



Impact of IMF rotation from northward to southward on the cusp dynamics: Global 3D PIC simulations

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The change of the interplanetary magnetic field (IMF) direction from northward to duskward, and then from duskward to southward has an important impact on the inner magnetosphere. This impact is analyzed with the help of a parallel version of the global three-dimensional full particle simulation code. For northward IMF, bands of weak magnetic field (sash) form poleward of the cusp at high latitudes in each hemisphere. As the newly duskward-oriented IMF approaches and interacts with the magnetosphere, these sashes move toward the equator (within opposite quadrants), reach lower latitude and merge into each other to form characteristic “Crosstail-S” structures within the neutral sheet of the magnetotail. These macroscopic magnetic patterns (sashes and Crosstail-S) evidenced herein are in a good agreement with results of previous 3D MHD simulations and experimental observations. As the IMF continues to rotate from duskward to southward, these sash patterns move further and stabilize within the equatorial plane. Analysis of particle ejection associated to these sashes dynamics and the identification of local reconnection will be presented.