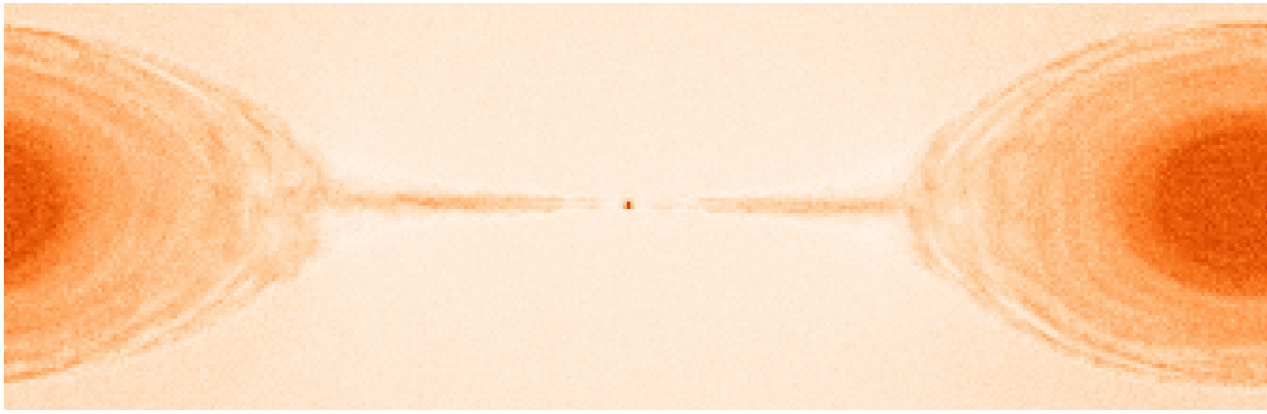


Characterization of heating





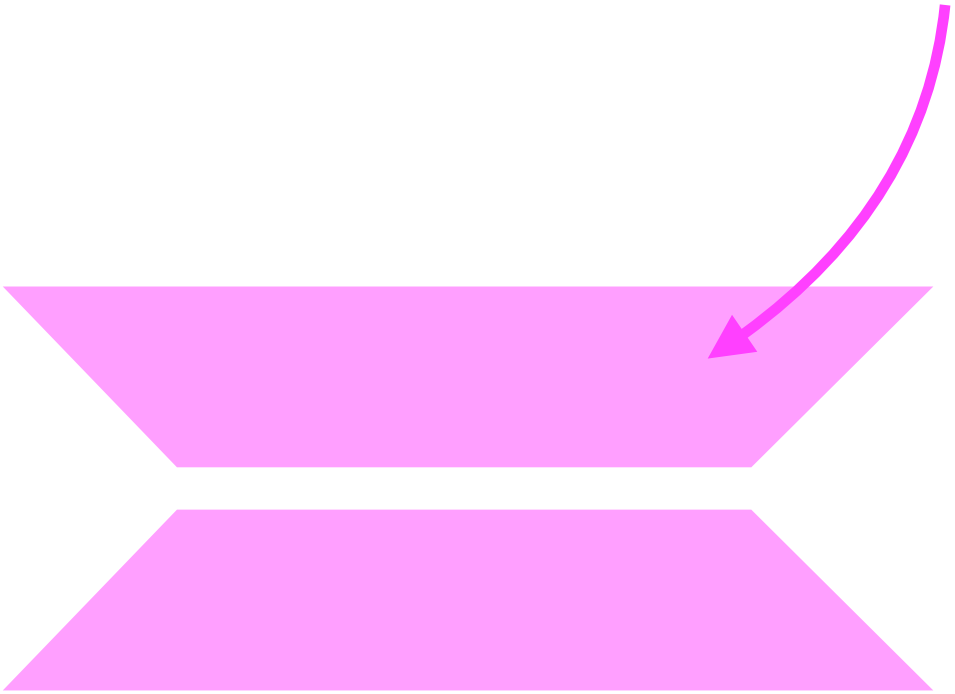
A large, stylized purple arrow pointing to the right. The arrow has a thick purple outline and a solid purple fill. Inside the arrow, the word "outflow" is written in a bold, white, sans-serif font, centered horizontally and vertically.

