AGN Feedback In Galaxy Groups

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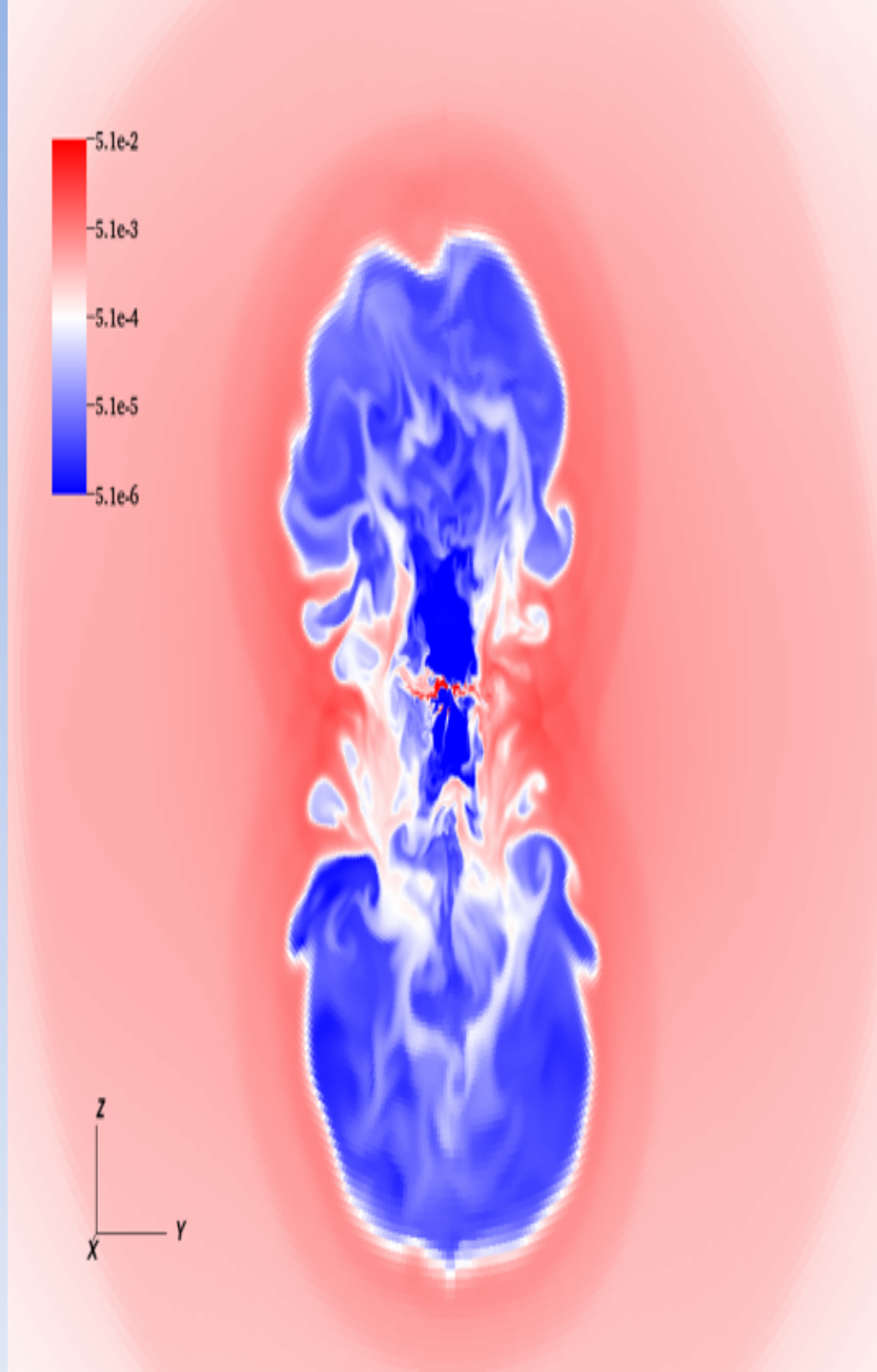
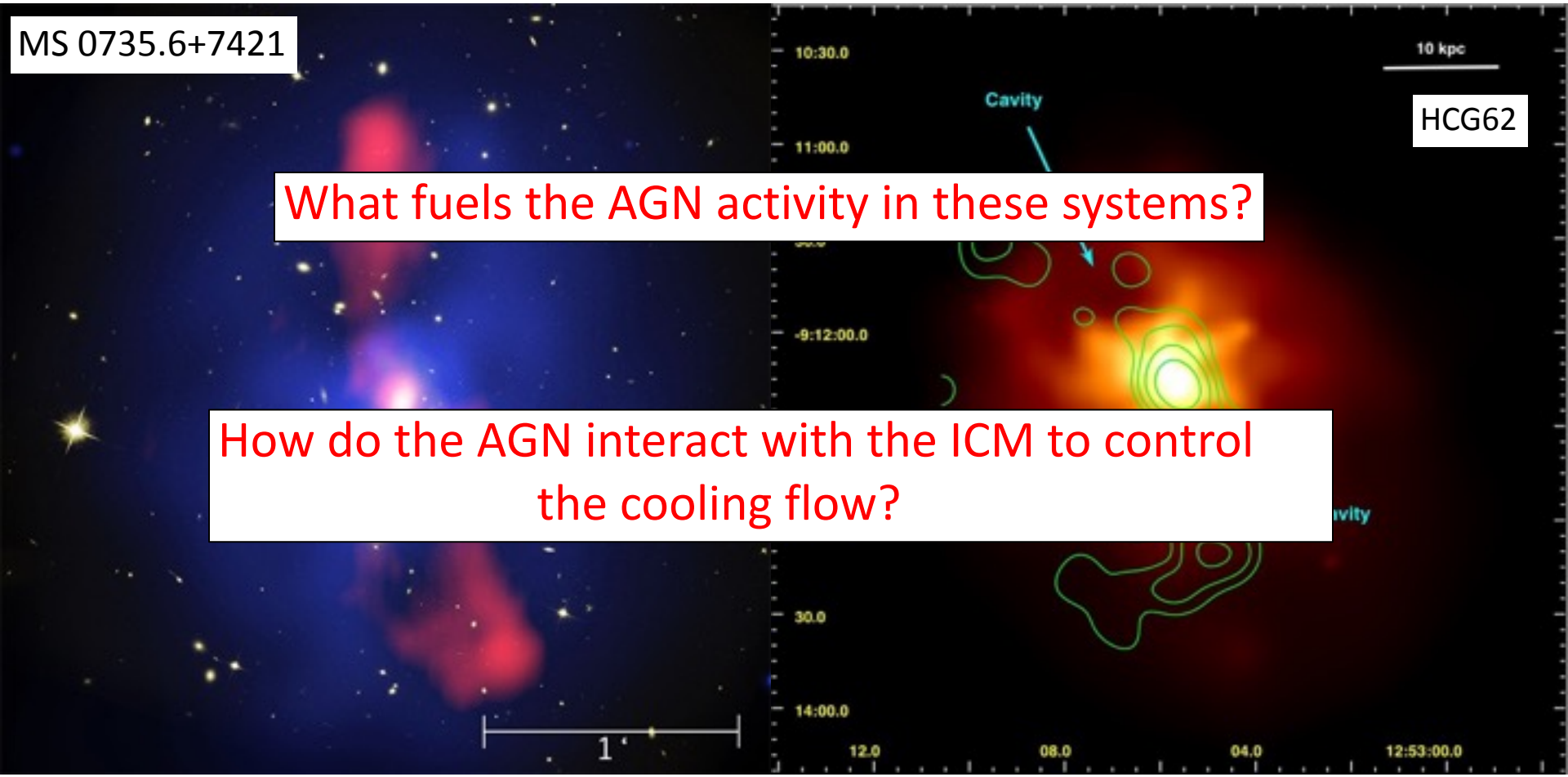
(Thanks to SERC, IISc, Bangalore)



