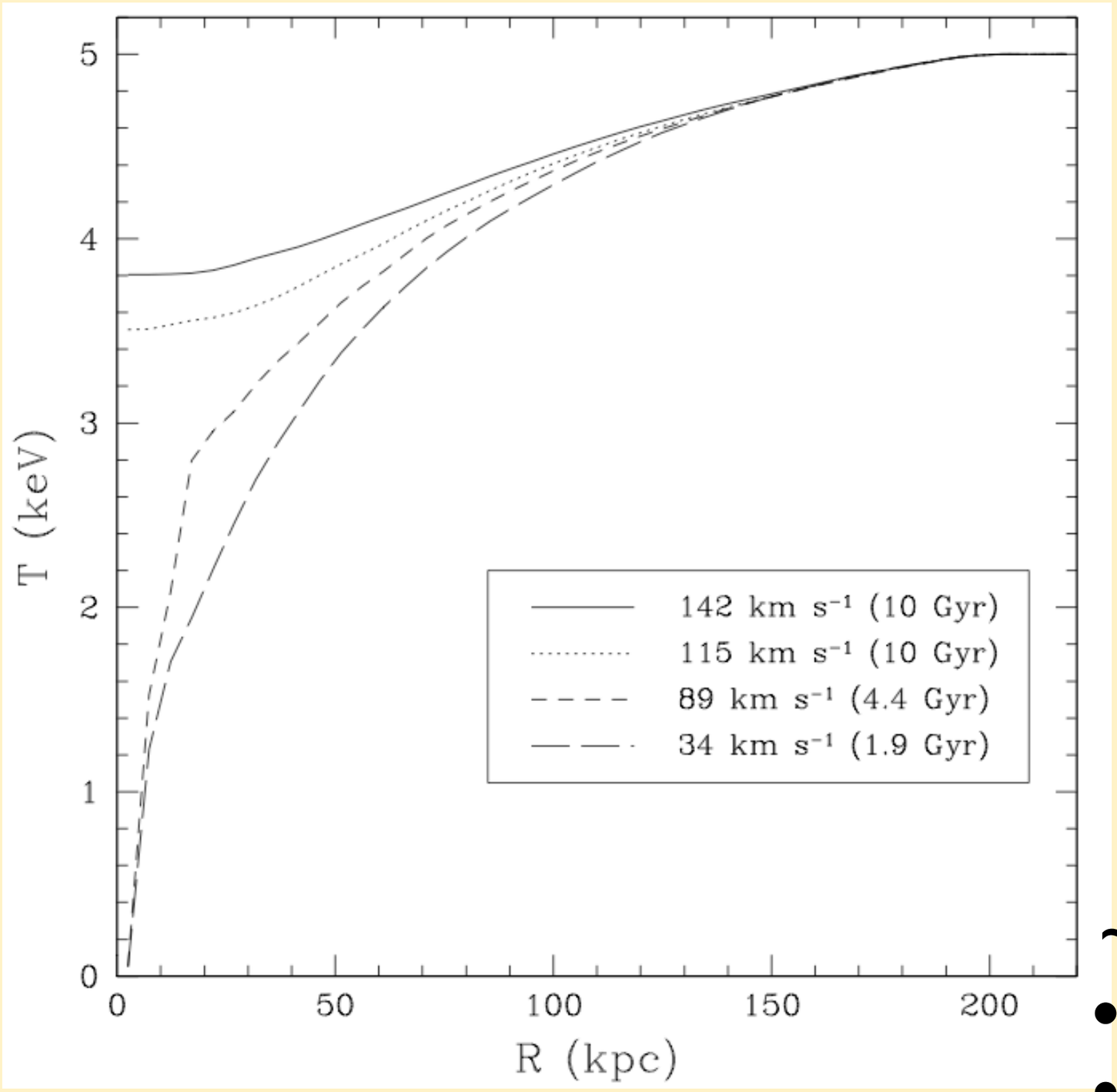
Ian Parrish, Turbulence in Galaxy Cluster Cores: The Key to Bimodality?

Final Temperature Profiles



Parrish, et al (2010), ApJ, 712, 194
See also Ruszkowsi & Oh

Exact Same
Initial Conditions
Turbulence of *L = 40* kpc.

