



Cluster Observation of spatial structures in the Earth's High-altitude Cusp: mirror structures?

Q. Q. Shi (1,2), Z. Y. Pu (2), Q.-G. Zong (2), S. Y. Fu (2), L. Xie (2), Y. Chen (1), H. Zhang (4), L. Lei (1), L. D. Xia (1), Z.X. Liu (3), and the E.Lucek(5) Team

(1) School of space science and physics, Shandong University of Weihai, China (sqq@pku.edu.cn), (2) Institute of space physics and applied technology, Peking University, China, (3) Key Laboratory for Space Weather, Chinese Academy of, (4) NASA Goddard Space Flight Center, USA, (5) Space and Atmospheric Physics Group, Blackett

An event containing several magnetic field decreasing structures with little change in the field direction across them, together with three additional examples, is analyzed using measurements by the four Cluster spacecraft. We reveal their spatial properties, study the plasma variations inside the dips, and discuss the formation mechanism of this type of small structures. After performing an empirical scheme to distinguish spatial from temporal effects with multi-spacecraft measurements, we found that the structures we observed are separated spatial structures traveling across the spacecraft. Several properties were found to resemble the mirror structures observed in the solar wind and in the magnetosheath. The mirror instability is found to be hardly excited locally in the cusp from our calculation. These structures thus give evidences that the mirror structures formed in the sheath could enter the cusp and survive, attributed to the open geometry of the cusp magnetic field.