Abstract Submitted
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New Magnetic Field Topologies and Amplification by Local Depletion of Electron Thermal Energy[1] A. FLETCHER, Boston University, MIT, B. COPPI, MIT — The conventional theory of magnetic reconnection by the tearing mode in weakly collisional and collisionless plasmas involve characteristic length scales that are unrealistically small for space plasmas. This fact motivates the search for modes that produce magnetic reconnection over microscopic scale distances that remain significant when large macroscopic scale distances are considered. Modes that, depend on the existence of a significant electron temperature gradient can have this desired property [1]. A neutral sheet configuration is considered as in the case of Ref. [2] where auroral substorms have been proposed, for the first time, to result from magnetic reconnection processes occurring in the Earths magnetotail. Now a new kind of mode that is localized within the region where reconnection takes place is found with an exact analytical solution of the equation describing the reconnected field. The topology of this is different from that of the well known drift-tearing type of modes and consists of two parallel strings of magnetic islands.

B. Coppi, Plasma Physics Reports, **42**, No. 5, 383 (2016).

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