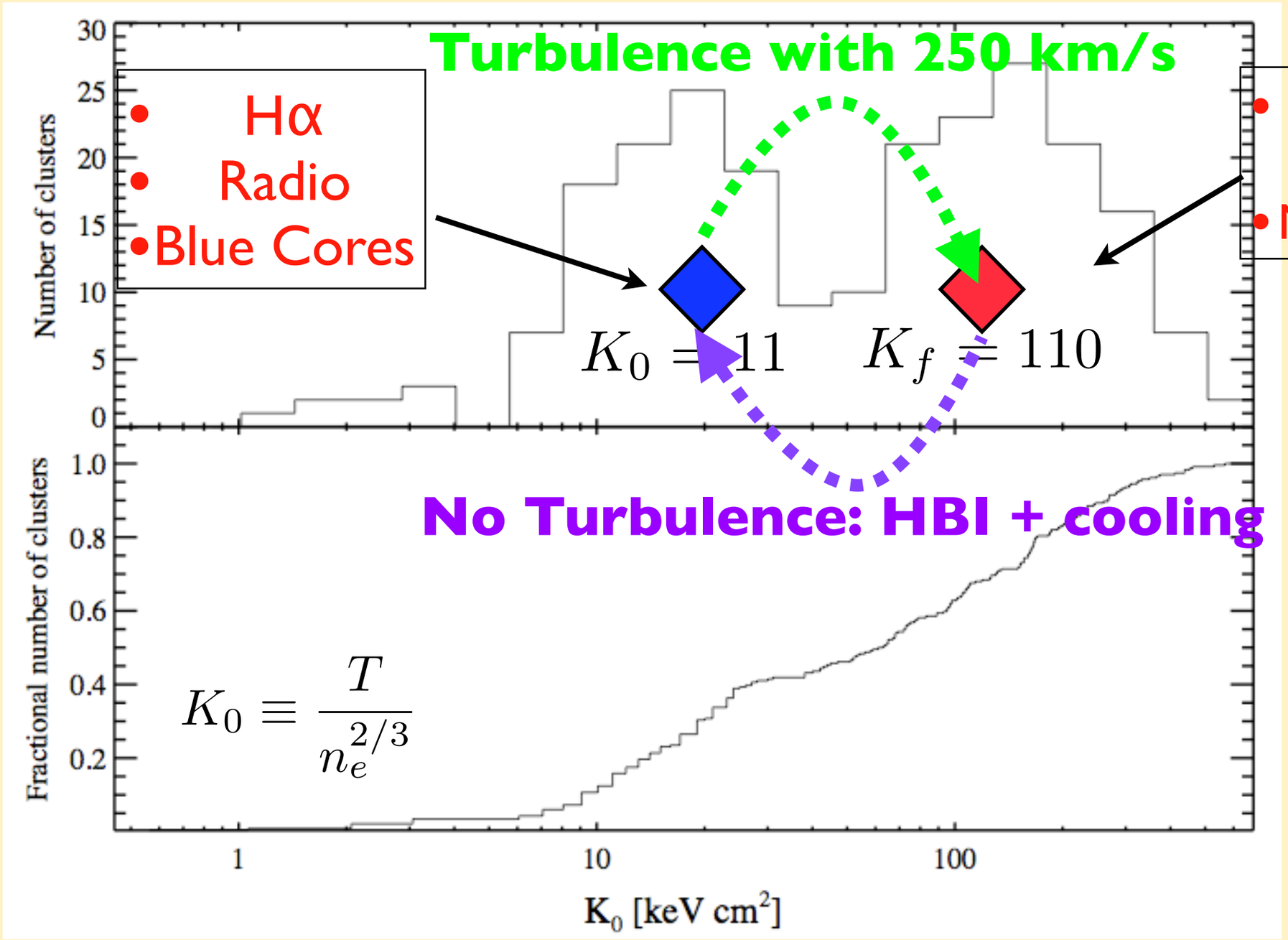
$$t_{\rm HBI} \approx 100\,{\rm Myr}$$
$$t_{\rm cool} \approx 400\,{\rm Myr}$$
$$t_{\rm eddy} \approx 100 - 450\,{\rm Myr}$$

Clear Bimodality:

~25 km/s velocity difference

- Stable ~isothermal profile
- HBI & Cooling Catastrophe

Turbulence and Entropy



- Conduction is a natural way to *volumetrically* raise entropy
- Turbulence (energetically weak) can be a catalyst for changing the cool core/non-cool core state.