

## Estimation of the plasma sheet thickness in the Mercury's magnetosphere from the MESSENGER observations: IMF dependence

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Only two of spacecraft arrived at the Mercury until now: NASA's MESSENGER which went into orbit around Mercury in 2011 and Mariner 10 which investigated Mercury for two years from 1974. Although the Mercury's magnetosphere was first found by the Mariner 10, the magnetosphere has not been quantitatively understood. With the observations of magnetic field, we deduced the thickness of the plasma sheet and examined its dependence on the IMF (Interplanetary Magnetic Field) As a result, the plasma sheet thickness is estimated as 0.12-0.19  $R_M$  during the northward IMF, and 0.02-0.08  $R_M$  during the southward IMF. Bi-polar magnetic field signatures, which can be associated with the plasma flow in the plasma sheet, are observed both during northward and southward IMF. We then discuss the substorm-related phenomena in the Mercury's plasma sheet.

Keywords: MESSENGER, Mercury's Magnetosphere, plasma sheet, plasma flow, substorm