



[Previous abstract](#) | [Graphical version](#) | [Text version](#) | [Next abstract](#)

**Session F3S - Poster Session: Space and Astrophysical Plasmas.**

*POSTER session, Tuesday morning, November 17*

*Imperial Ballroom, Fairmont*

## **[F3S.23] Tangential Discontinuities in Parker's Model of the Solar Corona: Resolution of a Controversy**

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Parker proposed that a large-scale coronal magnetic field with a complicated topology does not possess a smooth magnetostatic equilibrium and must, therefore, form true tangential discontinuities. This proposal has long been a source of considerable controversy, and we suggest a resolution. We show rigorously that there can be at most one smooth magnetostatic equilibrium for each smooth footpoint mapping between two end-plates to which field lines are line-tied. It follows that if such a smooth equilibrium is deformed continuously by further footpoint motion so that it becomes unstable, there is no other smooth equilibrium for the plasma to relax to, leading to magnetic non-equilibrium and the formation of singularities, as suggested by Parker. It is shown that this process can occur as the system relaxes asymptotically to a state of minimum energy (possibly in infinite time). Van Ballegooijen's original argument contradicting Parker's suggestion is shown to be valid only if the topology of the current sheet is simple which is generally not the case. Numerical simulations are presented, and suggest that as current layers become intense and cross a threshold for instability, the magnetic relaxation observed in the simulation is consistent with the formation of non-equilibrium states with current sheets.

### ■ [Part F of program listing](#)