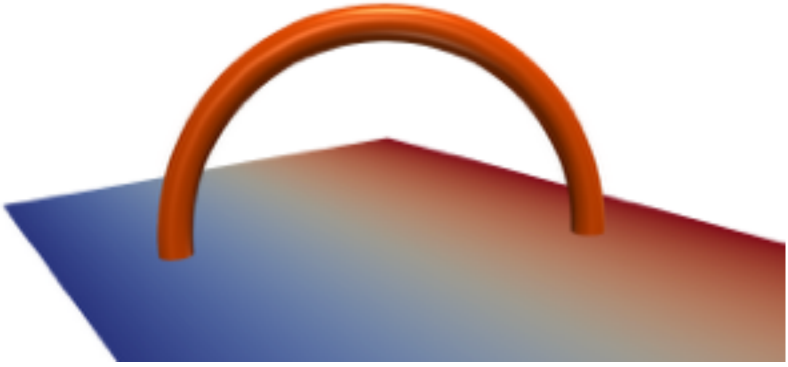


L/2

S

The plasma response to the heating

Loop geometry

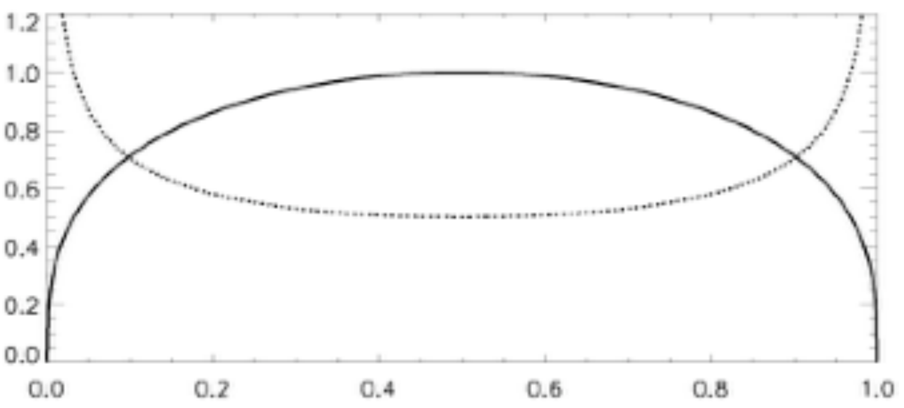
Rosner, Tucker & Vaianna 1978

$$T(s) \sim T_{max} \sqrt[3]{4(s/L)(1-s/L)}$$

$$\Lambda(T) = \Lambda_0 T^{-1/2}$$

$$T_{max} \sim h^{2/7} L^{4/7}$$

$$p_0 \sim h^{6/7} L^{5/7}$$



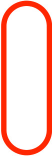
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0.0
0.2
0.4
0.6
0.8
1.0

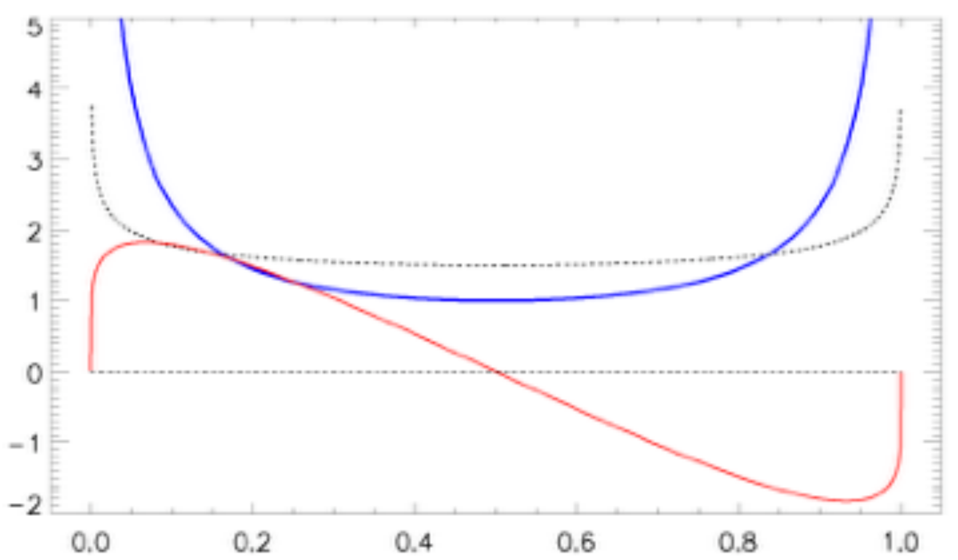
s/L

$T(s/L)$

$$\rho(s/L)$$

$$\frac{\mathrm{d}}{\mathrm{d}s}(\kappa_0 T^{5/2}\frac{\mathrm{d}T}{\mathrm{d}s}) - \frac{p_0^2}{4k_{\mathrm{B}}^2}\frac{\Lambda(T)}{T^2} + h = 0$$




