

# **MULTI-SPACECRAFT STUDY OF THE GEOMETRY OF INTERPLANETARY MAGNETIC FIELD DEPRESSIONS**

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Identical magnetometers onboard the four Cluster spacecraft were used to study the 3D structure of interplanetary magnetic field depressions. The separation between the satellites is ranging from ~500 km to ~10000 km, which affects largely whether all the four spacecraft is able to cross the same magnetic hole. In cases when the depressions could be identified by all four spacecraft, the velocity of the structures was determined by triangulation. That velocity was consistent with both the OMNI solar wind velocity and the plasma velocity measured by the CIS instrument onboard Cluster. Therefore, the study confirmed that the holes are likely to be frozen in the solar wind. Even during large spacecraft separation several magnetic field depressions were found when all spacecraft crossed the same hole. The reconstruction of the geometry suggests that those holes are inconsistent with axially symmetric structures around the averaged magnetic field line. Evidences are presented that interplanetary magnetic field depressions may be formed in sheet-like structures.

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