

## The interior structure of Mercury explored with the magnetic field

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Mercury possesses its intrinsic magnetic field, as Mariner 10 discovered it in 1974-1975. The understanding of generation mechanism of Mercury's magnetic field is significant, not only to understand physics of planetary dynamos, but also to provide essential constraints on the interior structure of Mercury. The BepiColombo mission scheduled for launch in 2009 will provide a chance to obtain magnetic field data and to explore the interior structure of Mercury.

To understand the Mercury's dynamo, we perform numerical simulations of an MHD dynamo in a rotating spherical shell. The results obtained are used to discuss modeling of magnetic field measurements at Mercury, in the following way.

The ratio of the inner to the outer core radii of Mercury is likely to be large, because Mercury is small, so that much of its small core is solidified. The length scale of convection cells in the liquid outer core of Mercury is considered to be small, and small-scale magnetic fields are to be generated by dynamo action. It is therefore likely that non-dipole magnetic fields are relatively larger than those of the Earth's field. Moreover, the size of Mercury's core is relatively large (the mantle is a thin spherical shell), as expected from its enormously large density. This means that it is possible to carry out magnetic field measurements at altitudes where non-dipole fields do not decay very much. Hence, the determination of the magnetic field structure of Mercury will provide significant constraints on its interior structure, in consequence of its origin and its evolution.