Groups and Clusters



NASA, ESA, CXC/NRAO/STScI,
B McNamara (Univ of Waterloo and Ohio Univ)

Gitti et al, ApJ, 2010

Numerical Setup

HD, 3D

PLUTO code
(grid based code)

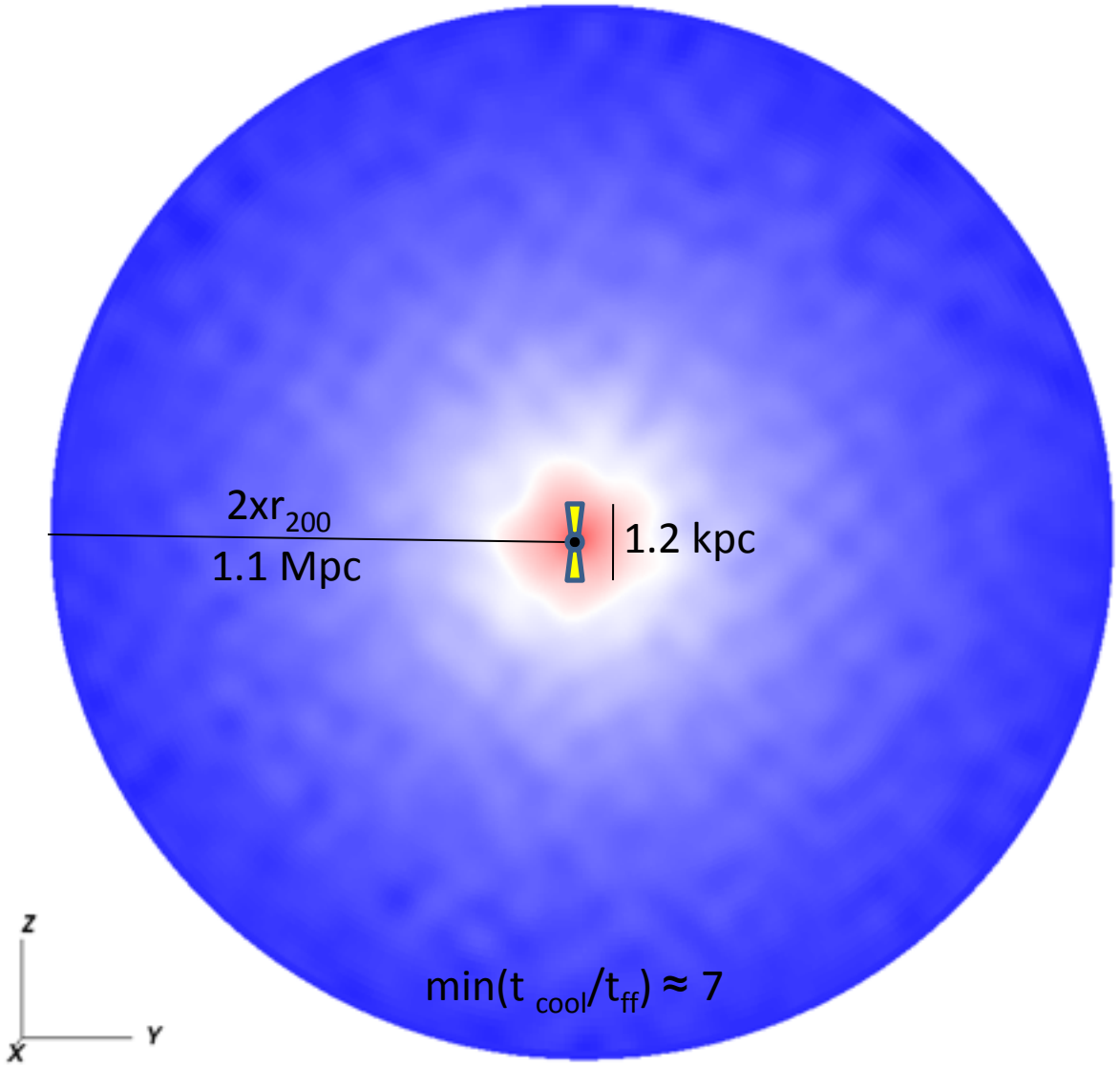
Spherical (r, θ,Φ) coordinates
min(Δr = 5 pc)

