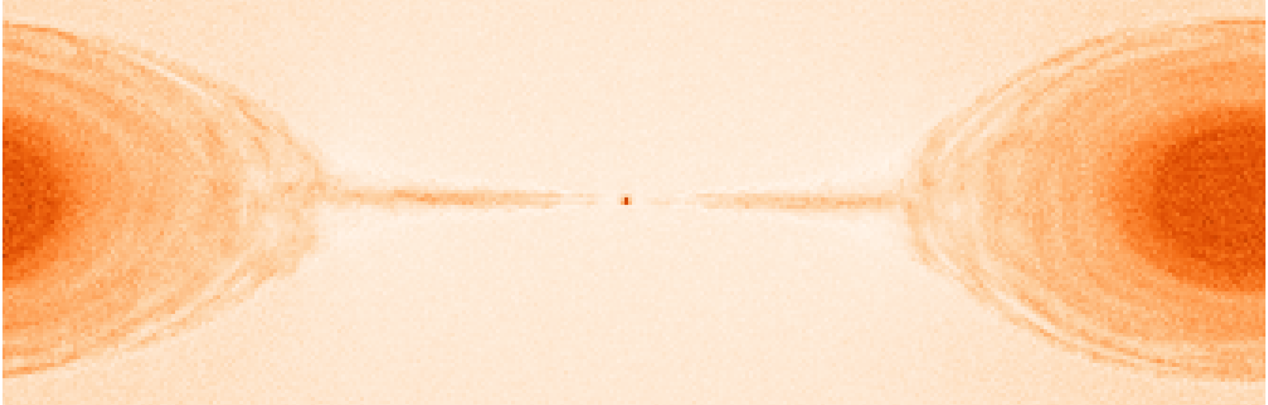
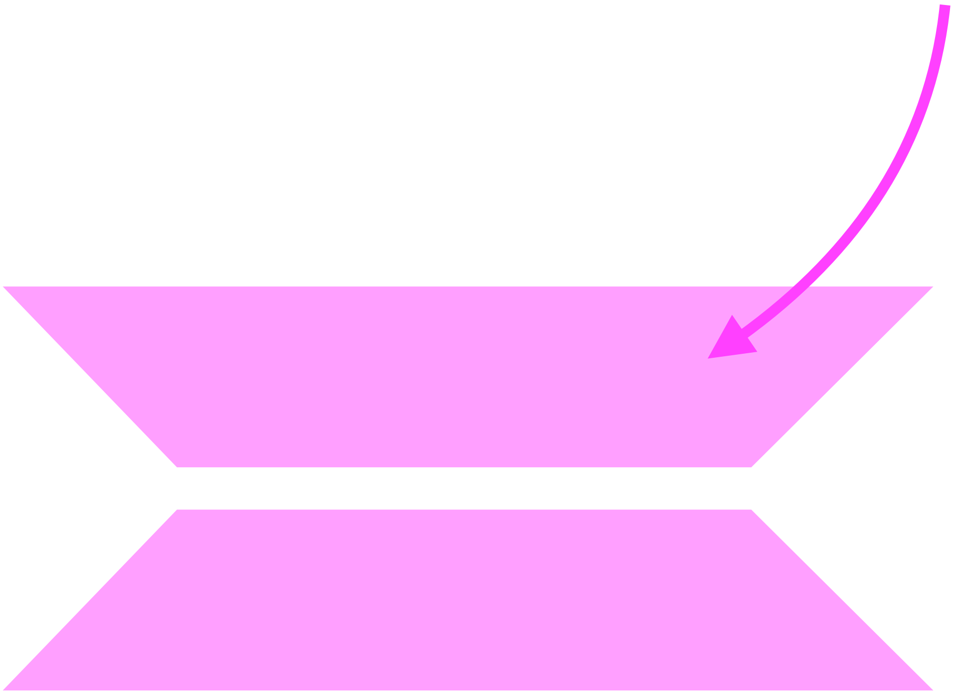
Characterization of heating



