Abstract Submitted
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Bi-directional Beams by Electron Trapping during Anti-parallel Reconnection[1] JAN EGEDAL, A. LE, N. KATZ, MIT, PSFC, L.-J. CHEN, B. LEFEBVRE, UNH, W. DAUGHTHON, LANL — So-called bi-directional electron beams have been observed by a number of spacecraft missions in the inflow regions of anti-parallel reconnection. Here we analyze electron distribution functions measured by the four Cluster spacecraft and we show that the beam features can be accounted for by electron trapping mainly by parallel electric fields. In turn, the parallel electric fields can be described by a parallel acceleration potential $\Phi_{\parallel}$ (defined in Ref [1]). In the analysis we determine the profiles of $\Phi_{\parallel}$ along the paths of the Cluster spacecraft during their encounter with a reconnection region. $\Phi_{\parallel}$ is typically in excess of 1kV and therefore all thermal electrons are trapped. This is important for the internal structure of the Hall current system because extended trapping significantly alters the pressure tensor of the electron fluid [2].

[1] J. Egedal, W. Daughton, J. Drake, N. Katz, and A. Le, *Physics of Plasmas*, **16**, 050701 (2009).
[2] A. Le, J. Egedal, W. Daughton, W. Fox, and N. Katz, *Phys. Rev. Lett.*, **102**, 085001 (2009).

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