

## **Key science issues after MESSENGER and current observation plans of BepiColombo MMO**

Go Murakami, Hajime Hayakawa, and Masaki Fujimoto

Japan Aerospace Exploration Agency, Institute of Space and Astronautical Science, Kanagawa, Japan (go@stp.isas.jaxa.jp)

Little had been known about the Hermean magnetosphere until MESSENGER explored the region. The region is formed as the weak planetary magnetic field stands against the intense solar wind in the close proximity of the Sun. Various prediction had been given by noting the difference in the parameters from the well-studied terrestrial magnetosphere of a similar setting and scaling the well-knowns to the Hermean environment. MESSENGER results, however, show a wide variety of phenomena that are out of the scope of what one could have reasonably argued. The micro-magnetosphere of Mercury is much more dynamic than one had predicted. BepiColombo MMO, the JAXA spacecraft of the BepiColombo Mercury exploration mission which will be launched in 2018 and will arrive at Mercury in 2025, is equipped to study the space environment of the planet Mercury. BepiColombo MMO is mainly designed for plasma observations and is expected to extract essential elements of space plasma physics that become visible in the Hermean environment. MMO has large constraints on science operations, such as thermal issue and limited telemetry rate. Due to the thermal issue each science instrument cannot always be turned on. In addition, due to the low telemetry rate in average, only a part (~20-30%) of science mission data with high resolution can be downlinked. Therefore, in order to maximize the scientific results and outcomes to be achieved by MMO, we are now working to optimize the science observation and downlink plans in detail. Here we review MESSENGER results and how MMO will contribute to deepen our understanding of space plasmas by addressing the puzzles raised by MESSENGER.