outflow



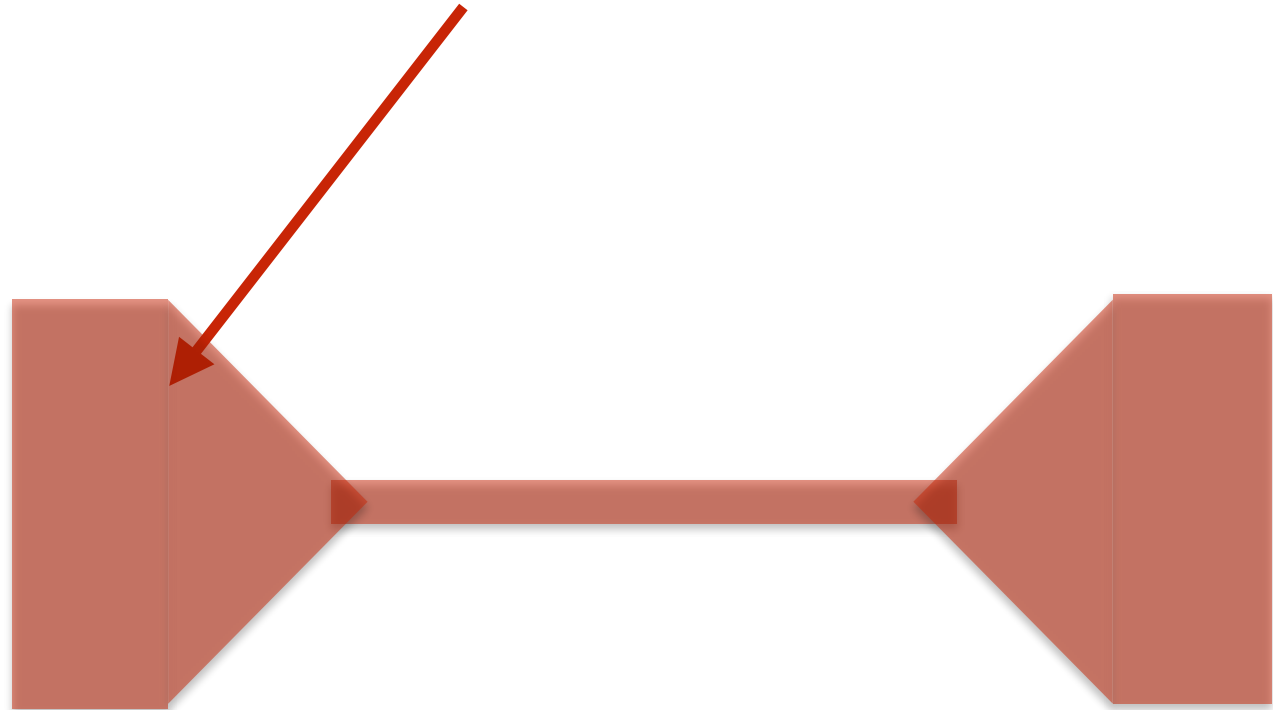
outflow

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



A large, stylized red arrow pointing upwards. The arrow has a thick red outline and a solid red fill. The word "Inflow" is written in white, bold, sans-serif font in the center of the arrow. The arrow is set against a white background with a subtle drop shadow.

