

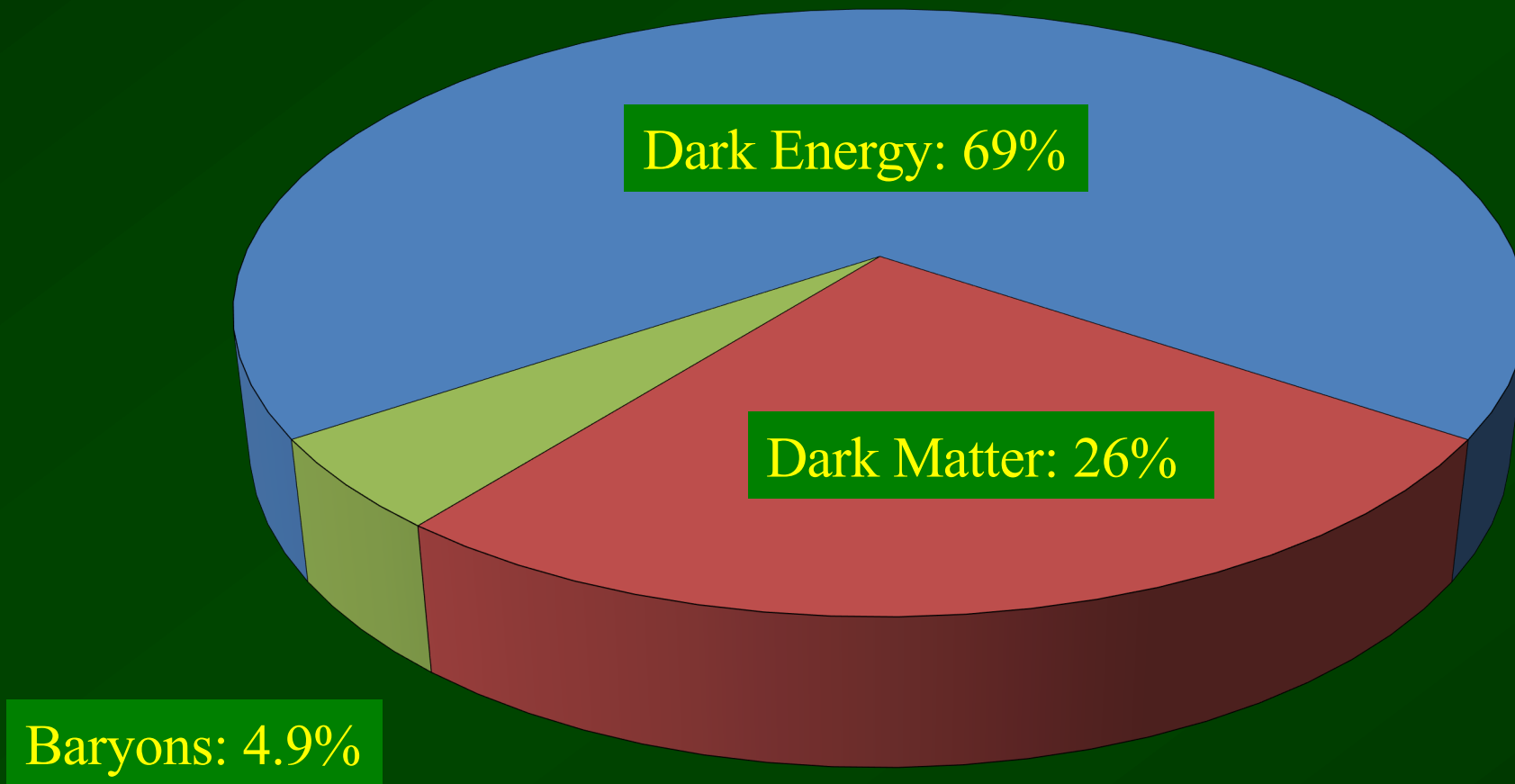
Cosmology 2

Week 9

Prof. Rennan Barkana

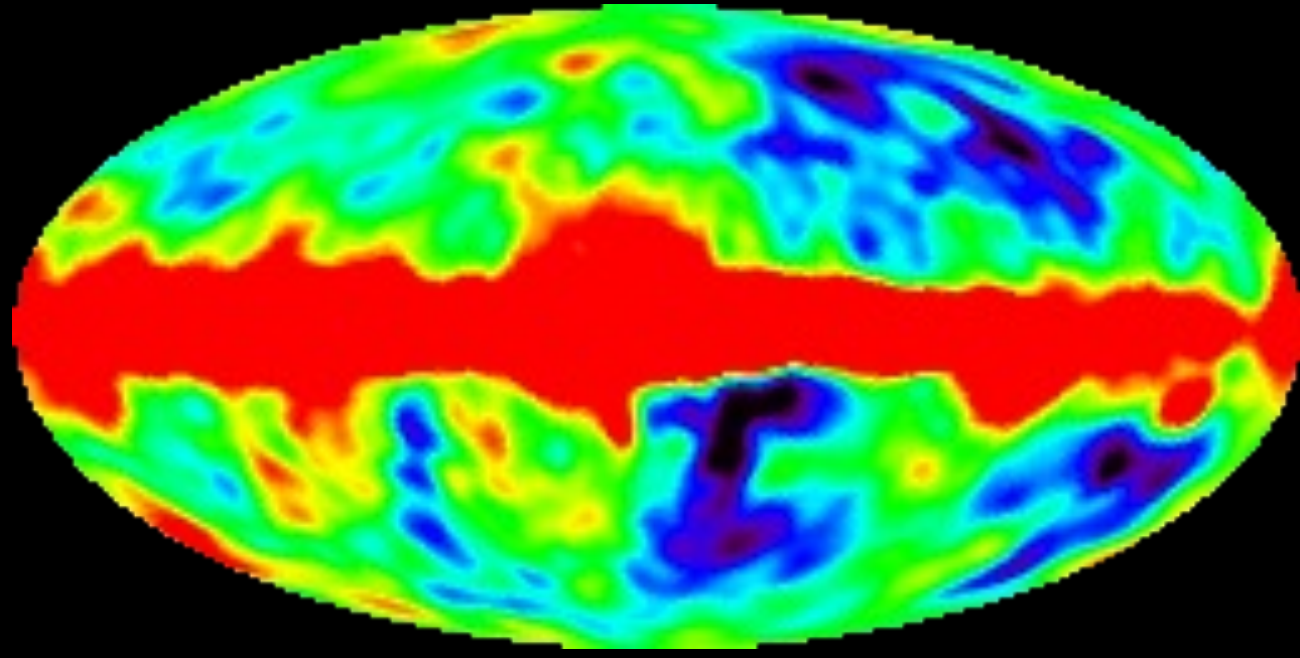
<http://wise-obs.tau.ac.il/~barkana/cosmology2.html>

