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MEFISTO - an electric field instrument for BepiColombo/MMO

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MEFISTO, together with the companion instrument WPANT, are planning the first-ever in-situ measurements of the electric field in the magnetosphere of planet Mercury. The instruments are proposed to JAXA for inclusion in the BepiColombo/MMO payload, as part of the Plasma Wave Investigation co-ordinated by Kyoto University. The magnetosphere of Mercury was discovered by Mariner 10 in 1974, and will be studied further by Messenger starting in 2011. However, neither spacecraft measures the electric field. Electric fields are crucial in the dynamics of a magnetosphere and for the energy and plasma transport between different regions within the magnetosphere as well as between the magnetosphere and the surrounding regions. The MEFISTO instrument will be capable of measuring electric fields from DC to 3 MHz, and will thus also allow diagnostics of waves at all frequencies of relevance to the Hermean magnetosphere. MEFISTO is a double-probe electric field instrument. The double-probe technique has strong heritage and is well proven on missions such as Viking, Freja, and Cluster. For BepiColombo, a newly developed deployment mechanism is planned which reduces the mass by a factor of about 5 compared to conventional mechanisms. We describe the basic characteristics of the instrument and briefly discuss the new

developments made to tailor the instrument to flight in Mercury orbit.