5
4
3
2
1
0
−1
−2
0.0
0.2
0.4
0.6
0.8
1.0

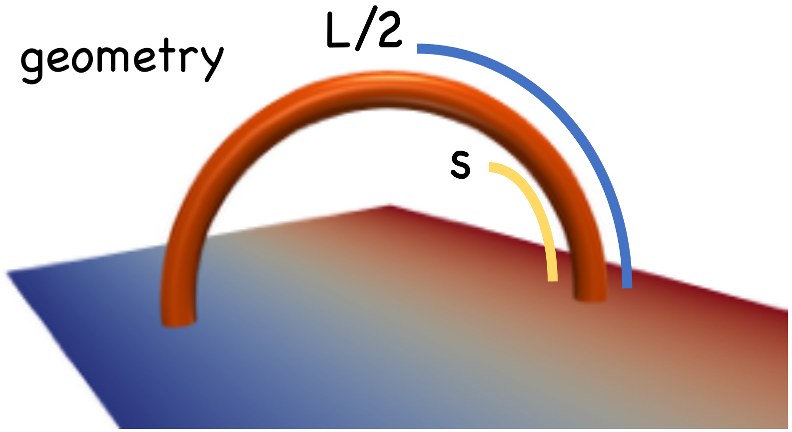
Loss

Conduction

$\Lambda(s/L)$

The plasma response to the heating

Loop geometry



Conduction Loss

$$\boxed{\frac{\mathrm{d}}{\mathrm{d}s}\left(\kappa_0 T^{5/2}\frac{\mathrm{d}T}{\mathrm{d}s}\right)} - \boxed{\frac{p_0^2}{4k_\mathrm{B}^2}\frac{\Lambda(T)}{T^2}} + \boxed{h} = 0$$