Cosmological Pie

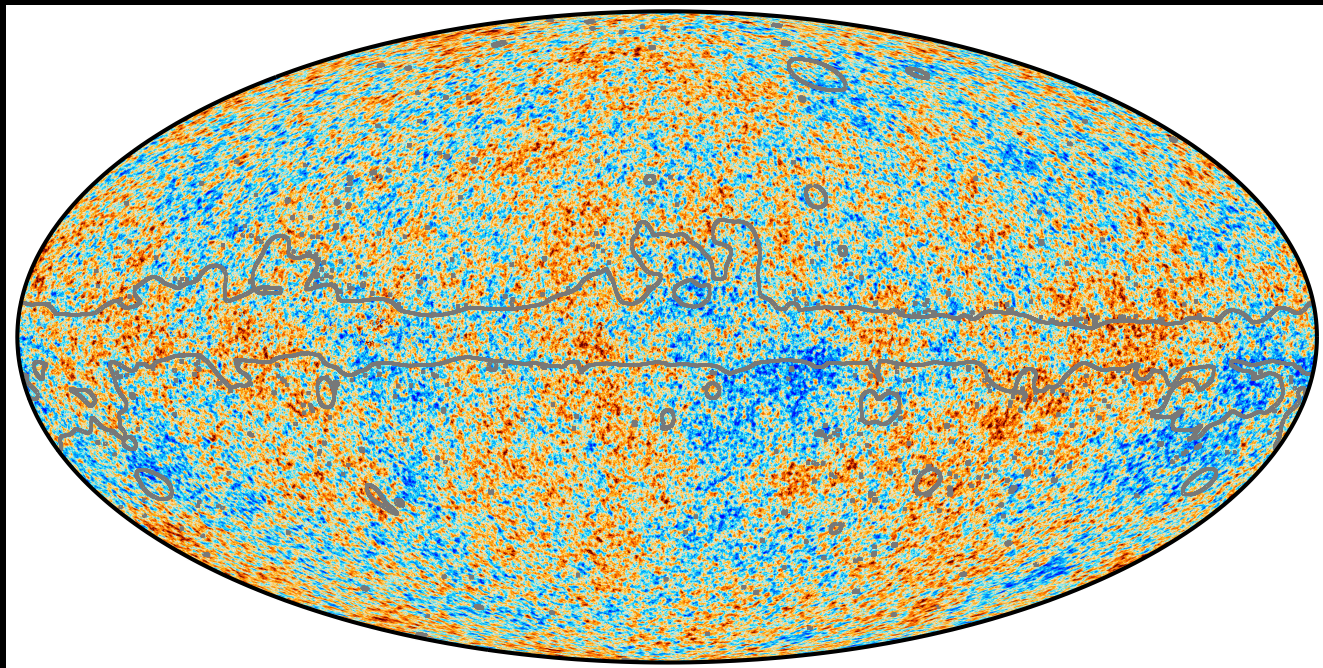


CMB: 2D temperature map, 10^{-5} fluctuations

COBE
1992



Planck
2018



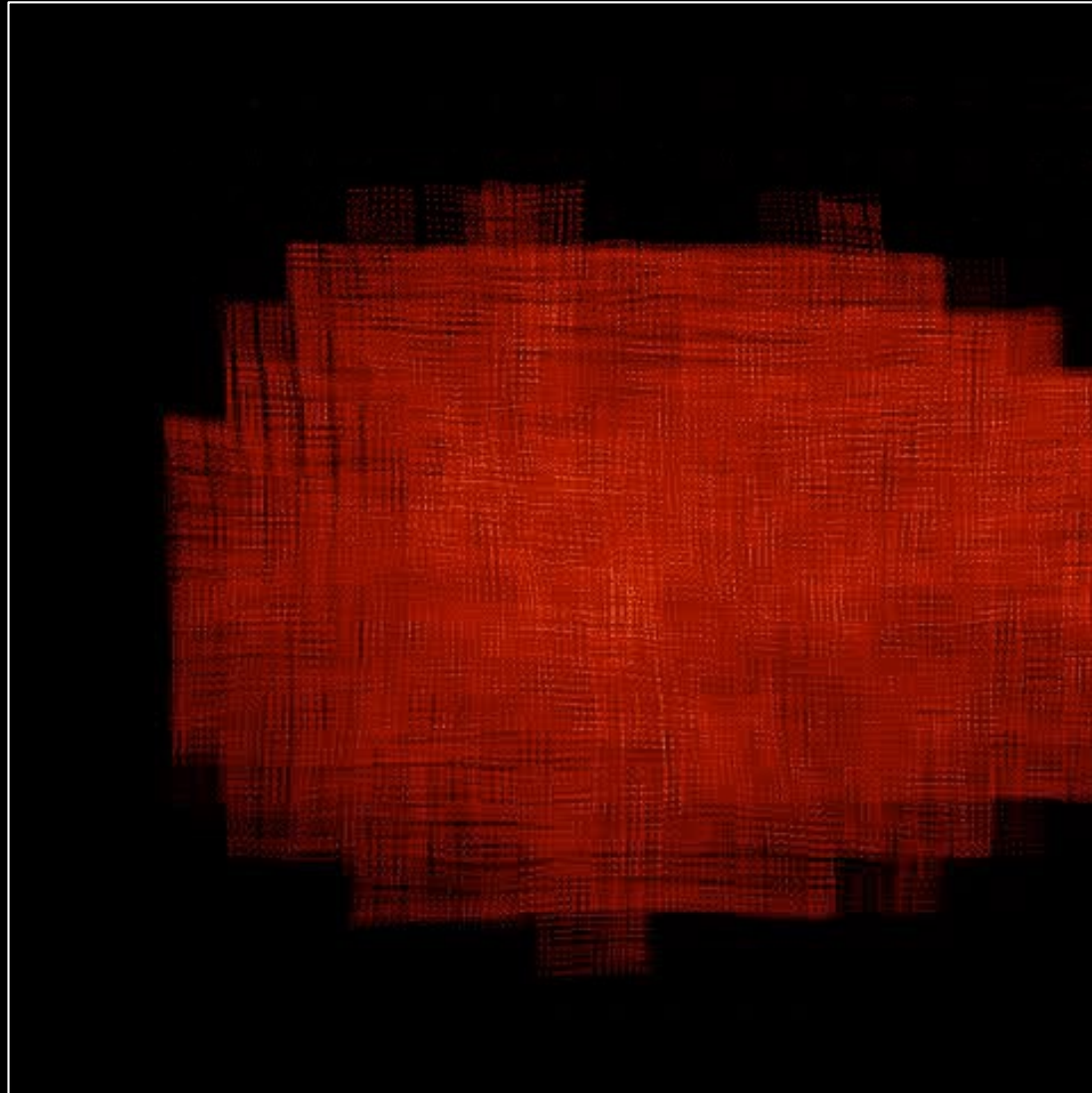
-300

300 μK

