

2006 Fall Meeting
Search Results

Cite abstracts as **Author(s) (2006), Title, *Eos Trans. AGU*, 87(52), Fall Meet. Suppl., Abstract xxxxx-xx**

Your query was: **bhattacharjee and au=ng**

HR: 1340h

AN: **SH33B-0415**

TI: [Reconnection and Current Sheet Formation in Line-Tied Magnetic Flux Tubes: Energetics and Stability](#)

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AB: Line-tied magnetic fields play a central role in Parker's model of coronal heating [E. N. Parker, *Astrophys. J.*, 174, 499, 1972]. Our previous result [C. S. Ng and A. Bhattacharjee, *Phys. Plasmas*, 5, 4028, 1998] shows that this model can be realized if a line-tied magnetic equilibrium produced by a smooth footpoint mapping becomes unstable and relaxes to a state with current sheets, leading to magnetic reconnection and heating. A flux-tube tectonics model driven by random footpoint motion [E. R. Priest, J. F. Heyvaerts, and A. M. Title, *Astrophys. J.*, 576, 533, 2002] is revisited. It is shown that if the magnetic field is driven to a statistically steady state, a large current density inversely proportional to the square root of resistivity can fill the whole volume and thus results in a heating rate independent of resistivity. However, the field structures are likely to become unstable and reconnect before they can reach the statistically steady state. The three-dimensional line-tied island coalescence instability -- a possible instability in such systems -- is studied with numerical simulations. Magnetic reconnection in this configuration, which contains neither magnetic nulls nor closed field lines, is discussed. A generalization of the concept of quasi-separatrix layers and a new criterion for the detection of such layers is developed. The new criterion is shown to correlate strongly with reconnection sites. Scaling results from higher resolution simulations will be discussed. This research is supported by a National Science Foundation grant AST-0434322 and by the National Aeronautics and Space Administration.

DE: 7509 Corona

DE: 7519 Flares

DE: 7524 Magnetic fields

DE: 7526 Magnetic reconnection (2723, 7835)

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SC: SPA-Solar and Heliospheric Physics [SH]

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