Inflow



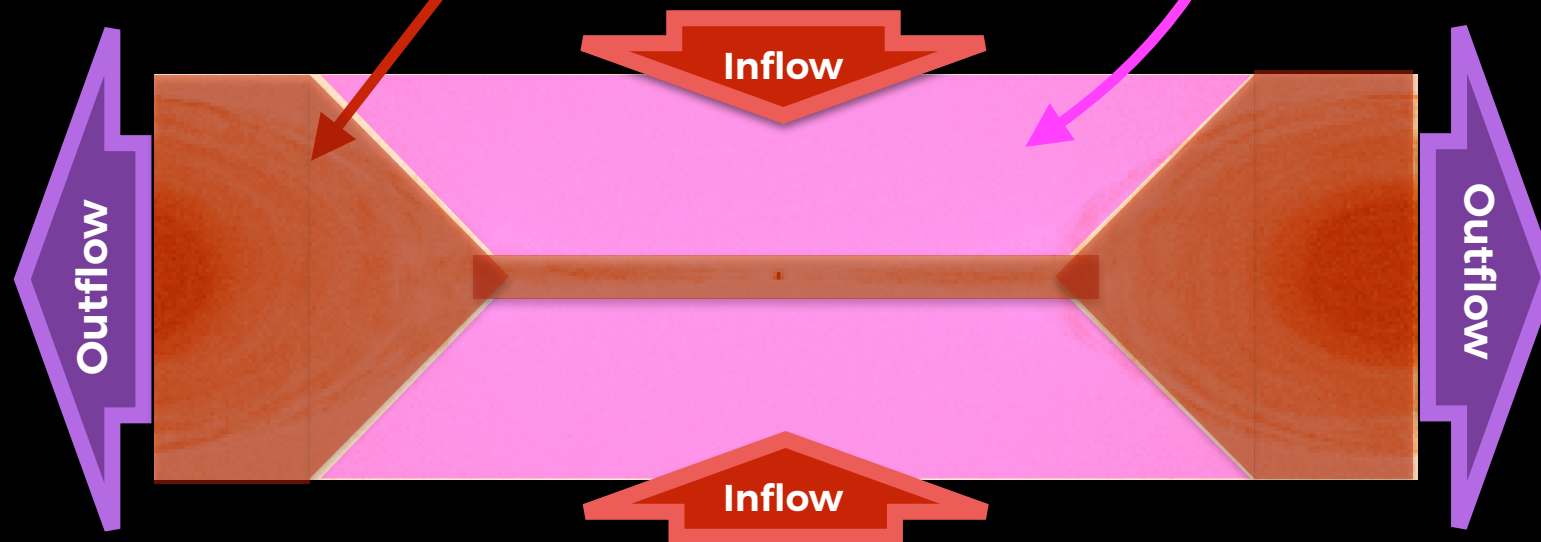


Inflow

Characterization of heating

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

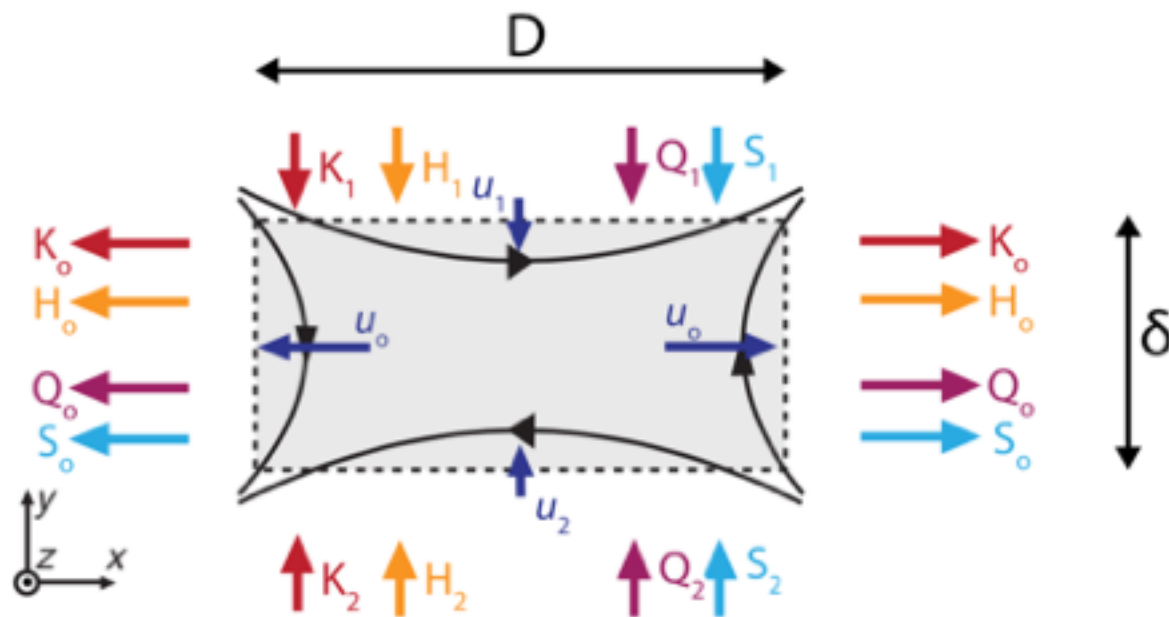
$$M_{Te} = \frac{k_B T_{e,out} - k_B T_{e,in}}{B^2 / (4\pi n)}$$