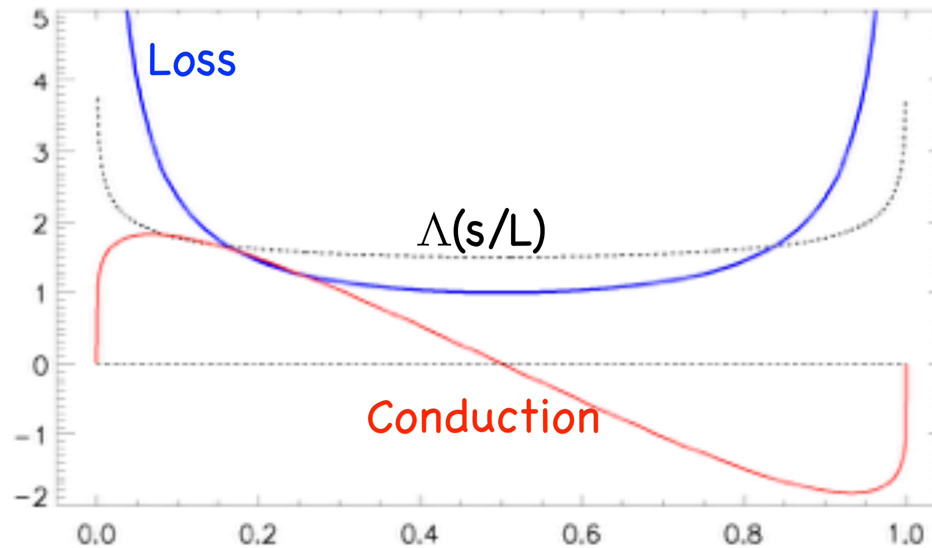
$$\Lambda(T) = \Lambda_0 T^{-1/2}$$

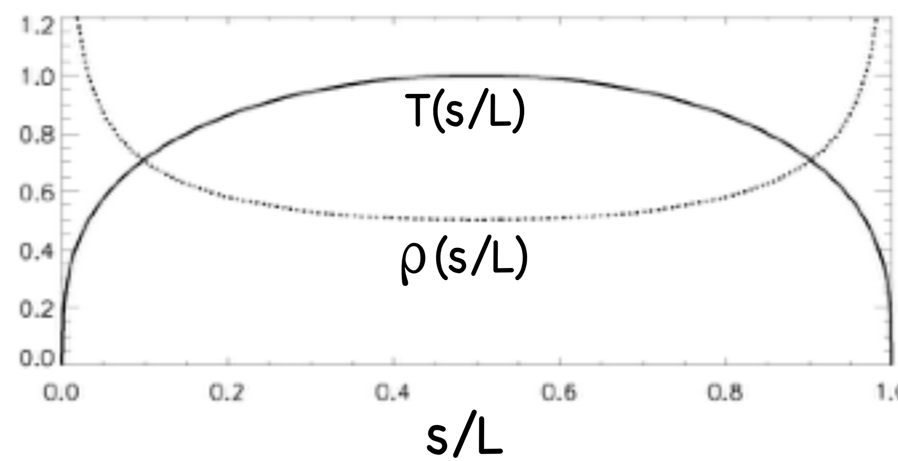
$$T_{max} \sim h^{2/7} L^{4/7}$$

$$p_0 \sim h^{6/7} L^{5/7}$$

$$T(s) \sim T_{max} \sqrt[3]{4(s/L)(1 - s/L)}$$

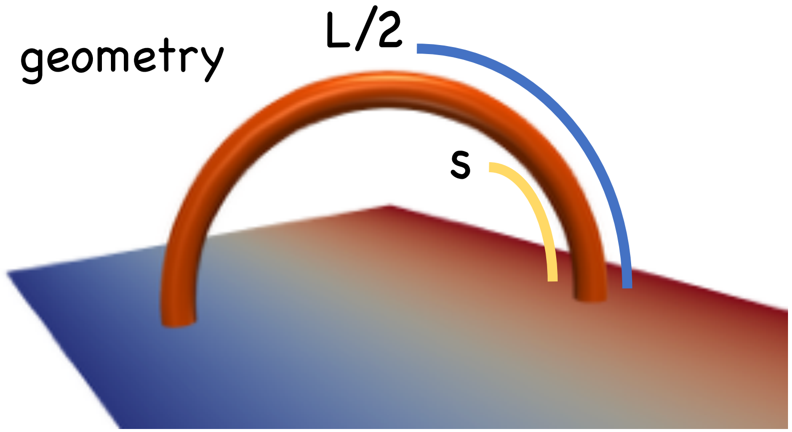
Rosner, Tucker & Vaianna 1978



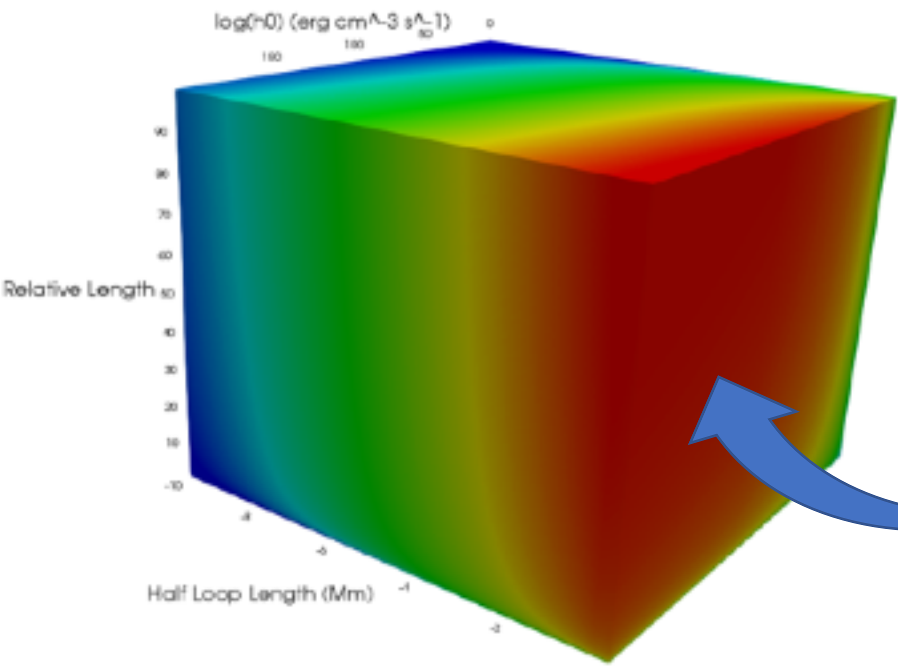


The plasma response to the heating

Loop geometry



Solution set: $T(h_0, L, s, \mathcal{R})$, $P(h_0, L, s, \mathcal{R})$



Equilibrium loop

$$\begin{cases} -\dfrac{P^2}{4k_{\mathrm{B}}^2T^2}\Lambda(T) + \dfrac{\partial}{\partial s}\left(\kappa\dfrac{\partial T}{\partial s}\right) + h(s) = 0 \\ \dfrac{\mathrm{d}P(s)}{\mathrm{d}s} = -\dfrac{g_\odot \bar{m}}{k_{\mathrm{B}}T(s)}P(s)\cos\left(\pi\dfrac{s}{L}\right) \end{cases}$$

$$\begin{cases} 2\displaystyle\int_0^{L/2} h(s)\mathrm{d}s = \dfrac{F_p + F_n}{2} \\ h(s) = h_0 \exp\left(-\dfrac{s}{\mathcal{R}L/2}\right) \end{cases}$$

$$\begin{cases} T(0) = 10^4\ \mathrm{K} \\ \kappa\dfrac{\partial T}{\partial s}\Big|_{s=L/2} = 0 \end{cases}$$

Here we have another free parameter $\mathcal{R}$ in the equilibrium loop.