Abstract Submitted
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Energetics of Localized, Transient Reconnection Models in 1, 2 and 3 Dimensions[1] DANA LONGCOPE, Montana State University — Fast magnetic reconnection has been proposed to explain how stored magnetic energy might be rapidly converted into other forms. The general prerequisite for local flux transfer to release significant energy is achieved most easily at some form of current sheet where fields of distinct global topologies come into close proximity. In Petschek's steady model magnetic fields are reconnected at a site of localized electric field, initiating energy release far away at standing slow mode shocks. I show that a wide variety of models, both steady and transient, agree qualitatively and quantitatively in the nature and outcome of a basic energy release scenario broadly similar to Petschek's. These include a recently-developed three-dimensional model whereby transient, localized flux transfer across a current sheet creates retracting magnetic flux tubes. This and all other models predict the same total energy release, its apportionment between thermal to kinetic forms, and the final plasma temperature. These quantities depend on initial field line angle and plasma beta and not on details of the flux-transfer electric field due to its assumed localization.

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