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Interactive comment on “The double layers in the plasma sheet boundary layer during magnetic reconnection” by J. Guo and B. Yu

Anonymous Referee #2

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This paper is focused on the study of generation of double layers (DLs) and phase-space holes in magnetic reconnection regions located several ion inertial lengths away from the electron diffusion region. There are several points which appear very unclear in the present paper: 1) The quality of the Figures is very poor and almost unreadable

2) The authors are not aware of the literature on DLs. For instance, DLs are commonly observed in the auroral upward current region where Auroral Kilometric Radiation is generated. Tripolar structures have been recorded in these latter regions and have been interpreted in terms of trains of nested ion and electron holes (Pottelette and Treumann, Geophys. Res. Lett., Vol. 32, No. 12, 2005)

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3) Numerical simulations have been performed during the past decade showing that double layers are highly variable structures moving with time. (Singh et al., Geophysical Research Letters, Volume 32, 2005). The results of the present simulations show that the DLs almost do not move. Why?

4) Previous simulation results by Hosino et al. (J. Geophys. Res; 106, 2001) and Prichett and Coroniti (J. Geophys. Res; 109, 2004) show that electron beams form mainly close to the separatrices. In this case strong DLs can be generated at the reconnection site. This is confirmed by the Cluster observations published by Vaivads et al. (Phys. Rev. Lett., 93, 2004)

5) It would be useful to plot Figure 1b as function of the electron Debye length instead of the ion inertial length.

6) Note that the DLs reported by Ergun et al in the plasma sheet are electromagnetic structures.

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