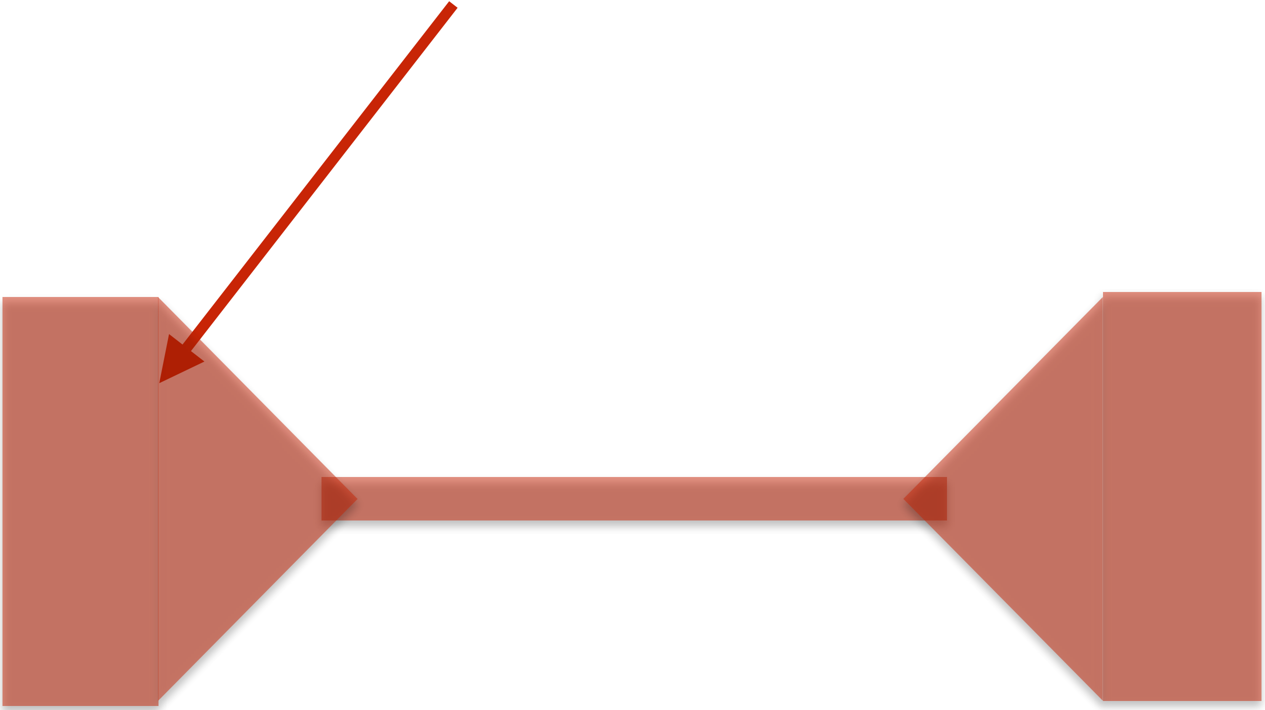

Outflow

Outflow

$$M_{Te} = \frac{k_B T_{e,out} - k_B T_{e,in}}{B^2/(4\pi n)}$$



Inflow

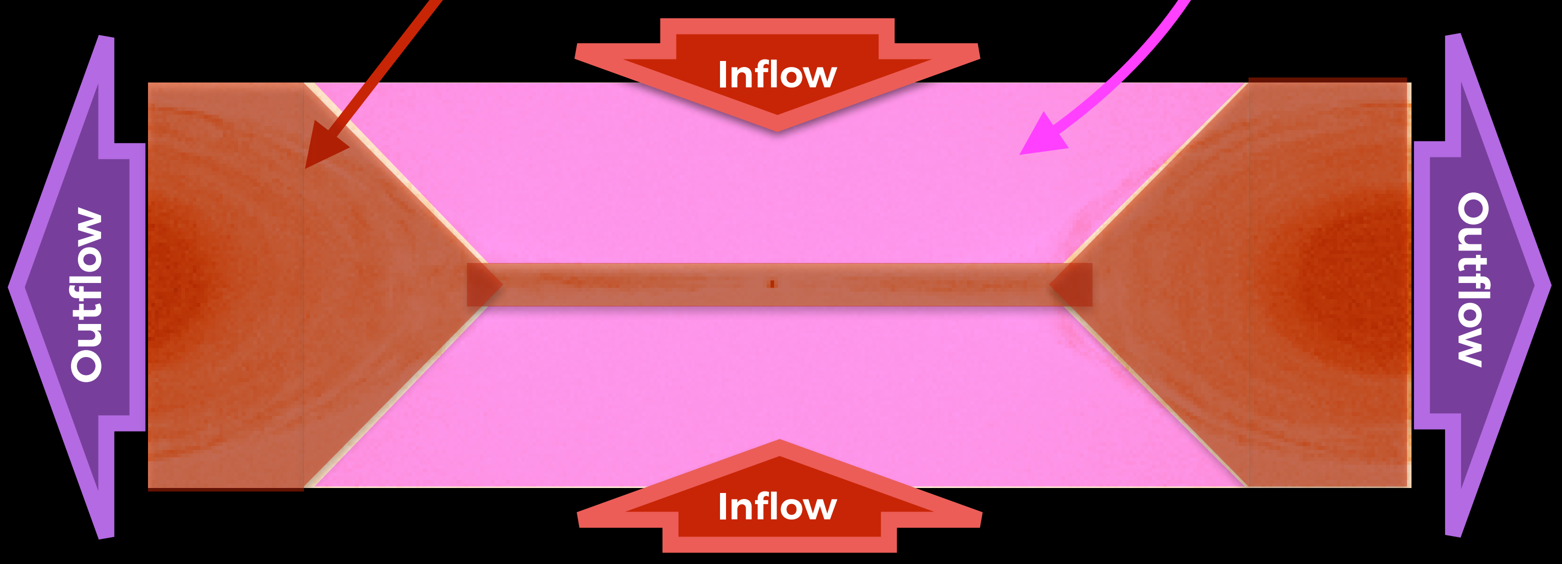


Inflow

Characterization of heating

