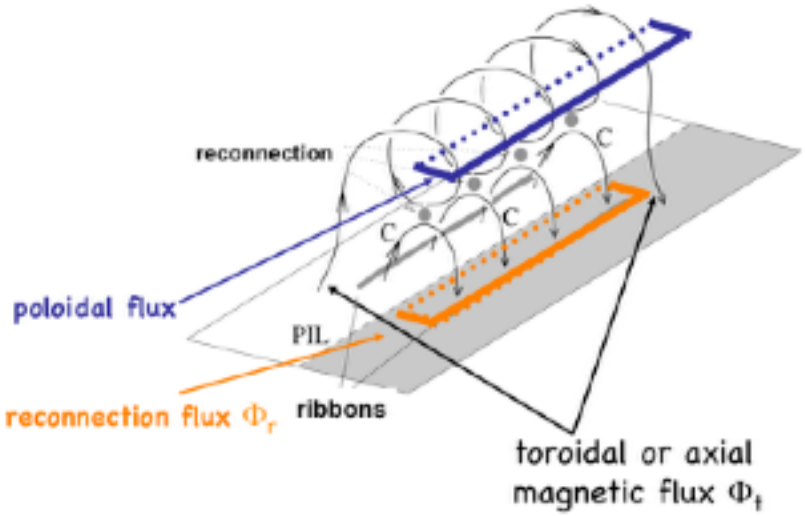
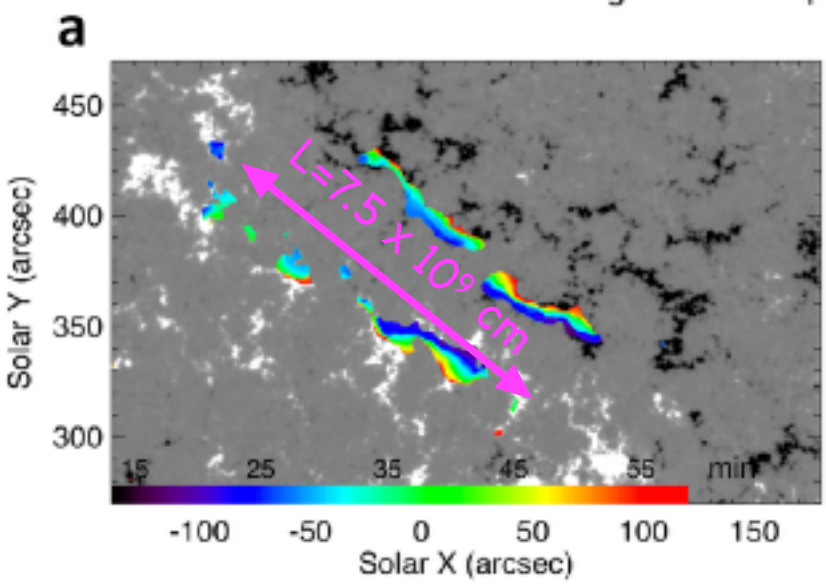
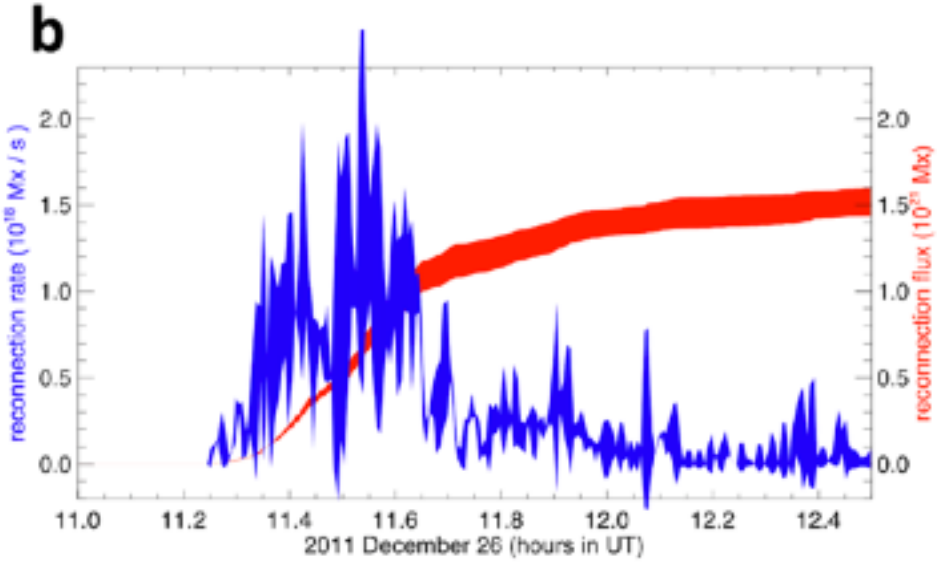
Energy dissipation in Reconnection



$$\dot{\Phi} = -\oint \mathbf{E} \cdot \mathrm{dl}$$

$$P = I\dot{\Phi}$$



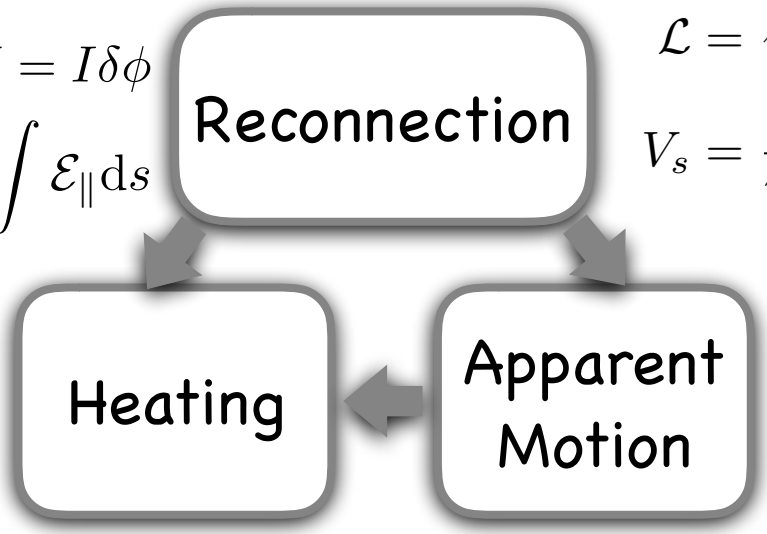


$$W = \int I \mathrm{d}\phi \sim \frac{1}{2} I_0 \delta\phi \sim \frac{(\delta\phi)^2}{8\pi L} = \frac{(1.5\times10^{21})^2}{8\pi\cdot 7.5\times10^{9}} = 1.2\times10^{31}\ \mathrm{erg}$$

Qiu 2002–2010

$\delta W = I\delta\phi$

$\delta\phi/\tau_r \sim \int \mathcal{E}_{\parallel} \mathrm{d}s$



$\mathcal{L} = \sqrt{\delta\phi/\bar{B}}$

$V_s = \dfrac{\mathcal{L}}{\tau_r}$