

Abstract Submitted
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The Role of Turbulent Outflow Jets in Electron-Positron Plasmas

MARC SWISDAK, YI-HSIN LIU, JAMES DRAKE, U. of Maryland — Numerical simulations of reconnection in electron-positron (pair) plasmas provide an interesting window into the role turbulence plays in current theories of whistler-mediated Hall reconnection. Because of the system's mass symmetry the Hall term vanishes from the generalized Ohm's law, suggesting that perhaps pair reconnection is slow, as in the classic Sweet-Parker picture. Large particle-in-cell simulations of pair reconnection confirm that the reconnection rate remains fast even as the system size changes by a factor of 8. For the largest systems a Weibel-like temperature anisotropy instability in the X-line outflow broadens the current layer and permits fast reconnection. This instability can be suppressed both artificially and for certain parameter choices, leading to non-steady behavior and a decrease in the reconnection rate.

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