

Cusp plasma intrusion and Pc 5

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We examined Pc 5 oscillations in the dawn-side outer magnetosphere using the magnetometer data observed by the THEMIS probes, P3 (THEMIS-E) and P4 (THEMIS-D) separated only one Earth-radius, and its relationship to plasma intrusion in the outer magnetosphere. The plasma intrusion excite the generation of Pc 5 oscillations in the outer magnetosphere, where large amplitude Pc 5 oscillations are observed. They appear as a field-line resonance (FLR) signature, which is confirmed with the magnetometer and electric field data, and they are observed over a long duration of three hours from 18:00 UT to 21:00 UT on November 23, 2007. Probes, P3 and P4 are located at a radial distance $R=10.64R_E$ ($X_{gsm}=0.25 R_E$, $Y_{gsm}=-10.58 R_E$, $Z_{gsm}=-1.21R_E$), and at $R=9.58 R_E$ ($X_{gsm}=1.23 R_E$, $Y_{gsm}=-9.47 R_E$, $Z_{gsm}=-0.71 R_E$), respectively, at 18:00UT. P3 observes the plasma injection related compressive large amplitude Pc 5 oscillations with a dominant power at a frequency of $f=4.4$ mHz ($T=228$ sec ≈ 3.8 min) at $L=9.0$, while Probe P4 observes a very clear azimuth oscillation with a dominant power at a frequency of 6.1 mHz, ($T=162$ sec ≈ 2.7 min) at $L=8.4$. These Pc 5 oscillations in the magnetosphere are compared with GBO ground magnetometers located in Alaska near the foot prints of the THEMIS P3 and P4 locations. It is surprising that H-component magnetic oscillations observed at Inuvik (INUV), (Mag. Lat. $=71.23N$, Mag. Lon. $=275.09E$, $L=9.5$), show a very similar oscillation signature to the X-component Pc 5 oscillations observed by P3, with a dominant power frequency of $f=4.4$ mHz, ($T=226$ sec ≈ 3.8 min) same to that observed by P3, and a coherency is high with a value of 0.95, while the D-component oscillations at INUV show two clear power spectral peaks at the frequencies, $fp_1=3.9$ mHz, ($T=255$ s ≈ 4.2 m), $fp_2=6.4$ mHz, ($T=156$ s ≈ 2.6 m). These frequencies are very similar to those observed by P3 and P4. Therefore, the oscillations observed at INUV are confirmed FLR oscillations observed by P3 and P4 in the magnetosphere. These results indicate that the plasma intrusion excited compressional signal at TH-E coupled to FLR power on TH-D and they can be seen on the ground.