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Hybrid Modeling of the Solar Wind Interaction with Mercury and the Lunar Magnetic Anomalies

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Mercury has a unique plasma environment in that it has an intrinsic global magnetic field as Earth, which is however of a very different dimension and in that it has no atmosphere unlike the other terrestrial planets. Relatively little is however known about Mercury, which is among other things due to its challenging location. The Messenger and BepiColombo missions will provide new data that could in conjunction with proper models, help us to understand Mercury's plasma environment better. This makes Mercury an interesting topic for modeling.

The Moon has no global intrinsic magnetic field, but there are several local magnetic anomalies on the Moon. These provide interesting mini environments for plasma interaction that can be compared to other larger structures found elsewhere in the solar system.

We are using and developing our 3D hybrid model (HYB) to simulate the solar wind interaction with Mercury and the lunar anomalies. The following topics are of special interest in the current face of development: structure of Mercury's magnetosphere and test particle simulations to understand particle energization from a single particle perspective.