



## **Deformation of the cusp boundary during the IMF rotation from Northward to Southward : 3-D PIC large scale simulation**

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The dynamics of the cusp boundary formation and particle entry are analyzed thanks to the use of large-scale global three-dimensional PIC simulations performed with higher resolution (one grid size equal to 0.2 Earth radii). The present analysis is focused on the impact of the interplanetary magnetic field (IMF) rotation from northward to southward direction, on the cusp region. As the IMF is northward, the cusp boundaries appear where the ion and electron densities are strongly enhanced. Similar results are observed for currents and kinetic energies of each population. A striking feature is the presence of a double hump. A «pile-up» of B field is observed along the outer edge of the cusp. The variations of density, currents and kinetic energy versus altitude of both electrons and ions are analyzed in order to collect information on particle acceleration, accumulation and energization. As the IMF turns to dawn-dusk, new changes take place. The double-hump persists and even extends over an elongated region in altitude. The «pile-up» of B field is reinforced along the outer edge of the cusp, while the X-region shrinks and slightly moves to night side. Preliminary results will be presented on the consequences of the IMF rotation from dawn-dusk to Southward, on particles penetration at different altitudes within the cusp region and their acceleration/accumulation and energization.