



Investigation of the Reconnection Dissipation Region at the Magnetopause with MMS

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The Magnetospheric Multiscale mission has investigated magnetic reconnection at the dayside magnetopause during September 2015 to March 2016 with four spacecraft and unprecedentedly high plasma time resolution. The data presented in this talk involves charged particles, electric fields, and magnetic fields during encounters with electron dissipation regions when the spacecraft were maintained in a tetrahedral configuration 10 km on a side. The full 3D electron distribution functions, which were observed every 30 ms, showed crescent-shaped features that are predicted to result from mixing of magnetosheath and magnetospheric particles and acceleration of electrons by electric-field components directed normal to the magnetopause. The observed currents and electric fields reveal out-of-plane (eastward) currents and reconnection electric fields that result in dissipation of magnetic energy through $\mathbf{J} \cdot \mathbf{E} > 0$. The reconnection X-line is marked by near magnetic null regions that occur just on the magnetosheath side of the dissipation region. In addition to the reconnection electric fields, parallel electric field components are also observed in this region. Localized reconnection dissipation is also observed along the separatrices that separate closed and open magnetic field lines along the exhaust region.