Hierarchical Galaxy Formation:

CDM

20 kpc box

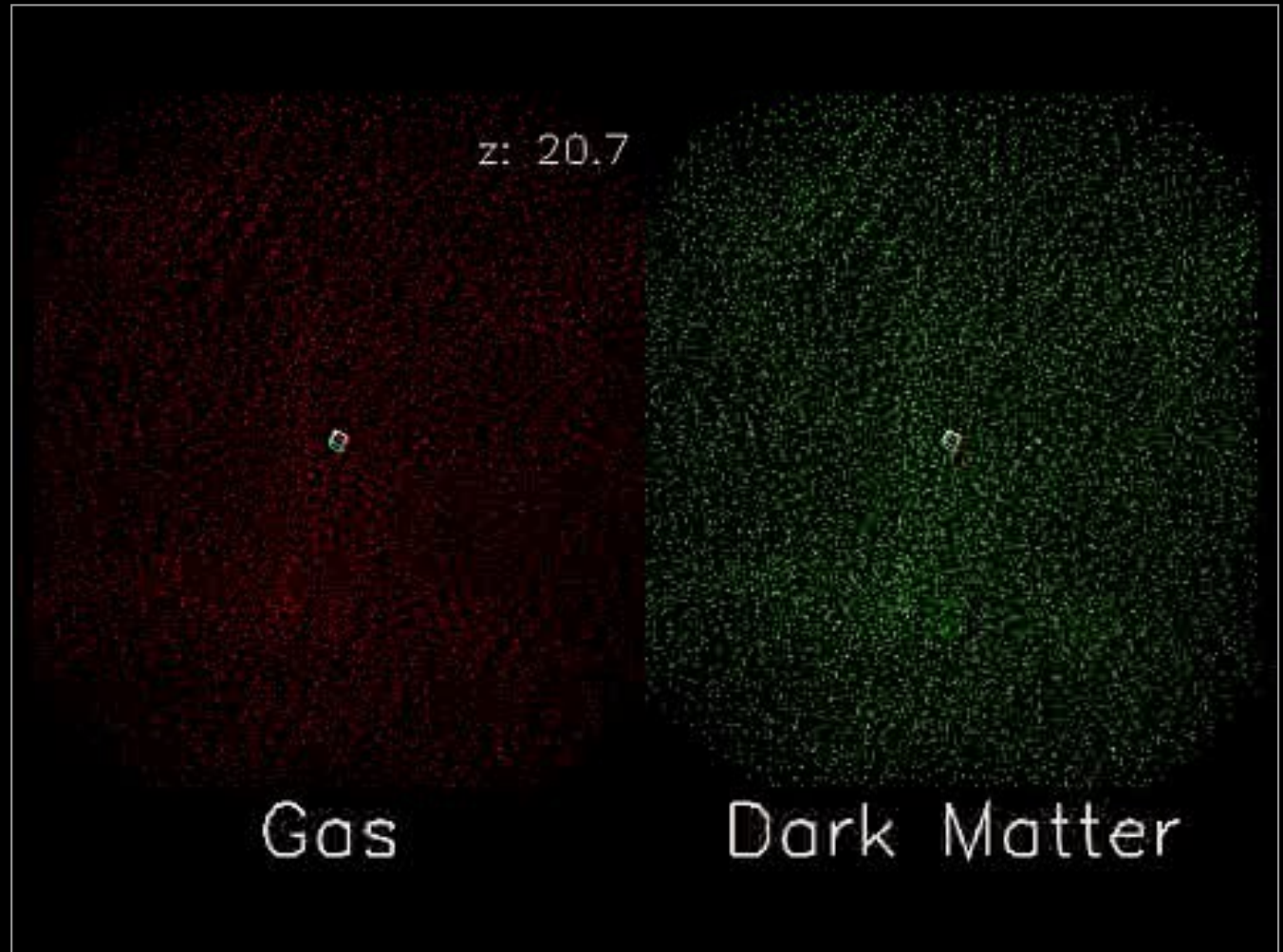


Credits: Matthias Steinmetz

<http://www.aip.de/People/MSteinmetz/E/movies.html>

Hierarchical Galaxy Formation:

