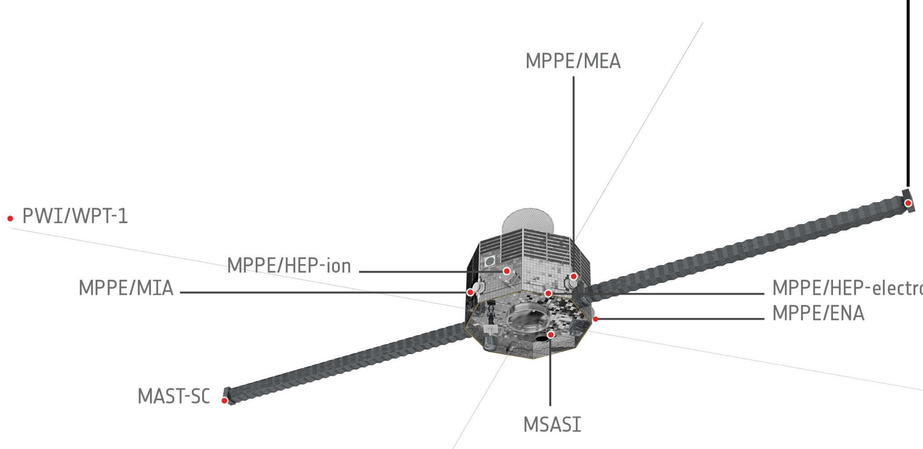
…is substantially involved in technical development and scientific interpretation of the magnetometers on both spacecraft (MPO and Mio) and the PICAM-sensor of the SERENA (Search for Exosphere Refilling and Emitted Neutral Abundances) instrument package onboard MPO.

SERENA-PICAM (PI)

Planetary Ion Camera

PICAM will provide the mass composition, energy and angular distribution of low energy ions up to 3 keV in the environment of Mercury. These observations will uniquely allow to study the low energy particles emitted from the surface of Mercury, their source regions, composition and ejection mechanisms. This will allow to better understand Mercury's exosphere.

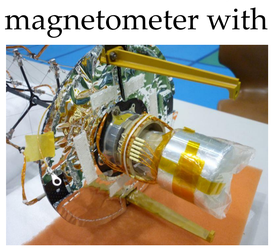




Mio-MGF (PI)

Mercury Magnetometer

MGF (and MAG) are digital fluxgate magnetometer with a dynamic range of +/-2,000 nT and 128 Hz. Providing a detailed description of Mercury's magnetosphere and of its interaction with the planetary magnetic field and the solar wind. The scientific objectives of the mission can be best met by the comprehensive scientific coordination of the magnetic field investigations.



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