A useful number we can extract from each simulation is the following dimensionless ratio:

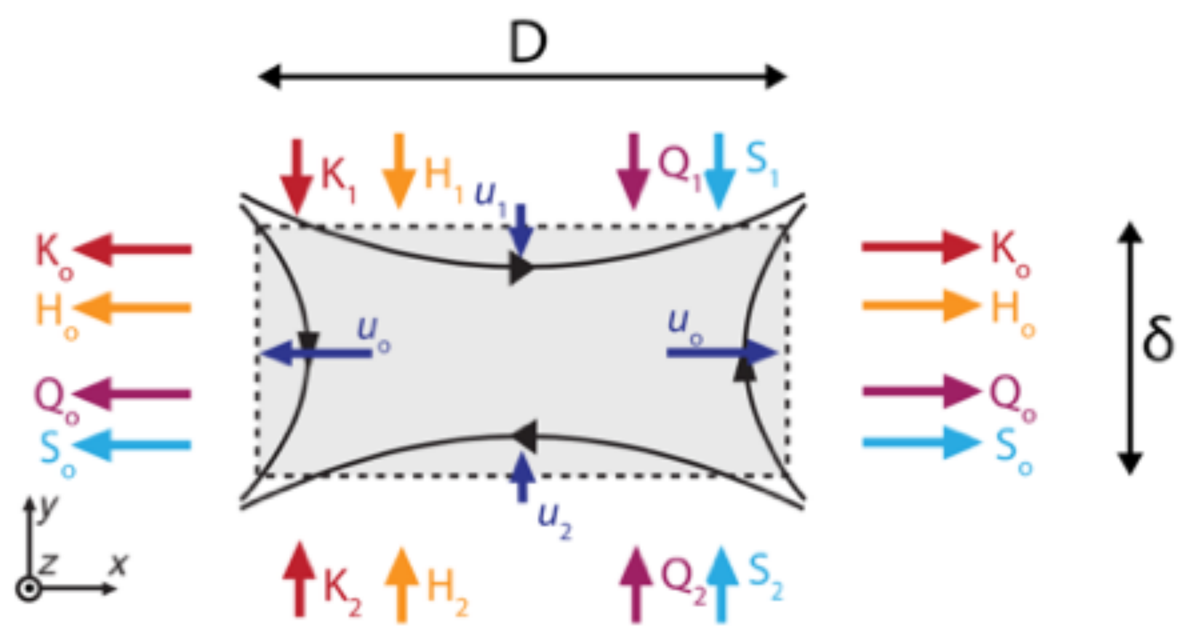
$$M_{Te} = \frac{k_B T_{e,out} - k_B T_{e,in}}{B^2/(4\pi n)}$$



