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Session 19 - Solar Flares.
Oral session, Monday, June 10
Wisconsin Center,

[19.02] Non-Equilibrium in Line-Tied Coronal Magnetic Fields

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Parker's model of nonequilibrium and topological dissipation [E. N. Parker, ApJ 174, 499, 1972] is revisited. Within the framework of ideal reduced MHD equations, it is shown that there can be at most one smooth magnetostatic equilibrium for each continuous footpoint mapping between the two plates with the line-tied boundary condition. This implies that for a given amount of footpoint driving, if a coronal equilibrium becomes unstable, magnetic non-equilibrium and current sheets (tangential discontinuities) can be realized. The special case of island coalescence is considered analytically and numerically. Stability of an equilibrium containing current layers is also studied. Numerical results suggest that such an equilibrium becomes more unstable as the current increases. This is consistent with the tendency for the formation of true tangential discontinuities. This work is supported by NSF and AFOSR.

Program listing for Monday