

Cluster Observations of Magnetospheric CUSP

S. N. WALKER¹, N. BALAN¹, H. ALLEYNE¹, CLUSTER TEAM¹

¹Automatic Control and Systems Engineering, University of Sheffield,, Sheffield, UK ²Cluster Team

Cluster data from the FGM, CIS, PEACE, EFW, WHISPER and STAFF instruments are used to study the magnetospheric cusp at different altitudes under normal and extreme solar wind conditions. On 18 April 2002 the Cluster spacecraft crossed through a high altitude cusp during the period 16:25-17:55 UT when the solar wind dynamic pressure was rather low (< 2 nPa). The data reveal that the cusp is structured with three anti-sunward ion flow events of durations \sim 1.5, 17.5 and 19.0 min, with bulk plasma flow roughly parallel to the magnetopause in a northerly direction. The ion and electron densities observed within these events are much greater than those outside. The zonal electric field in the ion flow events turns eastward as expected from the VxB effect. The sharp boundaries of the ion flow events cross the four spacecraft in a nested sequence suggestingglobal motion of the boundary rather than a convecting structure. Theobservations are studied using magnetosphere and magnetopause models.