$M_{200} = 2 \times 10^{13}\ M_{sun}$

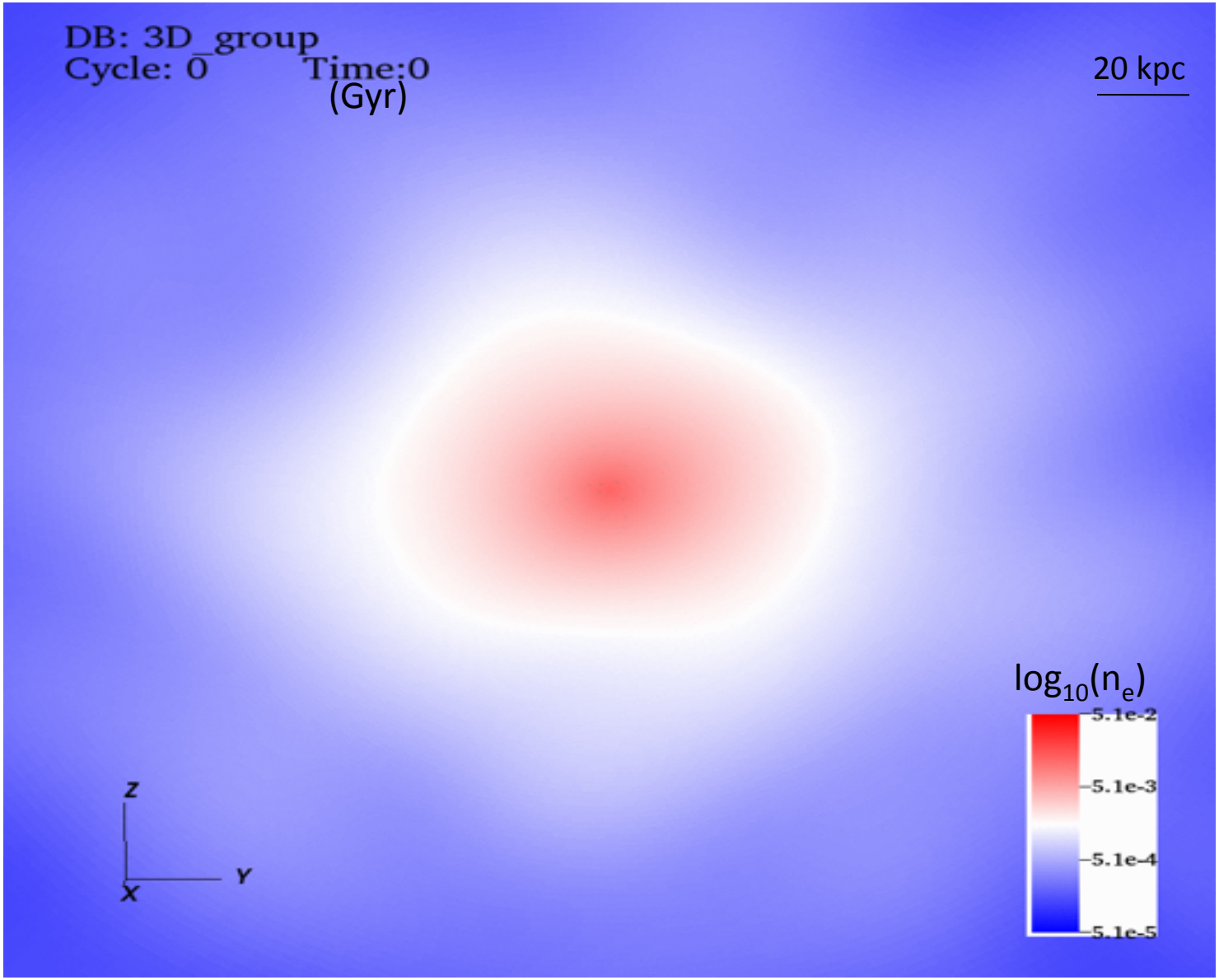
Jet mass loading factor:

$$\dot{M}_{\rm jet}\, v_{\rm jet}^2 = \epsilon \dot{M}_{\rm acc}\, c^2$$

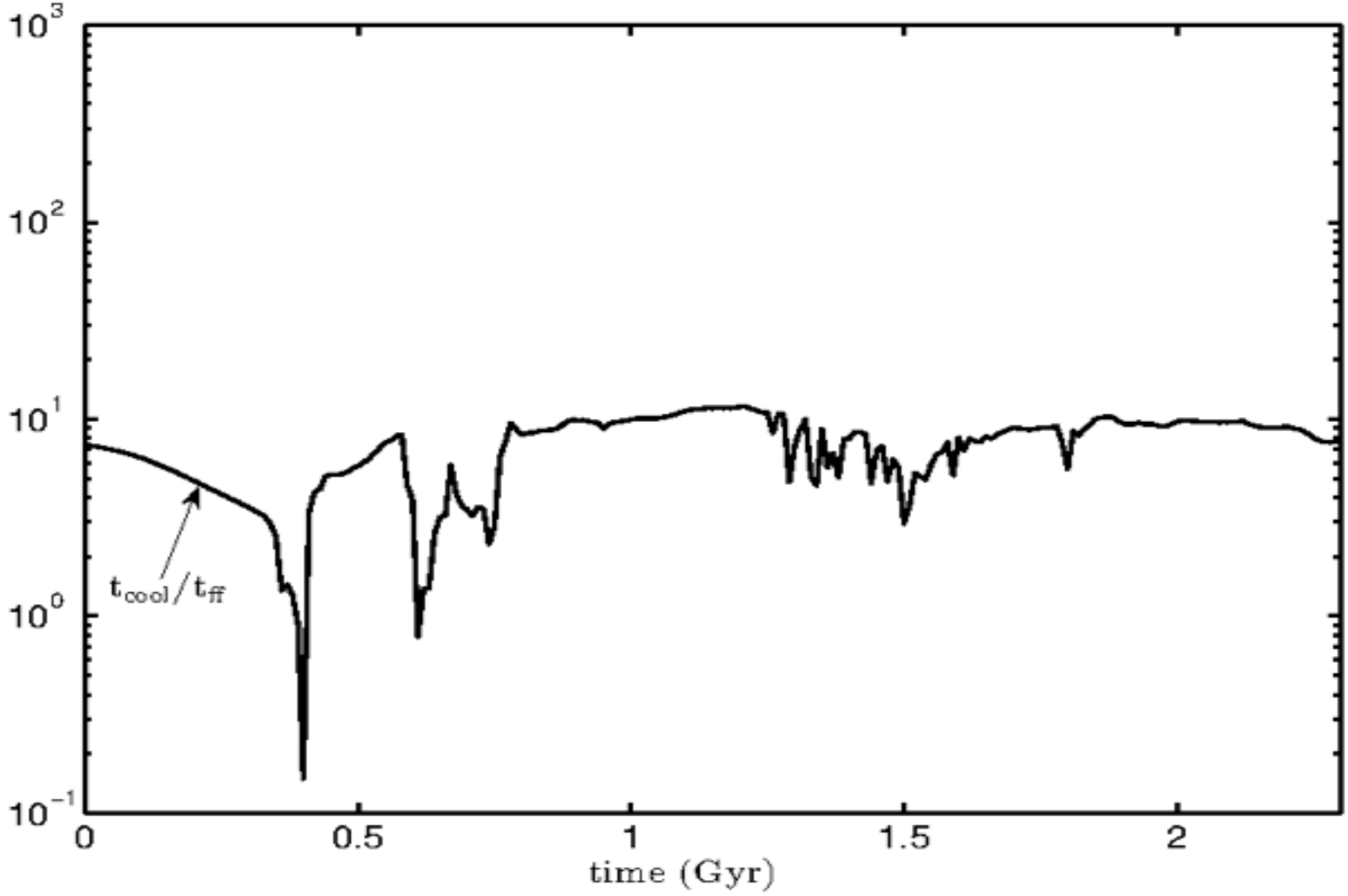
Where,
ϵ →accretion efficiency;
$v_{jet} = 0.1\ c$