CDM

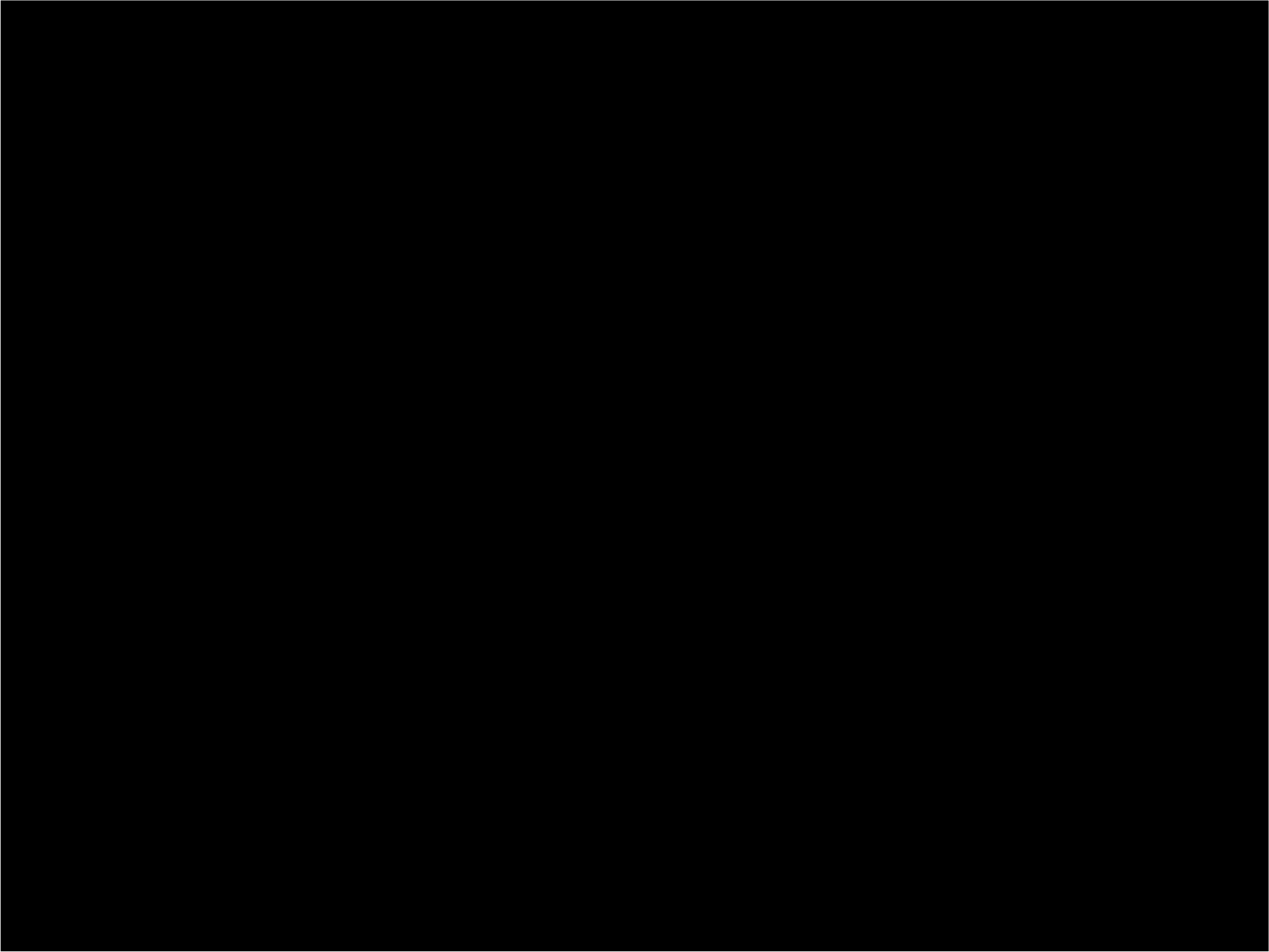


Credits: Matthias Steinmetz

<http://www.aip.de/People/MSteinmetz/E/movies.html>

The universe today:

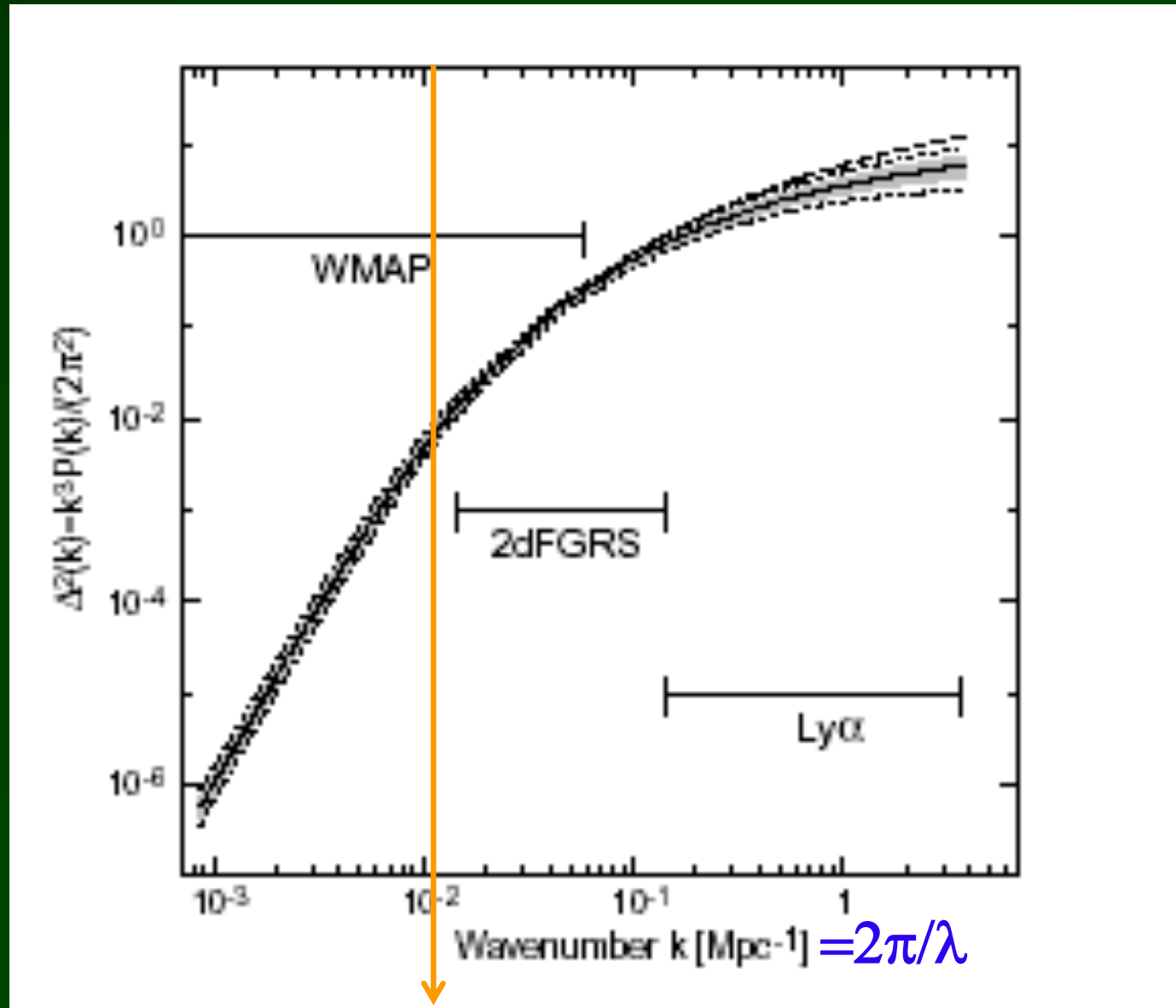
<http://www.mpa-garching.mpg.de/galform/millennium/>



