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Revised Modular Model of Mercury's Magnetospheric Magnetic Field

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Mercury is the smallest and innermost planet of our solar system and has a dipole-dominated internal magnetic field that is relatively weak, very axisymmetric and significantly offset towards north. Through the interaction with the solar wind, this field leads to a magnetosphere. Compared to the magnetosphere of Earth, Mercury's magnetosphere is smaller and more dynamic. To understand the magnetospheric structures and processes we use in-situ MESSENGER data to develop a semi-empirical model, which can explain the observations and help to improve the mission planning for the BepiColombo mission en-route to Mercury.

We will present this semi-empirical KTH-model, a modular model to calculate the magnetic field inside the Hermean magnetosphere. Korth et al. (2015 and 2017) published a model, which is the basis for the KTH-Model. In this new version, the calculation of the magnetic field for the neutral current sheet is restructured based on observations rather than ad-hoc assumptions so that the description is more realistic. Furthermore, a new model is added to depict the partial ring current. An analysis of the residuals shows a better visibility of the field-aligned currents. In addition, this model offers the possibility to improve the main field determination.