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Energy Transport during Magnetotail Reconnection[1] M.V. GOLDMAN, D.L. NEWMAN, J.T. GOSLING, L. ANDERSSON, S. ERIKSSON, University of Colorado at Boulder, G. LAPENTA, Katholieke Universiteit Leuven, Belgium, S. MARKIDIS, KTH Royal Institute of Technology, Stockholm, Sweden — A fundamental issue in magnetic reconnection concerns the magnetic energy stored in a reversed-field configuration: how much magnetic energy is lost as spontaneous reconnection develops and where does it go? This question is addressed using implicit 2D PIC simulations together with the theory of energy transport of waves and particles. The primary initial condition in these studies, relevant to Earth's magnetotail, is a Harris equilibrium with maximum density ten times the background density. These simulations show that space-integrated magnetic energy is converted into ion energy at an increasing rate, even well after the reconnection rate has leveled off. The partition of ion energy between thermal and coherent flow energy and between Harris and background particles is also studied. Examination of the spatial transport of particle and field energy at a late time reveals that little work is performed on ions at the x-point, where *topological* reconnection occurs. The peak work on ions is instead performed by the reconnection electric field in the magnetic *pile-up region* of the exhaust. The dominant outflowing Poynting flux is also in the pile-up region and associated with the reconnection $\mathbf{E}$. The peak Poynting flux, $\mathbf{S}_H$ associated with the Hall fields, $\mathbf{E}_H$ and $\mathbf{B}_H$ is weaker. However, additional simulations performed with a non-Harris initial condition show no pile-up and only $\mathbf{S}_H$.

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