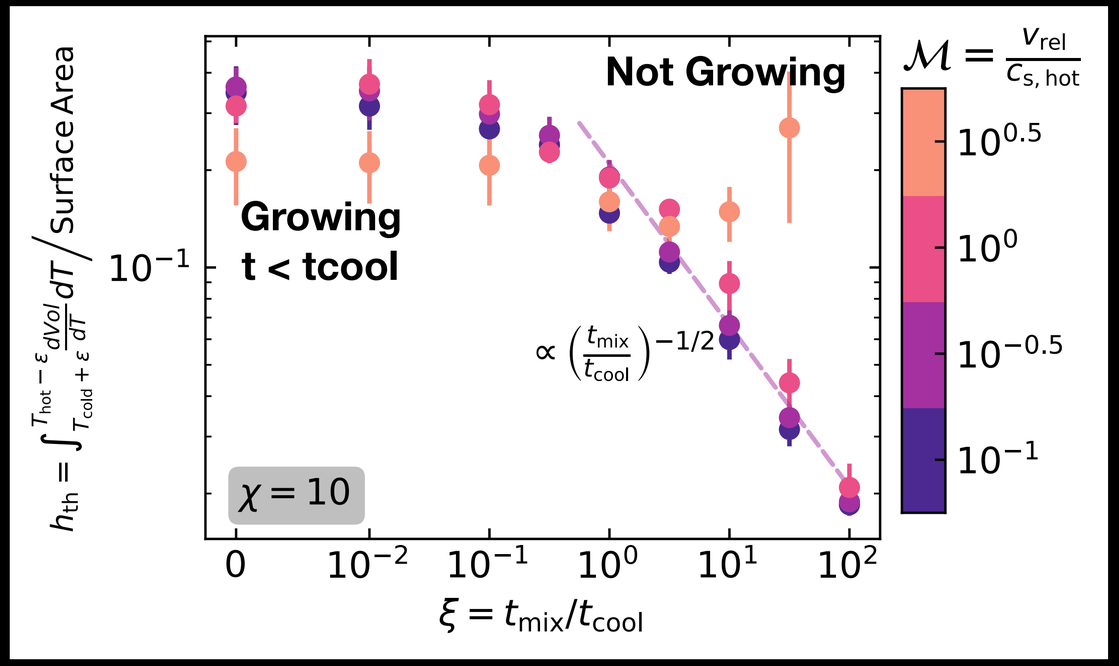
Cooling v. Turbulence – Layer thickness

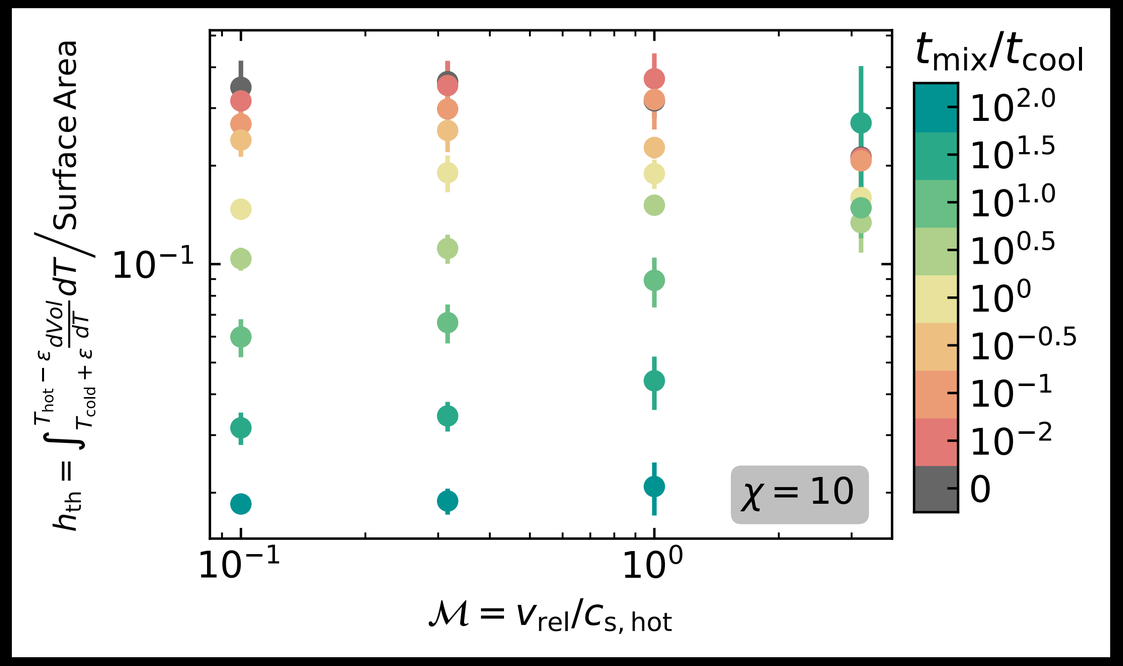
When $t_{mix} < t_{cool}$:

$h \propto (t_{mix}/t_{cool})^0$ Mach $\propto v_{rel}$

When $t_{mix} > t_{cool}$:

$h \propto (t_{mix}/t_{cool})^{1/2}$ Mach$^0 \propto (v_{rel} t_{cool})^{1/2}$





Entrainment, acceleration, & cooling

Slow cooling limit, i.e. when $t_{mix}/t_{cool} \lesssim 1$:

$$\dot{E}_{cool} \propto (t_{mix}/t_{cool})\ \text{Mach} \sim \left(\frac{\chi^{1/2} L}{v_{rel}\, t_{cool}}\right)\left(\frac{v_{rel}}{c_s}\right) \propto \frac{1}{t_{cool}}$$