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Resistive MHD Simulations of X-Line Retreat and Competing Reconnection Sites N.A. MURPHY, Harvard-Smithsonian Center for Astrophysics, A.K. YOUNG, Florida Institute of Technology — Most simulations and theories of magnetic reconnection assume that the diffusion region is symmetric and stationary. However, in many situations in nature and the laboratory, the reconnection layer moves with respect to the upstream plasma. To investigate the impact of current sheet motion on the reconnection process, we perform numerical simulations of multiple competing reconnection sites. In double perturbation simulations, the two X-lines retreat from each other as they develop. Early in time, the flow stagnation point is located closer to the obstructing magnetic island between the reconnection sites than the X-line so that the X-line is advected by the plasma flow. Late in time, the relative positions of the flow stagnation point and X-line switch so that the X-line retreats in the opposite direction of the local plasma flow. An expression for the rate of X-line retreat shows that the X-line position changes due to both advection and diffusion. In multiple perturbation simulations, isolated and large amplitude perturbations are most likely to survive. The number of X-lines changes due to diffusion of the normal component of the magnetic field in either the inflow and outflow directions. When the X-line is pulled towards one end of the current sheet, the flow stagnation point is generally located between the X-line and the current sheet center.

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