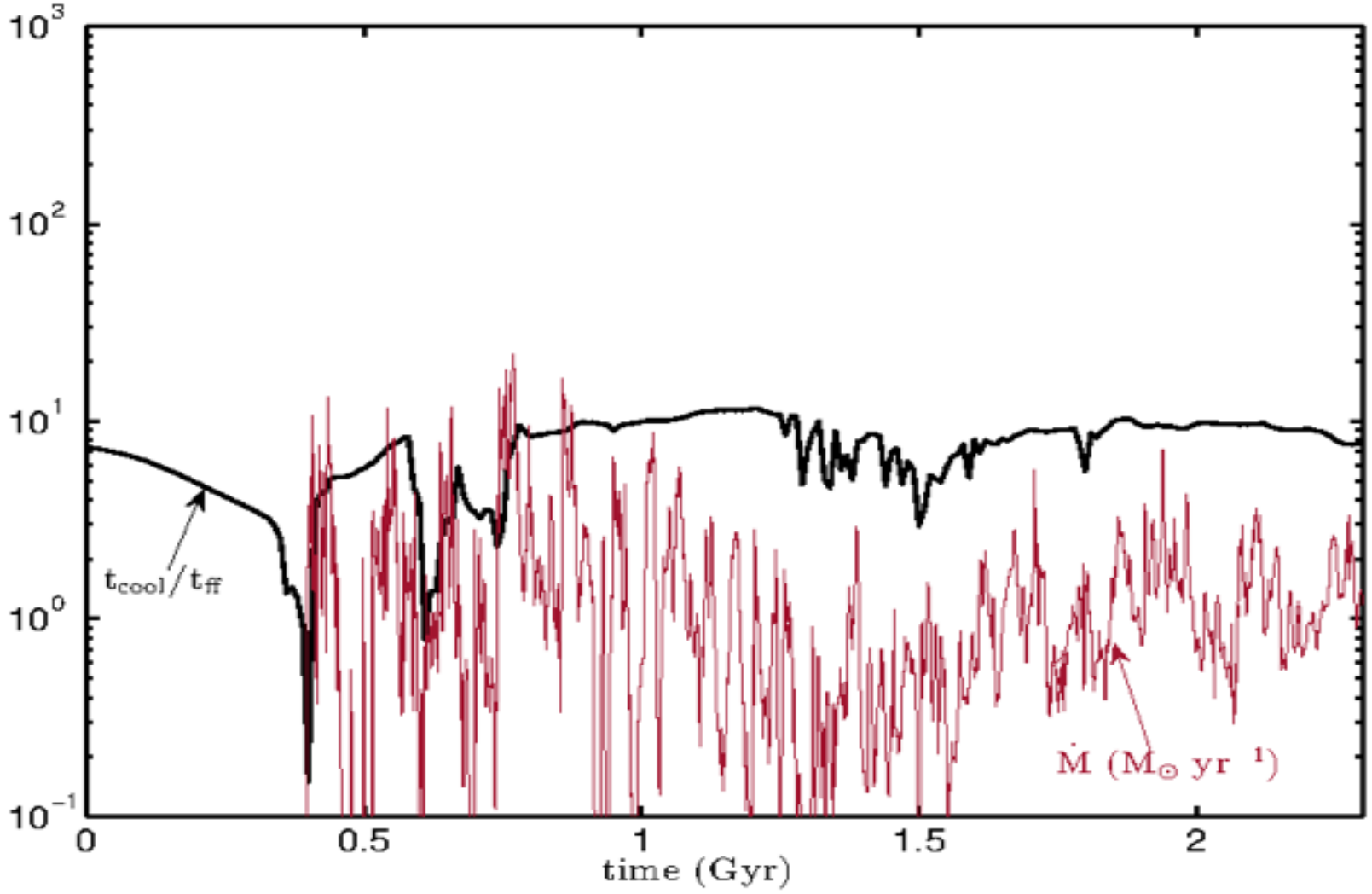
The Feedback cycle



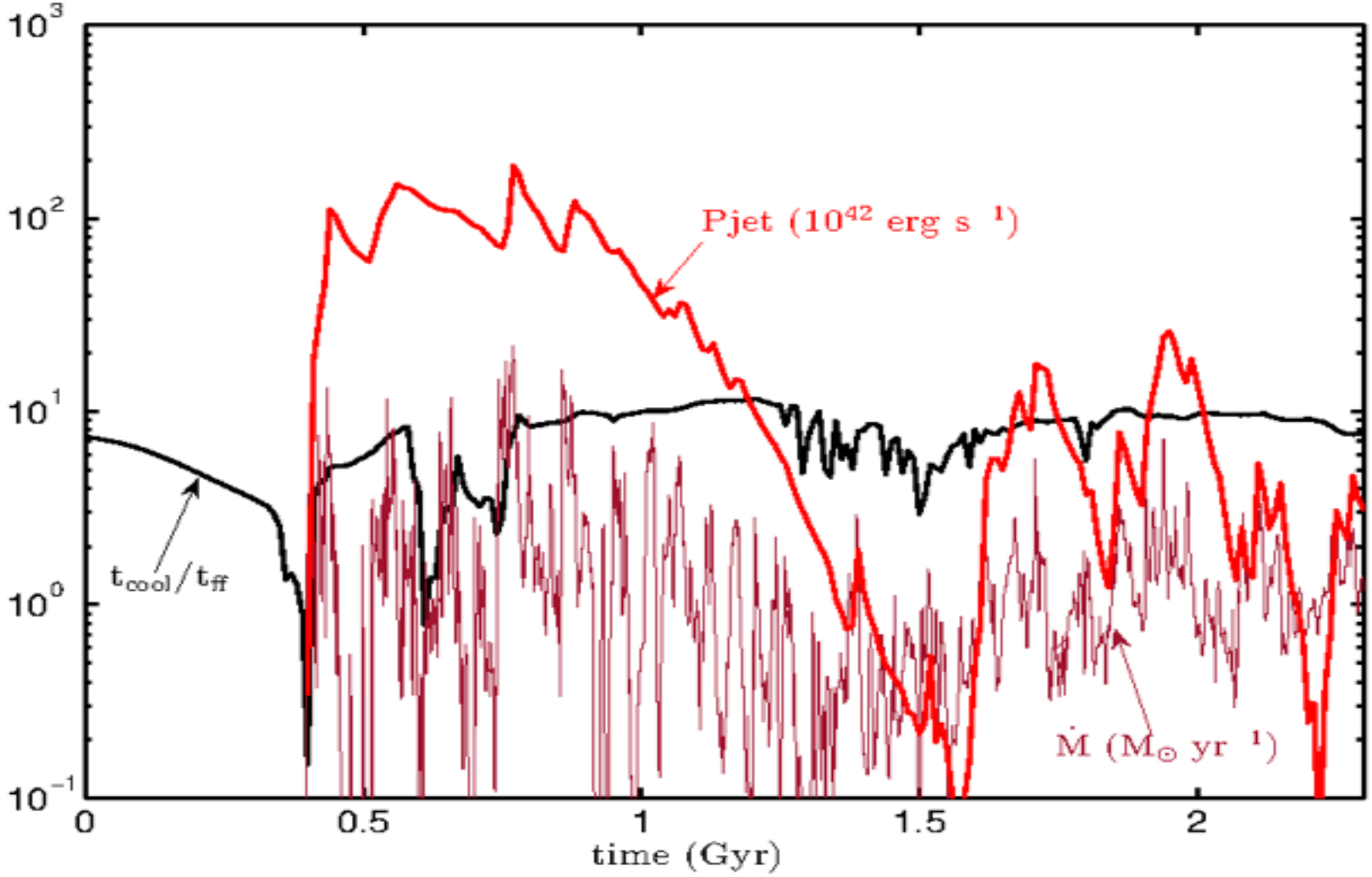
Time Evolution



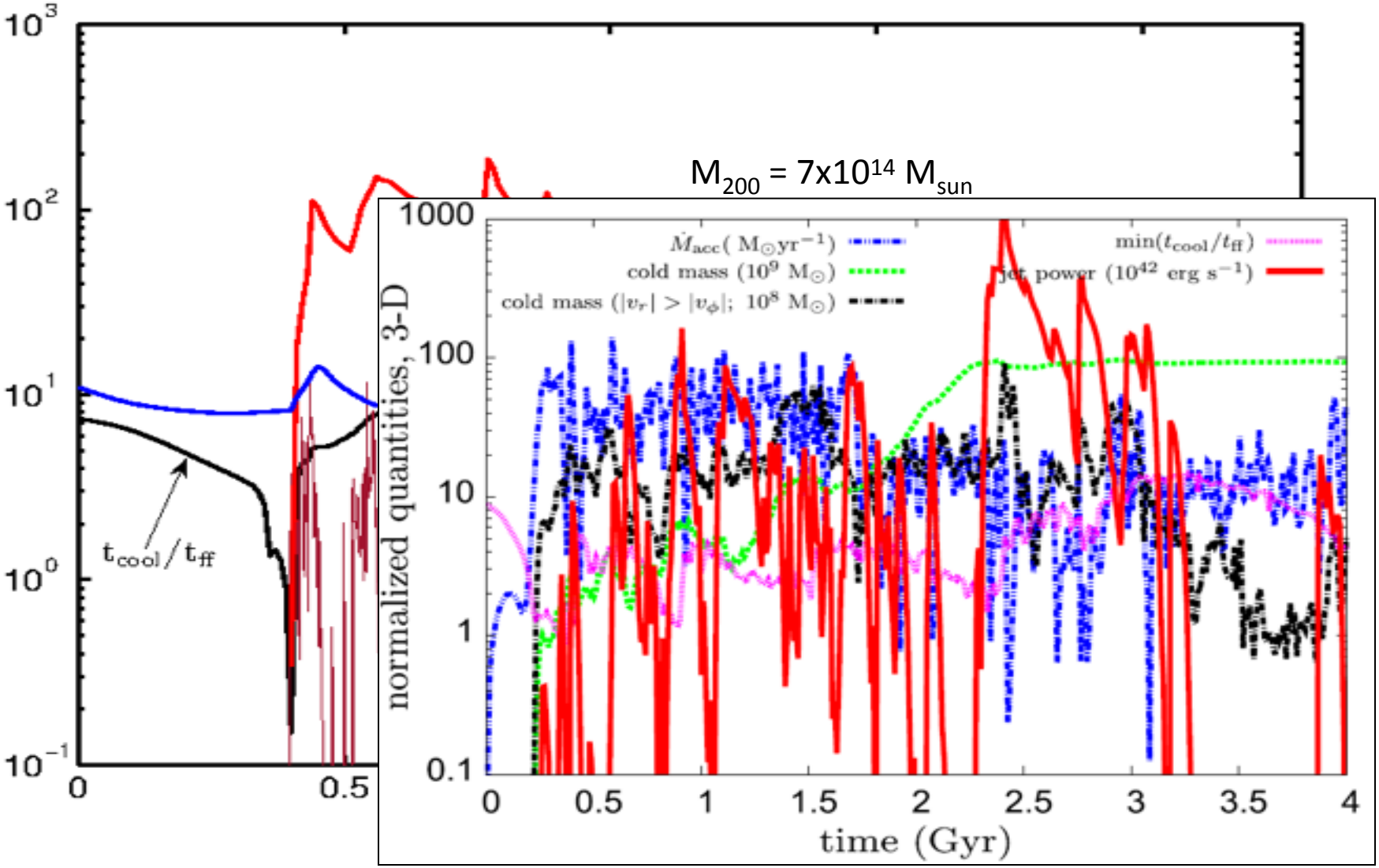
Time Evolution



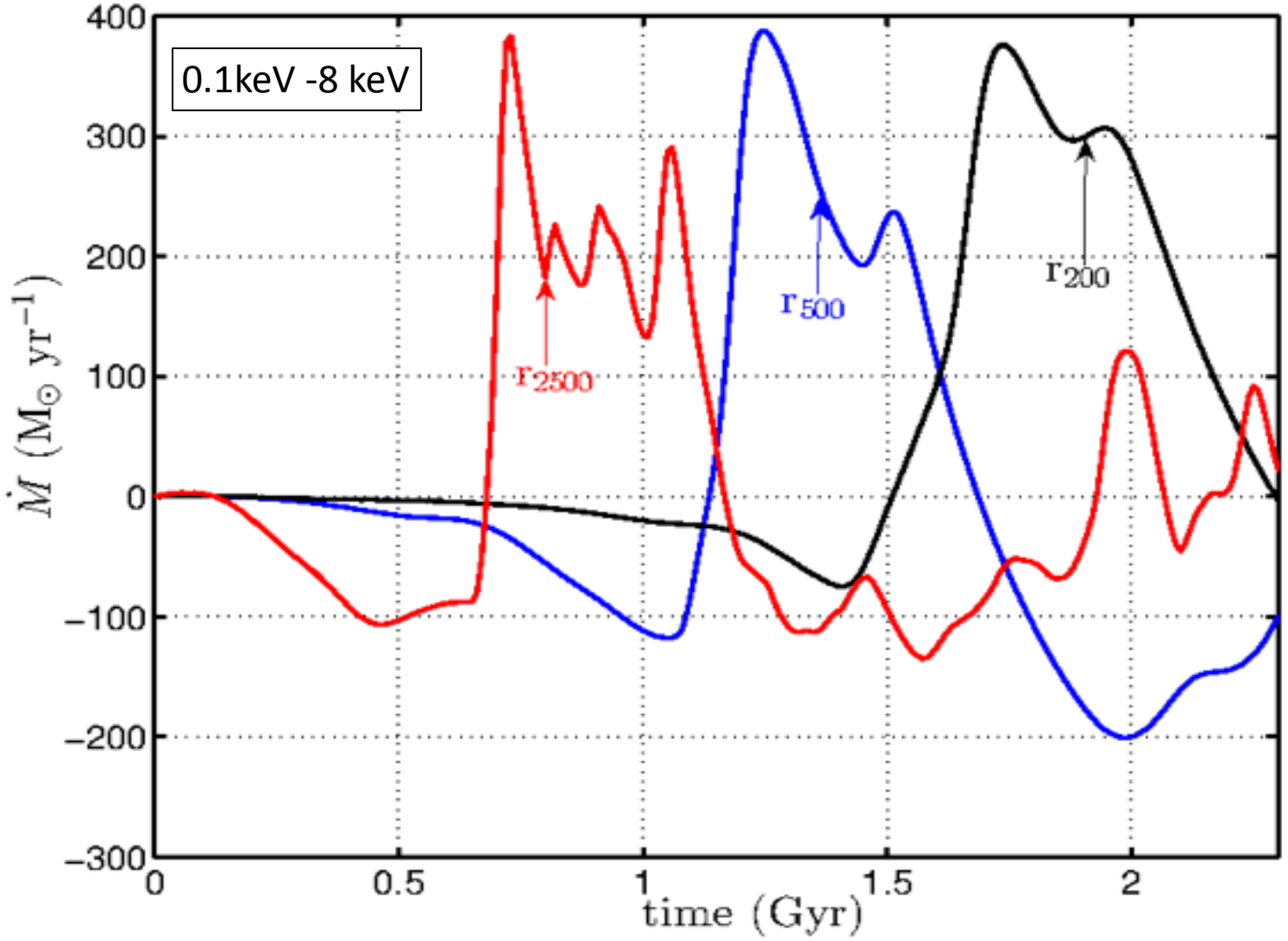