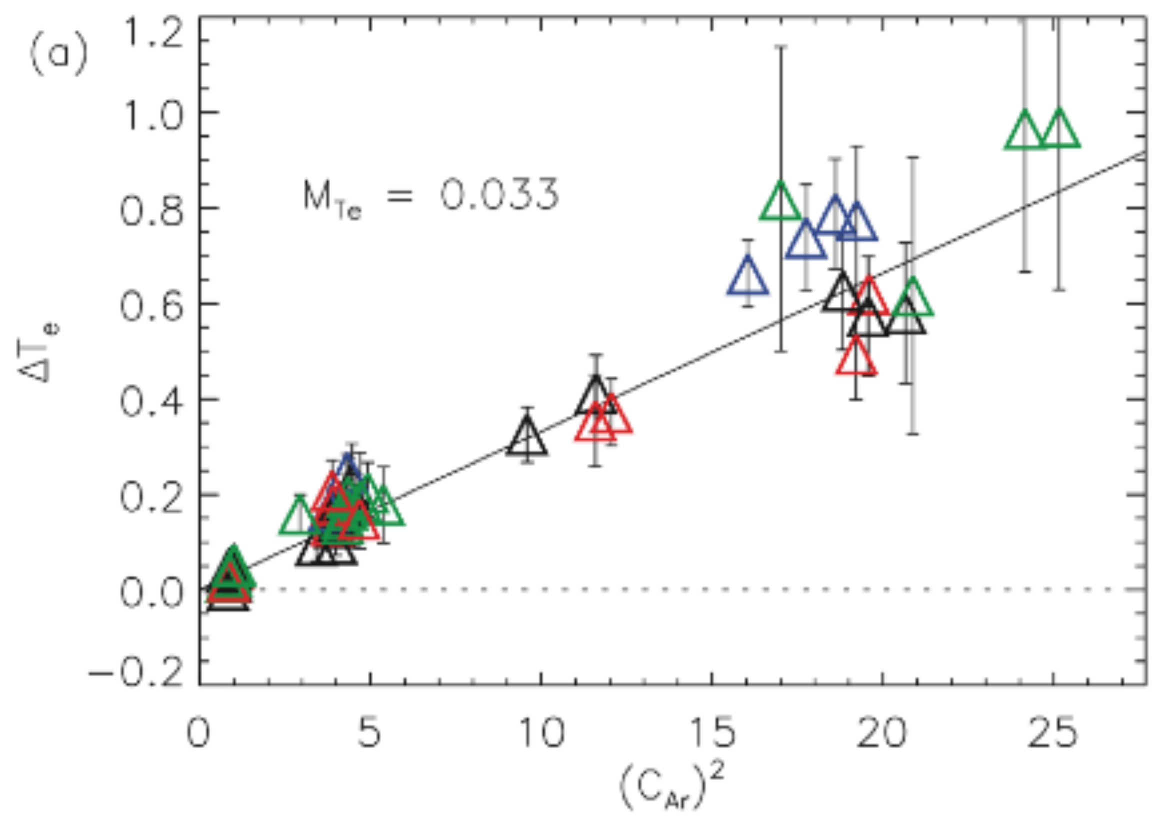
This is the ratio of increase in temperature to magnetic energy available for dissipation. It can be thought of as the 'efficiency' of reconnection.

How much are electrons heated during reconnection?

PIC simulations and observations of magnetic reconnection suggest that a constant fraction of inflowing magnetic energy is given to electrons



$$M_{Te} = \frac{k_B T_{e,out} - k_B T_{e,in}}{m_i v_A^2}$$



(Drake et al., 2014)

This fraction M_{Te} is remarkably independent of plasma parameters in the inflowing region