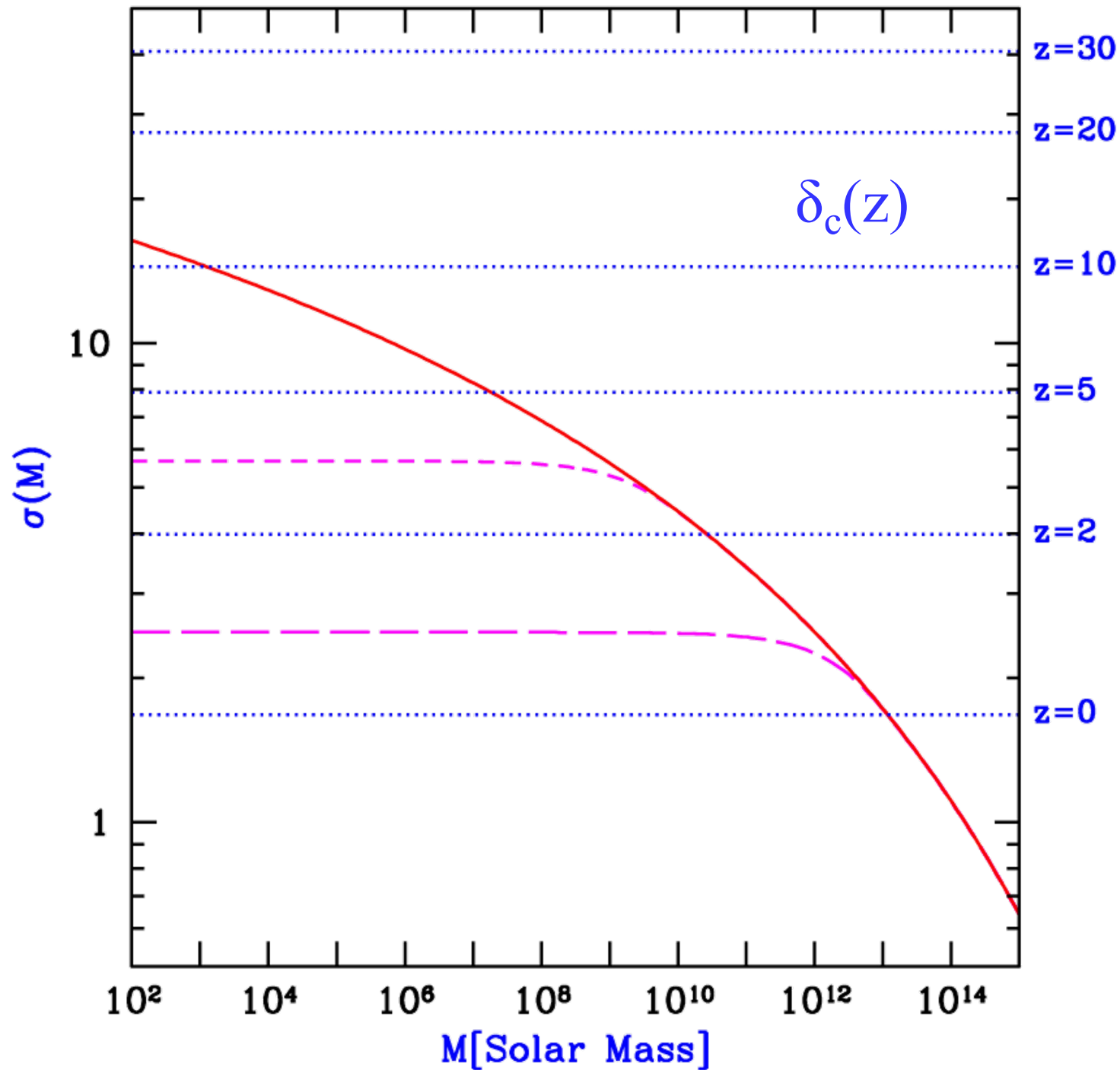
Formation of a galaxy cluster:

http://www.mpa-garching.mpg.de/galform/data_vis/

Power spectrum of fluctuations

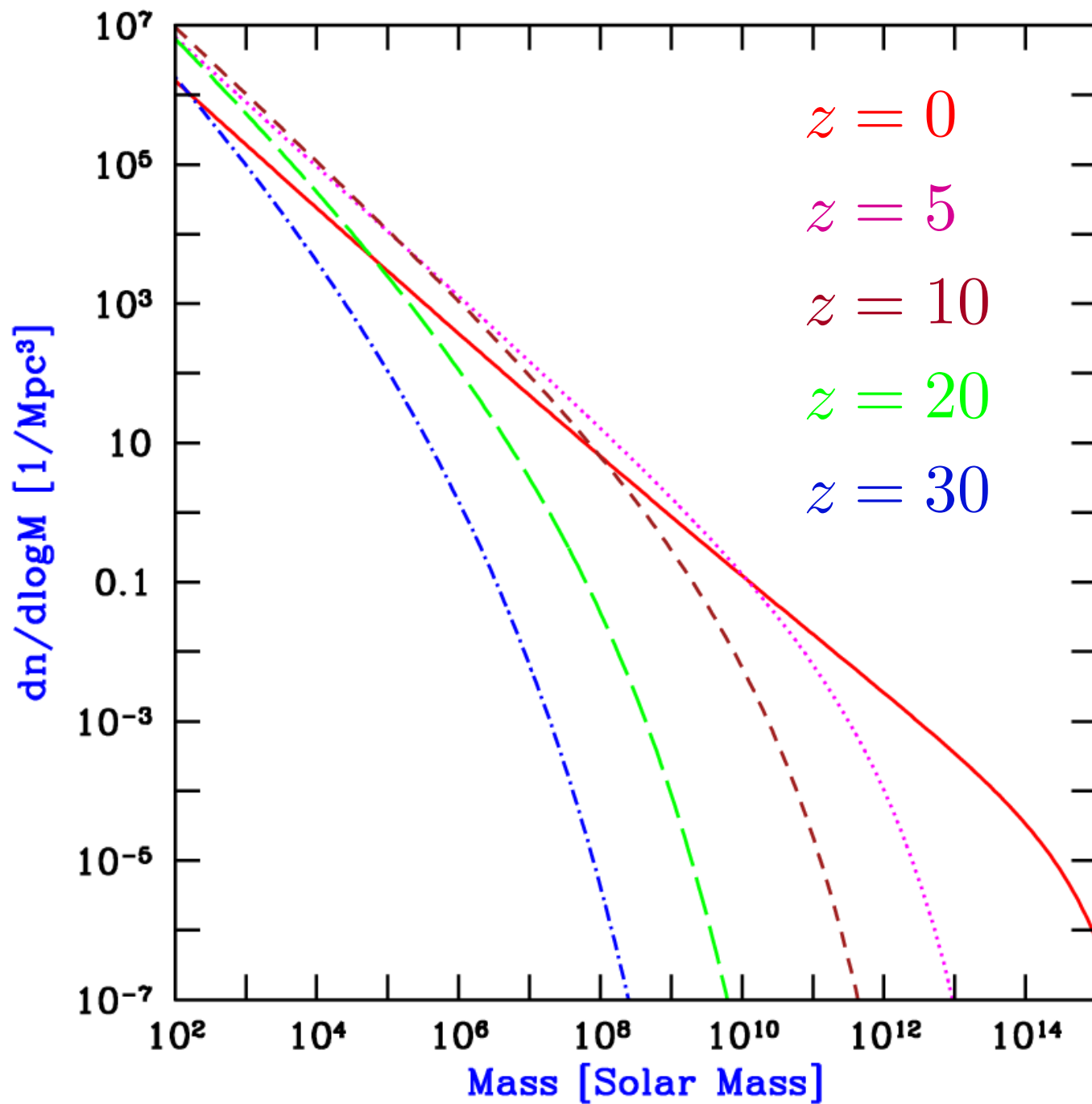


horizon cH^{-1} at matter-radiation equality



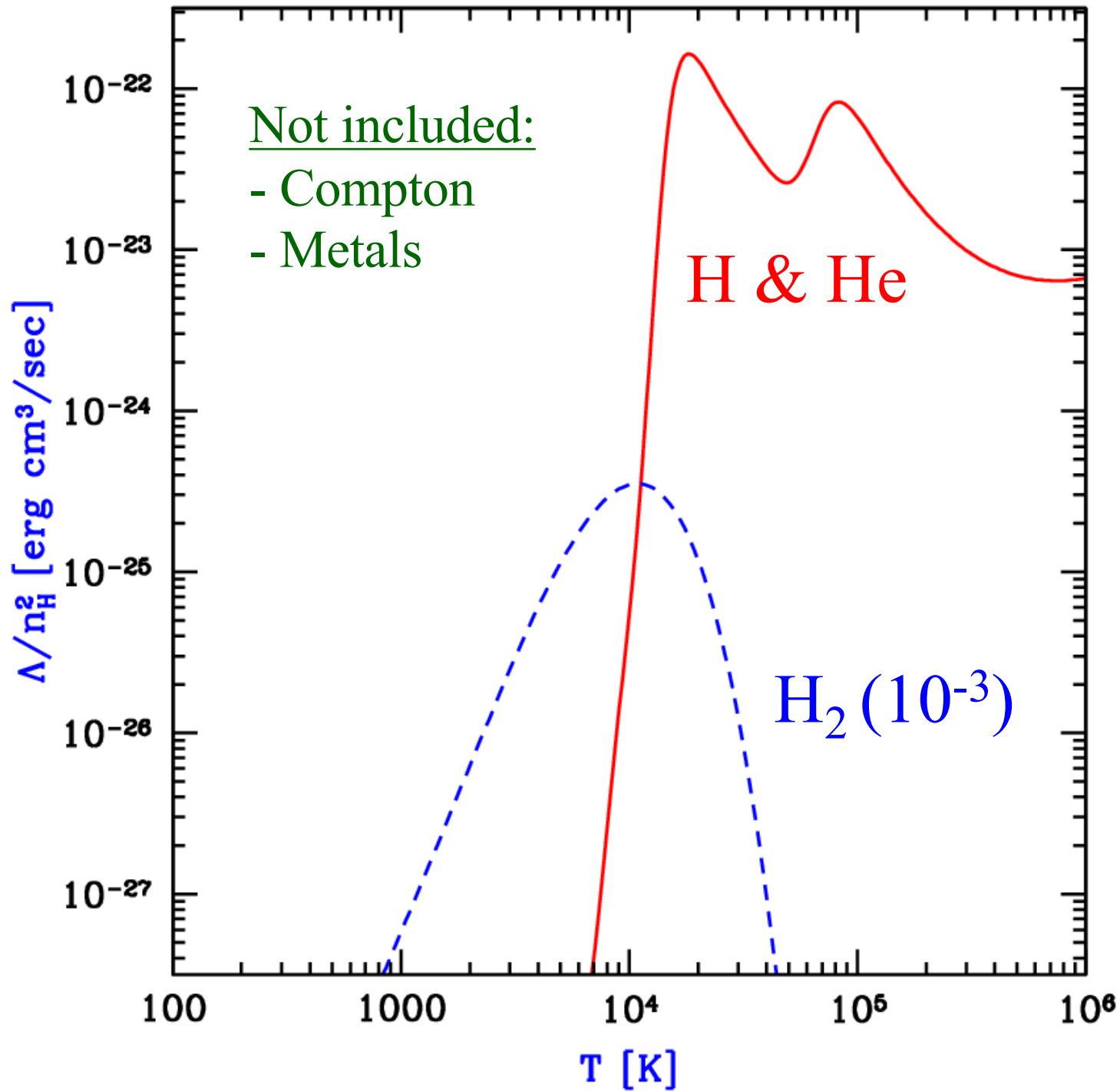
**Typical
fluctuations
compared
with the
critical value**

