



## Formation of The Inner Structure of a Reconnection Separatrix Region

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The two most important regions for the microphysics of magnetic reconnection are the diffusion and separatrix regions. The separatrix region extends far away from the X-line and separates plasmas with different properties. In recent Cluster spacecraft observations [1] we identify and describe in detail a separatrix region at the dayside magnetopause. The electric field inside a thin  $\sim c/\omega_{pi}$  Hall layer within the separatrix region is balanced by the  $\mathbf{j} \times \mathbf{B}/ne$  term in the generalized Ohm's law while other terms dominate elsewhere. We also observe a narrow density cavity which forms due to the escape of energetic magnetospheric electrons along the newly opened field lines. The perpendicular electric field inside the cavity constitutes a potential jump of several kV. We discuss the connection of the potential jump and intense field aligned currents inside the separatrix region to the ionosphere, and suggest that they can be responsible for strong aurora.

## References

- [1] Yu. V. Khotyaintsev *et al.*, Phys. Rev. Lett, **97**, 205003 (2006).