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Electric Fields in Mercury's Environment Measured by BepiColombo/MMO/PWI - Scientific Case and Planned Instrumentation

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Returning to Mercury with the BepiColombo mission will provide a unique opportunity to obtain in situ information on the electric field in Mercury's magnetosphere. The electric field plays a crucial role for plasma transport in the magnetoshere, for transfer of energy between different parts of the system, and for propagation of information.

Measuring the electric field, we will be able to better understand plasma motion and wave propagation in Mercury's magnetosphere. Together with knowledge of the magnetic field a better understanding will be derived of the magnetospheric current systems and their closure at or near the planetary surface. Further, insight into possible substorms at Mercury will be gained. The Plasma Wave Investigation (PWI) on BepiColombo/MMO includes two sensor systems (WPANT and MEFISTO) for measuring the electric field over a wide frequency range.We review the scientific case for electric field measurements around Mercury, and discuss planned instrumentation as well as the requirements for instrument capability posed by the scientific objectives.