Geophysical Research Abstracts,
Vol. 11, EGU2009-6218, 2009
EGU General Assembly 2009

Plasma Energization in the Near-Earth Magnetotail

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Energetic ions with hundreds of keV energy are frequently observed in the inner magnetospheric region within $\sim$10 R_E during magnetospheric substorms. Large scale kinetic modeling has shown that solar wind protons can be accelerated earthward of a reconnection region by non-adiabatic motion across large ($>\sim$5 mV/m) electric fields in the near-Earth magnetotail. It was found that the acceleration occurred primarily in the "wall" region of the near-Earth tail where non-adiabatic motion dominates over convection and the particles move rapidly in the Y-direction. Strong acceleration occurred only in regions when both large electric fields and non-adiabatic motion were present. In regions where there is only a large electric field and motion is adiabatic, or non-adiabatic motion and small electric fields, there is much less acceleration. In this talk, modeling results and observations will be presented discussing the acceleration mechanisms and the implications for plasma energization in the near-Earth magnetotail.