Time Evolution



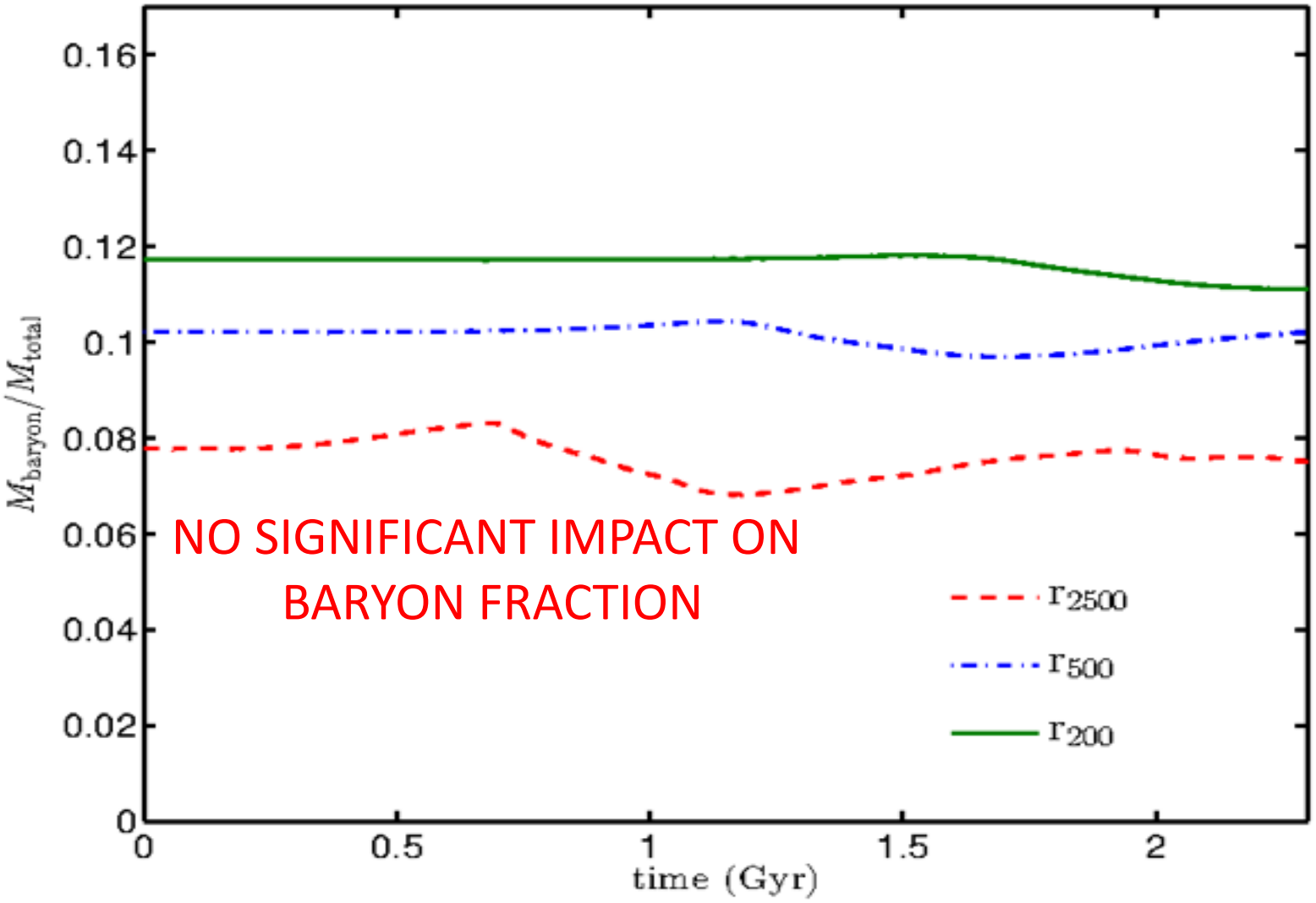
Time Evolution



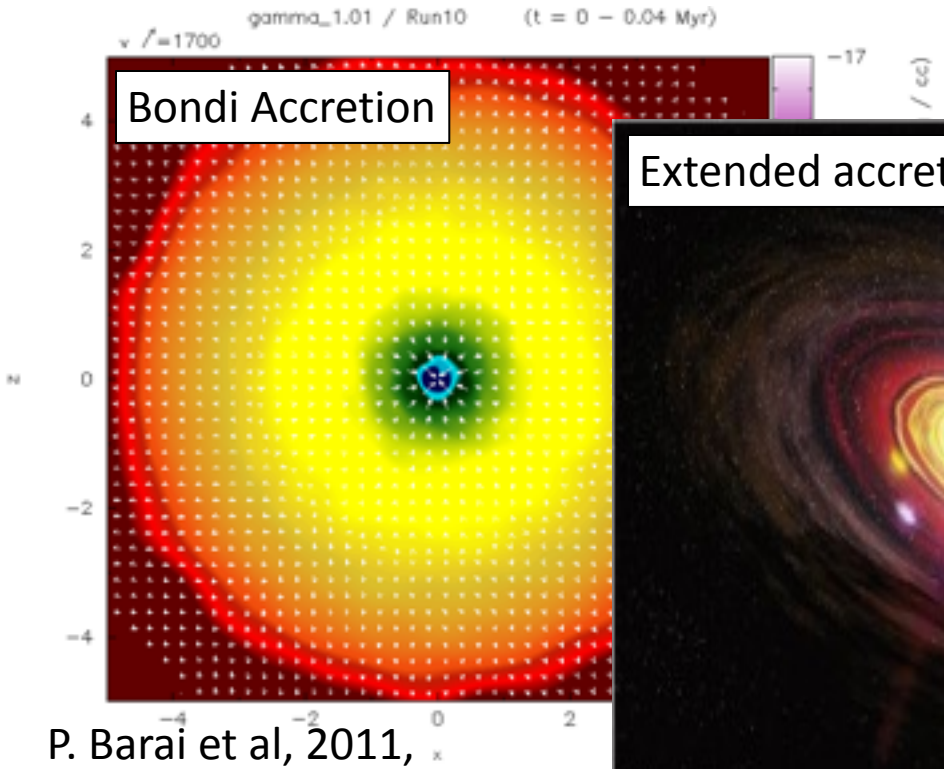
Inflow-Outflow



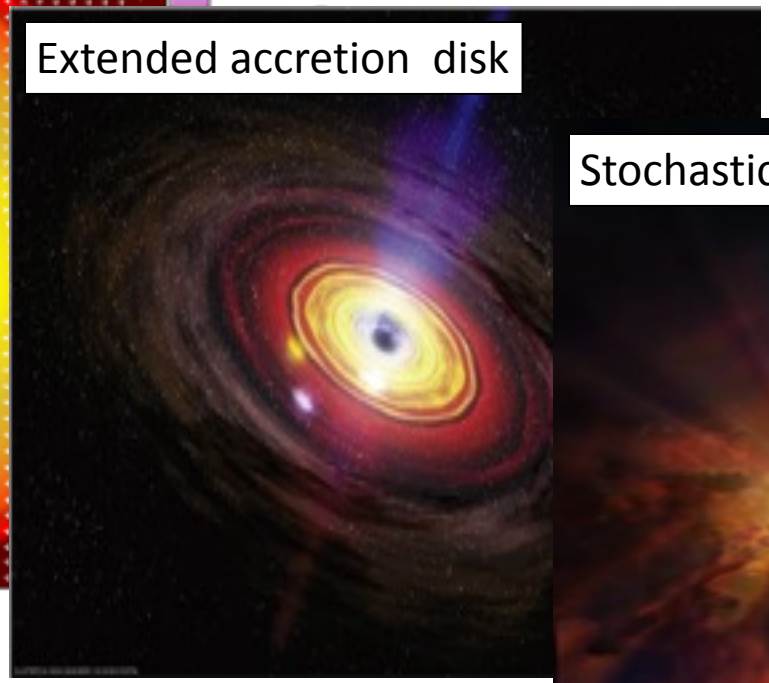
Baryon Fraction



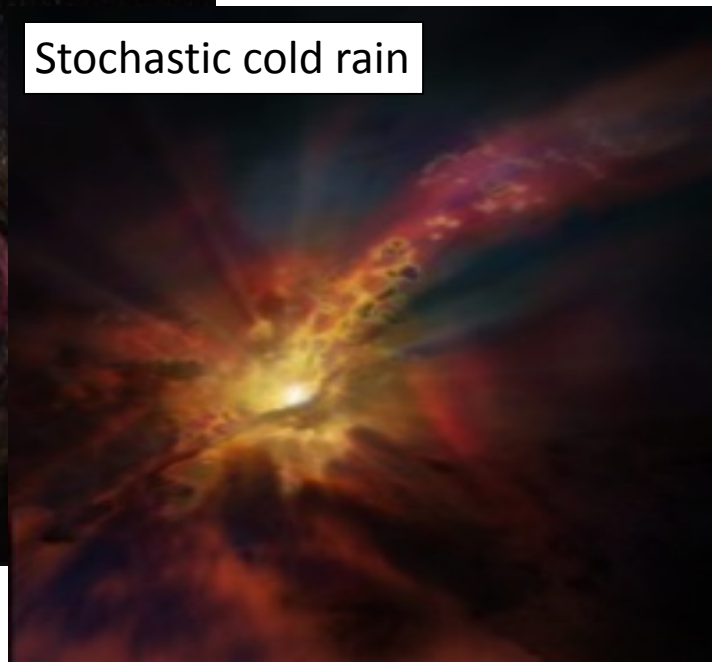