**Barkana
& Loeb
2001**



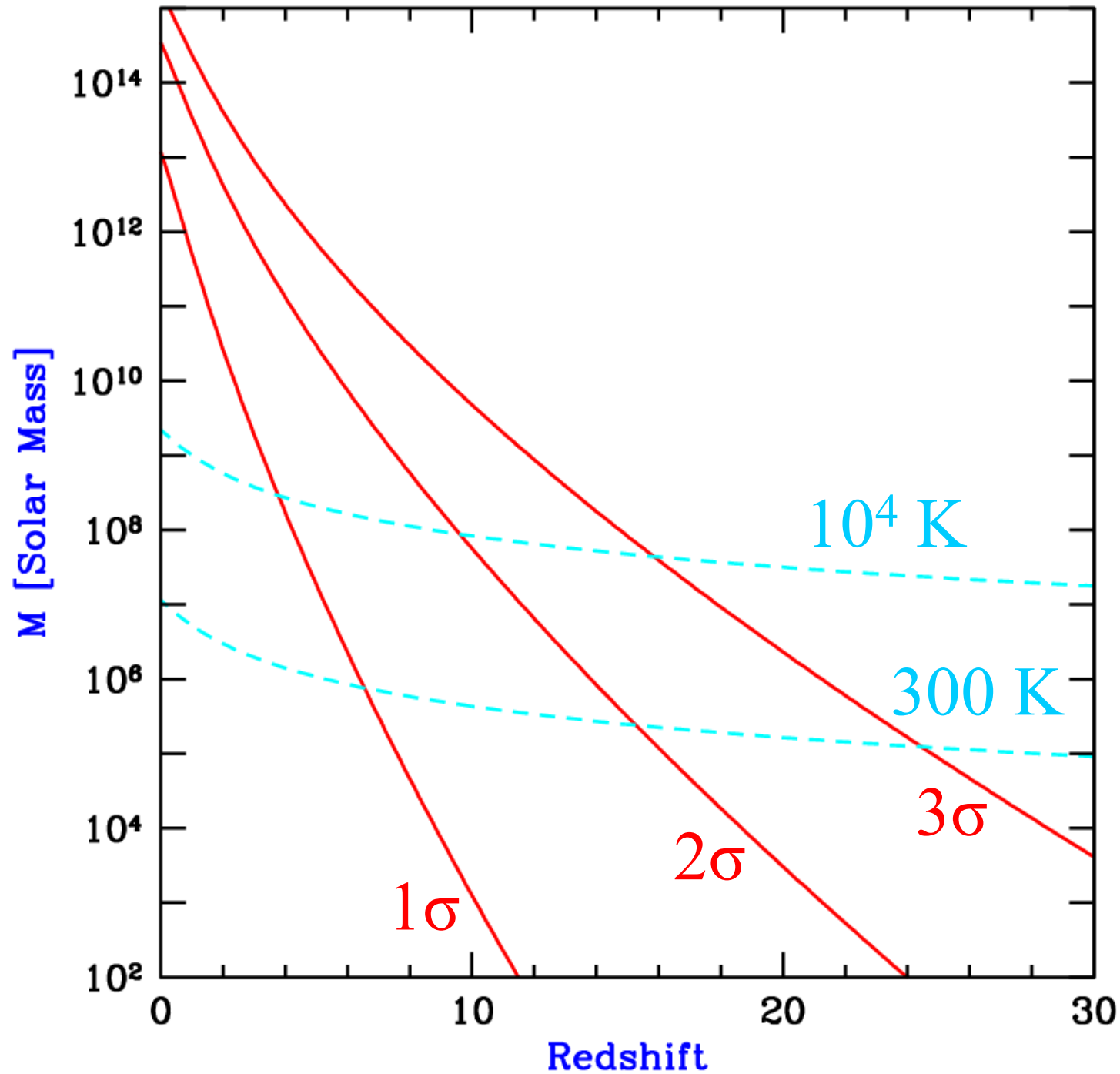
**The
Press-
Schechter
halo mass
function**

