



## **Inverse gradient of the magnetic field at the flank magnetopause**

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Magnetic pressure inside the magnetopause is usually balanced with a sum of thermal plasma and magnetic pressures on the magnetosheath side. However, the THEMIS spacecraft encounter several times situations when the magnetosheath magnetic field is larger than that in the magnetosphere and thus the pressure from the magnetosheath side seems to be uncompensated. The northward pointing IMF leads to a creation of the plasma depletion layer or magnetic barrier characterized by the enhanced magnetic field and depressed plasma density just in front of the magnetopause but THEMIS observations reveal that a “magnetic barrier” can be created also under a strong southward IMF and that this structure of the boundary layer can persist for several hours. We present case studies as well as a small statistics and propose conditions and mechanisms which can lead to creation such “unbalanced” structure at the magnetopause.