

## Steady state magnetic reconnection

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Huba and Rudakov (2004) found that the magnetic reconnection rate in the Hall limit is nearly independent of the initial current sheet width, scale length on which the electron ‘frozen-in’ condition is broken (as long as it is  $< c/\omega_{pi}$  the ion inertial length) and the system size. The reconnection rate is  $\lesssim 0.1 V_{A0} B_0$  where  $V_{A0}$  and  $B_0$  are the Alfvén velocity and magnetic field strength in the upstream region. In this paper we present a more detailed study of steady state 2D magnetic reconnection in the Hall and ideal MHD limits. In particular we focus on the effects of system size and localized resistivity, and compare profiles of the density, temperature, velocity, and magnetic field in the reconnection layer for different cases.

Huba, J.D. and L.I. Rudakov, *Phys. Rev. Lett.* *93*, 175003, 2004.