

Multi-Point Observations of Small-Scale Structures in the Plasmapause Region

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We investigate plasma density and drift patterns in the inner magnetosphere during quiet and storm intervals, using multi-point Cluster EFW observations and single-point Polar EFI observations. As the perigees of the satellites are in the same MLT sector, they provide interesting conjunction observations from time to time. Cluster crosses the inner magnetosphere during the perigee at $L = 4-10$, saying that during storm intervals the plasmapause may not be crossed but still interesting plasmaspheric structures, such as plumes and other irregularities, are encountered. Polar collects data on two opposing MLT sectors so that on one side near the perigee at small distances (1.6-3 Re) it crosses L shells down to $L = 2$ over both hemispheres in the same MLT sector as Cluster. However, during storms the density can become very high at low altitudes, hiding many features such as the plasmapause and the plumes. Plumes are usually 1-2 L shell wide and the plasma drift velocity within the plume is 5-20 km/s westward/noonward, while outside the plume the drift velocity is only a few km/s westward. Cluster has also witnessed the formation of isolated drifting plasmaspheric flux tubes. These structures may be related to the formation of the plume itself. They drift at the same velocity as the ambient plasma (eastward in the corotation region and westward in the convection region) and their cross sections are about 0.1 L shell.