

A possible source of the Hermean magnetospheric Plasma

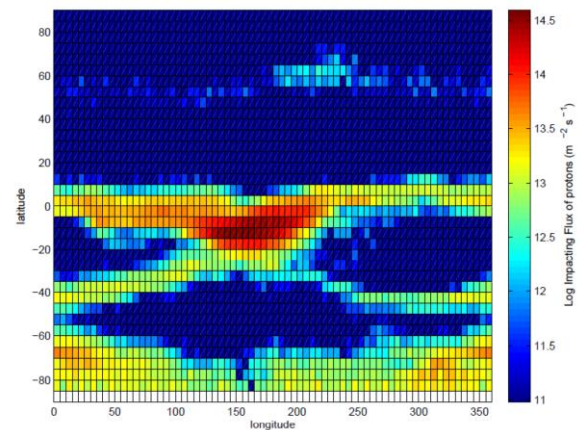
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Three dimensional global hybrid simulations of the interaction of the solar wind with planet Mercury show that solar wind protons can penetrate inside the Hermean magnetosphere and impact the surface of the planet in regions governed by the intrinsic planetary magnetic field and the orientation and strength of the interplanetary magnetic field (IMF). As planet Mercury has no atmosphere and no ionosphere except for a tenuous surface bounded exosphere made of rather heavy elements like Na, Ca and other species, the origin of the magnetospheric plasma is a pending question. Plasma experiments onboard lunar orbiters like Chandrayan and Kaguya have demonstrated that solar wind protons impacting the lunar surface are scattered either as hydrogen atoms after neutralization in the regolith or as protons after some energy loss. It is suggested on the basis of hybrid simulations that solar wind protons impacting the surface of planet Mercury could contribute to the formation of a major component of the Hermean magnetospheric plasma.

Figure 1 Example of a computed flux of solar wind protons impacting the surface of Mercury



References

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