Mode of Accretion



P. Barai et al, 2011, MNRAS, 418, 591

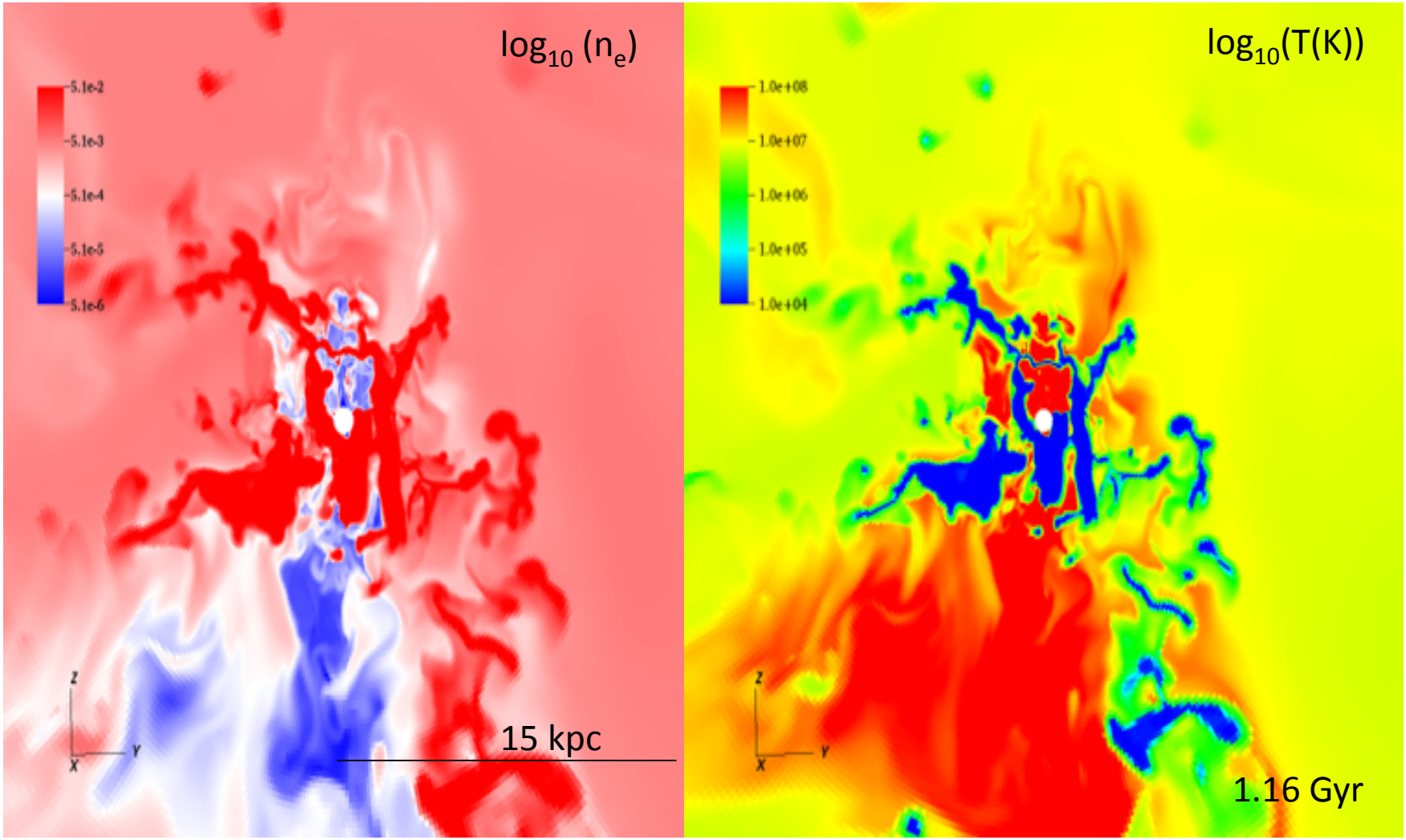


Credit:NASA/Dana Berry, SkyWorks Digital

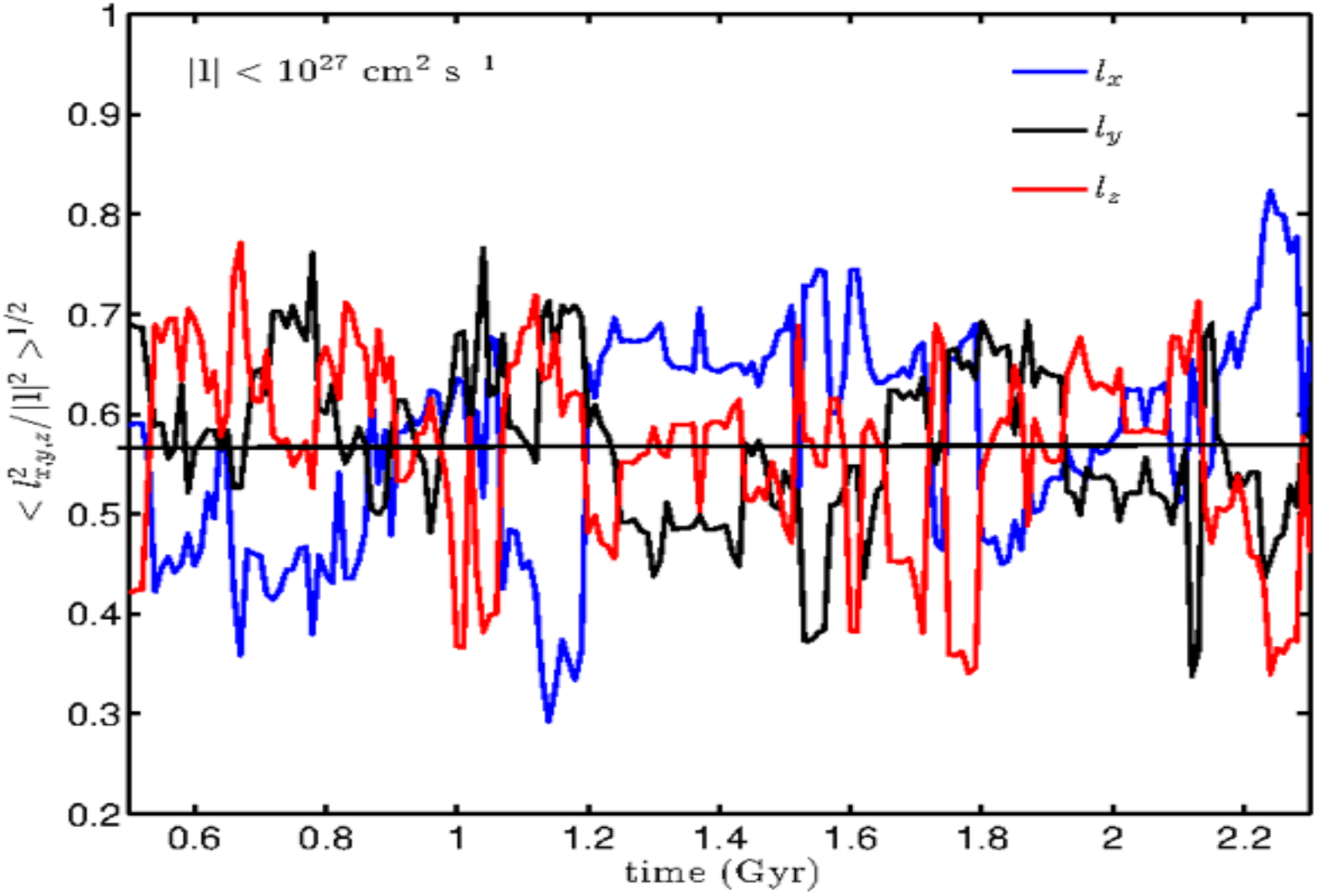


Credit: NRAO/AUI/NSF; D Berry/SkyWorks; ALMA

Infalling Gas in Our Simulation



Stochastic Low Angular Momentum Cold Gas



Summary

- Cold mode AGN feedback control the catastrophic cooling flow in galaxy groups.
- AGN Feedback is unable to change the baryon fraction within R_{200} dramatically.
- Different observables like jet power, cold gas mass, entropy etc evolve similar to galaxy clusters.
- Accretion of cold gas is stochastic with formation of no galactic scale disc.

THANKS !