**Barkana
& Loeb
2001**



**Cooling
 rate of a
 primordial
 cosmic gas**

**Barkana
 & Loeb
 2001**



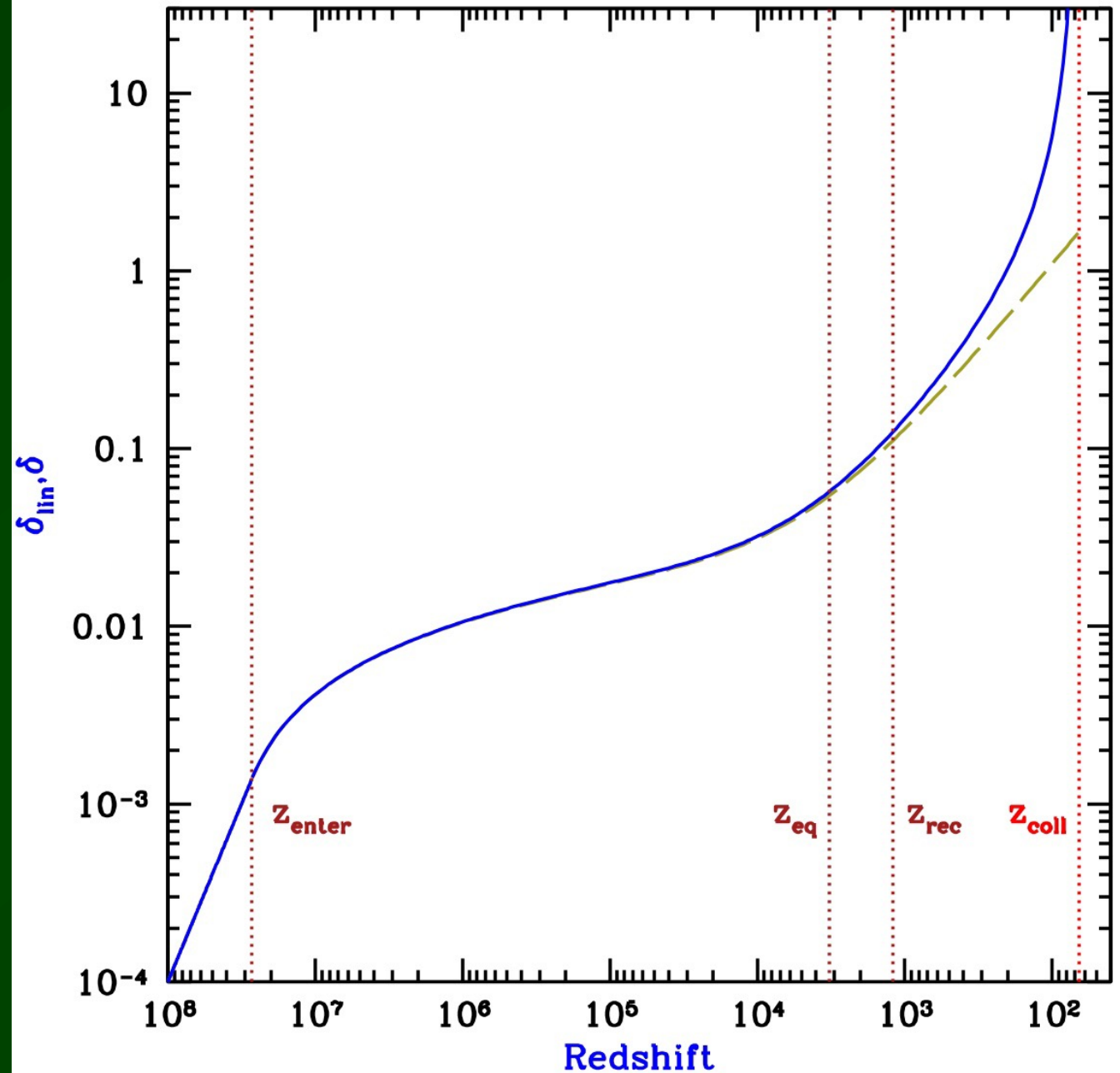
**Galactic
halos**

**Barkana
& Loeb
2001**

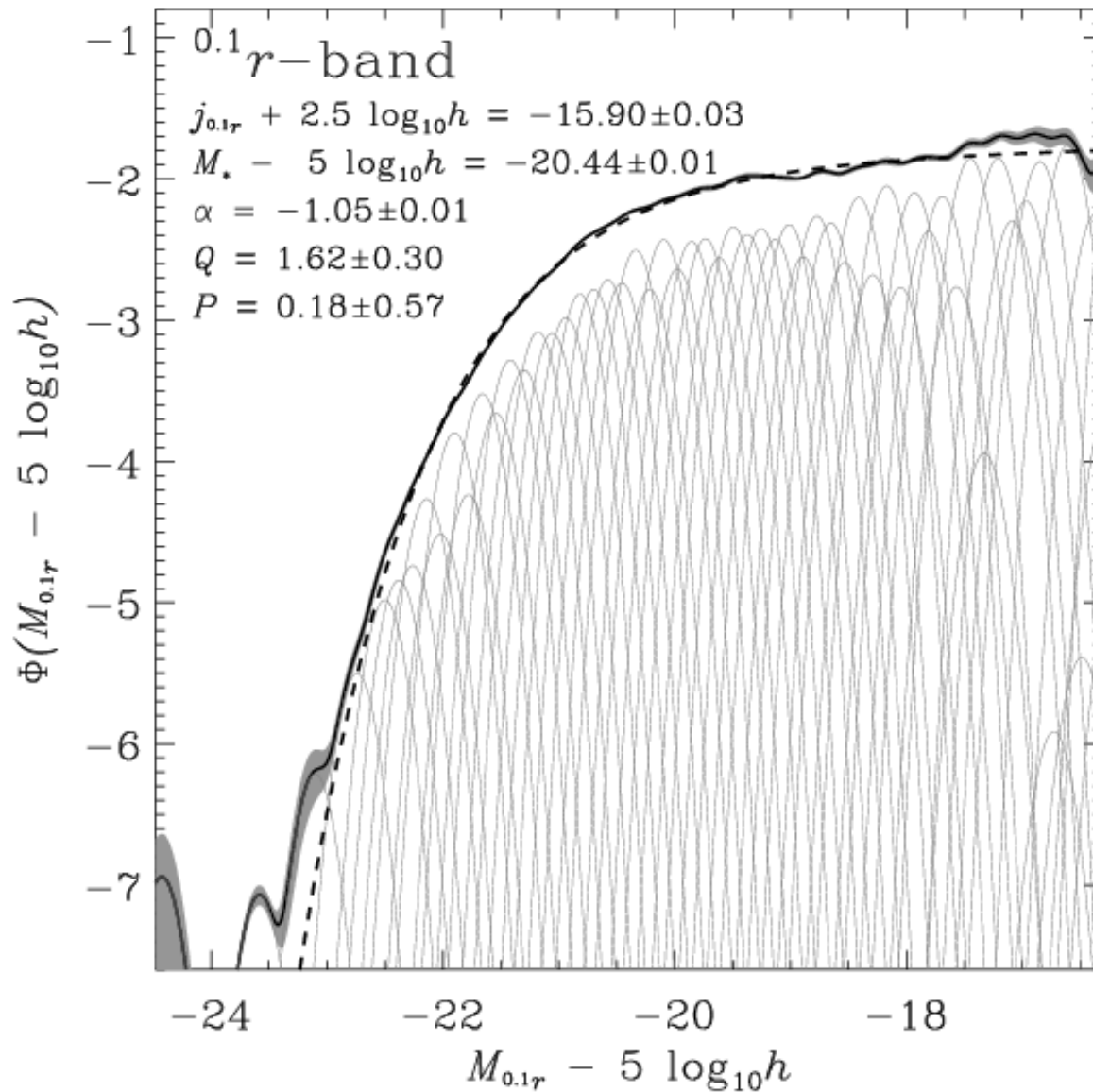
The First Star (theory)

The second
star: feedback

Naoz, Noter,
& RB (2006)



Galaxy Luminosity Function



Sloan Digital
Sky Survey:
148,000
galaxies

Blanton
et al.
2003