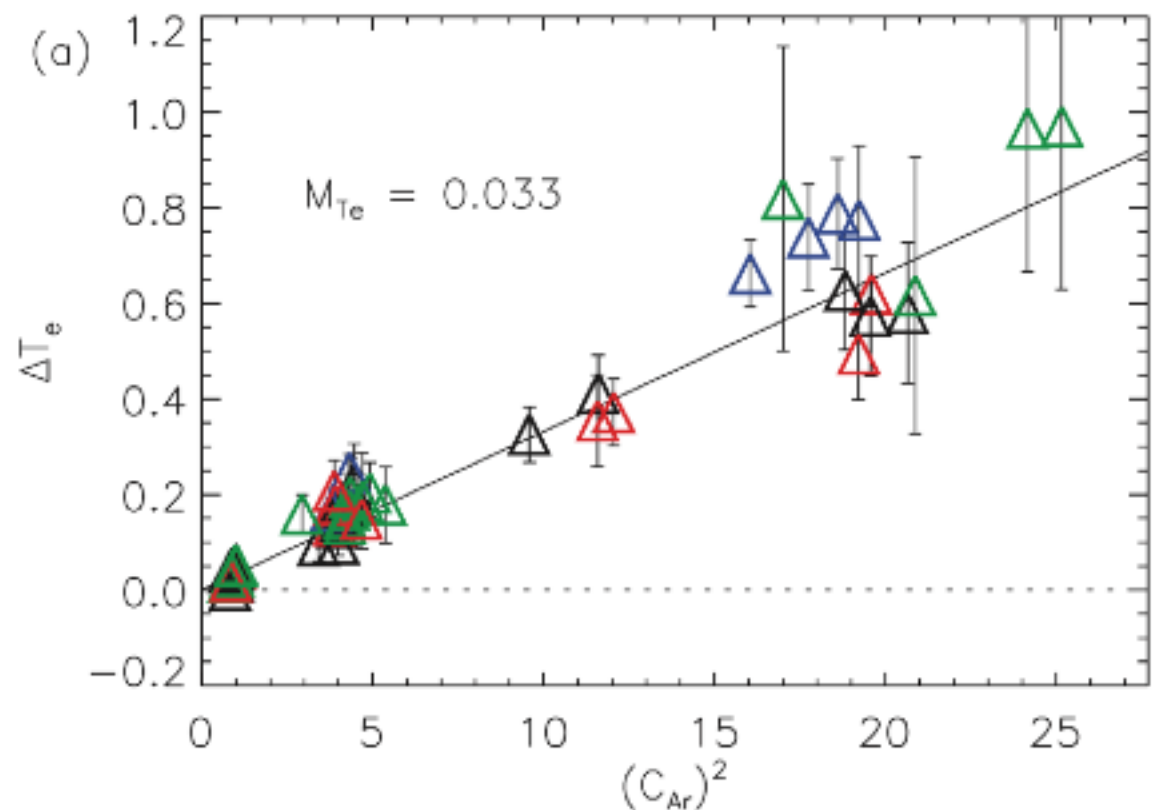
This is the ratio of increase in temperature to magnetic energy available for dissipation. It can be thought of as the 'efficiency' of reconnection.

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



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



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