

Title: *Auroral Effects of Thin Current Sheets in The Earth's Magnetotail*

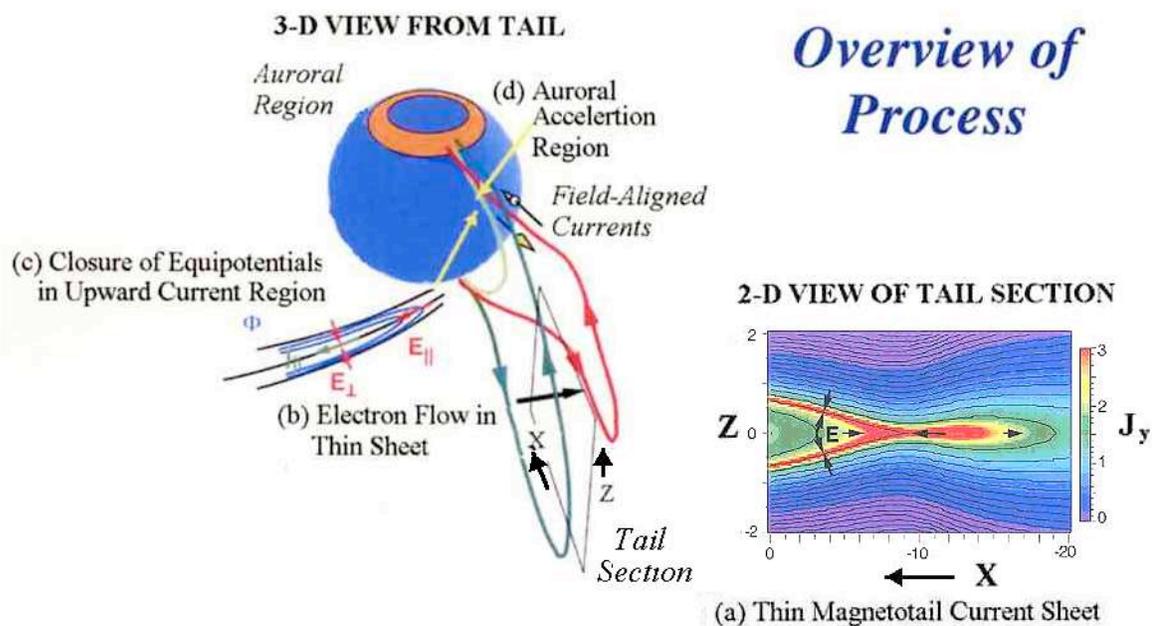
Cluster: *Cross-Theme Theory and Data Analysis/SECTP*

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- **Thin Magnetotail Current Sheets may be a Source of Auroral Arcs**

Self-consistent kinetic models of thin current sheets developed under SEC Theory Program support by the LANL/GSFC/UMD group have been used to explore important auroral consequences of thin current sheets in the Earth's magnetotail. In particular, a direct link of the current sheets with auroral arc production is now suggested. The modeling showed that a thin magnetotail current sheet, carried by electrons, will drive electric fields perpendicular to the magnetic field, deform the magnetic field and produce magnetic field-aligned currents. The electric equipotentials then map along magnetic field lines to the inner magnetosphere, down to the ionosphere. If the equipotentials then close across the magnetic field lines near the Earth, resulting in parallel, outward directed E-fields, it would be a source for downward auroral electron acceleration and discrete auroral brightening.

This provides a new framework for linking complex auroral morphological features to particular structures in the Earth's magnetotail. In addition to providing new understanding of a basic magnetosphere-ionosphere coupling process it contributes a useful piece of the puzzle needed for following the causal chain of events between solar disturbances and changes in the near-Earth environment - the information sought by LWS and STP spacecraft missions.



Reference: Schindler, K., and J. Birn, Models of two-dimensional embedded thin current sheets from Vlasov theory, **J. Geophys. Res.**, **107** (A8), SMP20, 2002.