Abstract Submitted
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Double layer electric fields aiding the production of superthermal electrons within magnetic reconnection exhausts[1] JAN EGEDAL, UW-Madison, WILLIAM DAUGHTON, ARI LE, LANL — Using a kinetic simulation of magnetic reconnection it was recently shown that parallel electric fields ($E_\parallel$) can be present over large spatial scales in reconnection exhausts [1]. The largest values of $E_\parallel$ are observed within double layers, which form through large parallel streaming of electrons into the reconnection region. The electron confinement, provided in part by the structure in $E_\parallel$, allows sustained energization by perpendicular electric fields ($E_\perp$). The energization is a consequence of the confined electrons' chaotic orbital motion that includes drifts aligned with the reconnection electric field. The mechanism is effective in an extended region of the reconnection exhaust allowing for the generation of superthermal electrons in reconnection scenarios, including those with only a single x-line. The numerical and analytical results agree with detailed spacecraft observations recorded during reconnection events in the Earth's magnetotail [2].

[1] J. Egedal, W. Daughton, and A. Le, Nature Physics **8**, 321 (2012)
[2] J. Egedal, W. Daughton, A. Le, and A.L. Borg, Phys. Plasmas, in press (2015)

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