

COUPLING MAGNETOSPHERE AND DYNAMO: MERCURY'S FEEDBACK DYNAMO

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Planets like Mercury, Earth, Jupiter, or Saturn possess a strong planetary magnetic field. Such a global magnetic field has far reaching consequences for the solar wind plasma. A magnetosphere develops around these magnetized objects with the solar wind plasma strongly being modified by the dynamo generated magnetic field. The possibility of the reversed process, the magnetized solar wind plasma impacting the planetary dynamo has only recently been discussed. A particular place where such a coupling process probably occurs is planet Mercury. Though its planetary magnetic field is rather weak Mercury has a fully developed magnetosphere. But its size is small, causing strong magnetic fields of magnetospheric origin at the surface. This external field is always anti-parallel to the main planetary field in the interior of the planet and opposes dynamo action there. This negative feedback can explain the weak magnetic field actually observed. Using kinematic dynamo models this feedback situation is discussed in more detail