



Magnetic portraits of the icy satellites of Saturn

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Cassini made 3 close flybys of Enceladus and one each of Tethys, Dione Rhea and Hyperion in 2005. The magnetic field observations obtained during these flybys provide unique portraits of the magnetic properties of these moons. We have examined the magnetic signatures of each of these moons to infer whether the moon is a net contributor to the plasma (draped magnetic field consistent with the slowing down of plasma) or an absorber like the Earth's moon (enhanced field strength in the wake, field lines

The magnetic field observations from these moons confirm that Enceladus is the main source of plasma in Saturn's magnetosphere. Surprisingly, Dione also displayed the characteristics of a plasma loading moon, even though its net contribution to the plasma in the Saturnian magnetosphere is expected to be small.

Tethys and Rhea displayed the characteristics of mass-absorbing moons. The wakes of these moons were observed to have enhanced field strengths and the magnetic field appeared to be drawn into the wakes from the flanks. However, it must be pointed out that the most sensitive measurement of mass-loading is provided by those passes which occur just upstream of the moons. Until, we obtain such passes, some mass-loading at these moons cannot be ruled out.

Finally, no field signature was observed to be associated with Hyperion. This may be due to the large distance of the wake flyby such that that the wake had dissipated at the location of Cassini. Alternatively, the plasma flow may have had a large deviation from the corotation flow direction making the spacecraft miss the wake crossing.