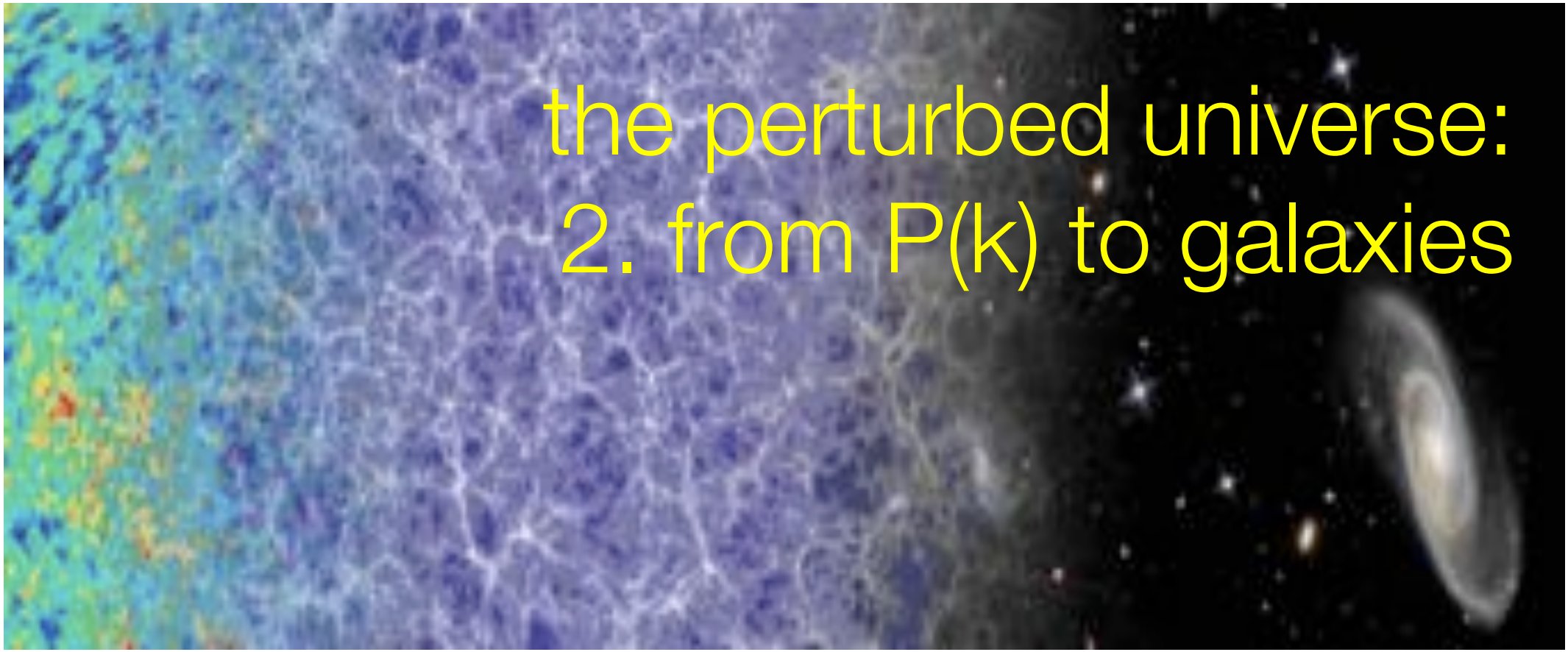

the perturbed universe: 2. from P(k) to galaxies

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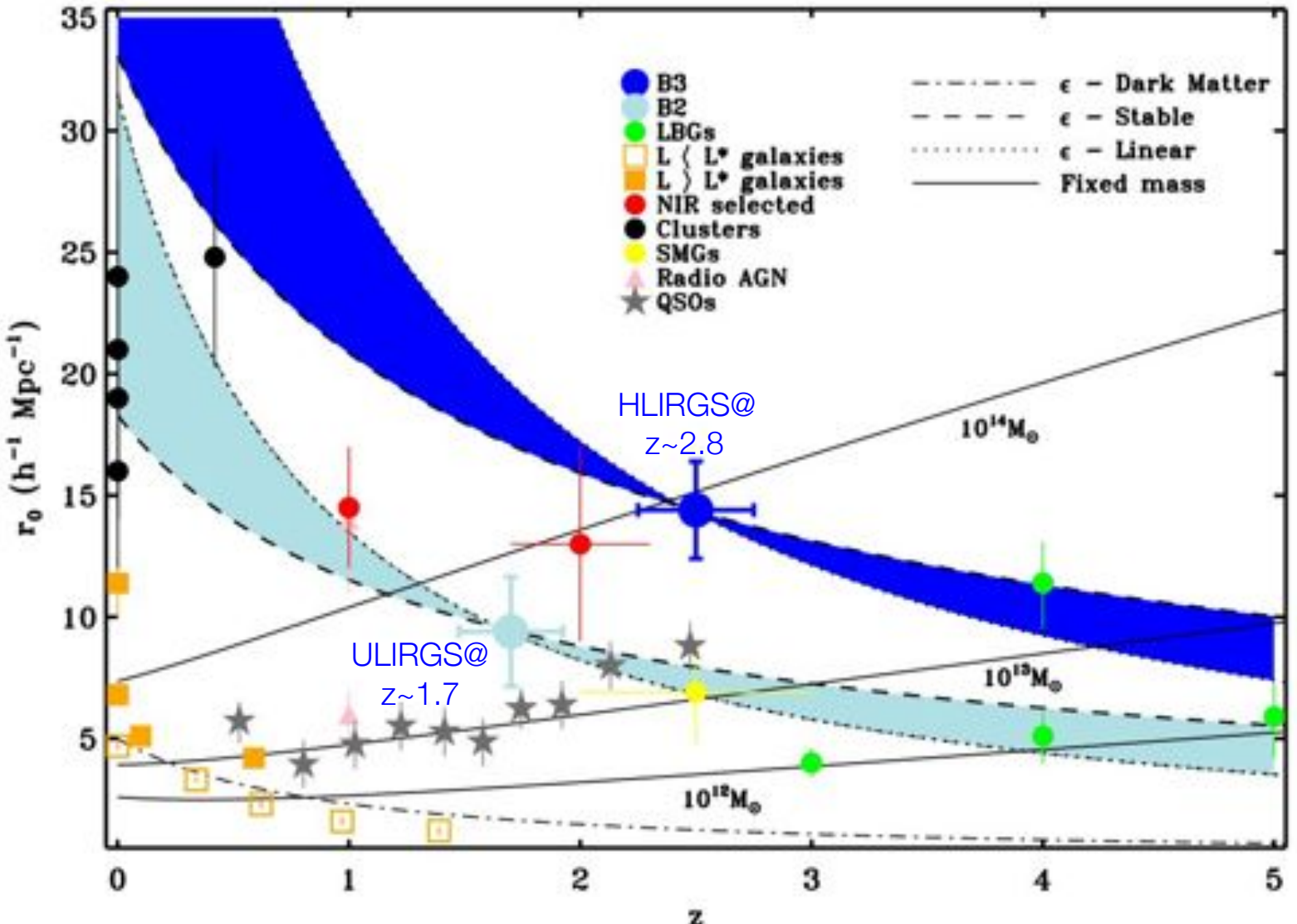
http://www.ias.u-psud.fr/dole/m2.php

Montage: CMB, LSS, galaxies: SPACE

I. Correlation function of galaxies and bias

2. Correlation Function

3D correlation function of galaxies



Overzier et al., 2003, A&A; Farrah et al., 2006

correlation lengths of galaxies

CFHTLS
100000 redshifts

McCracken et al., 2008
astro-ph/0711.4204

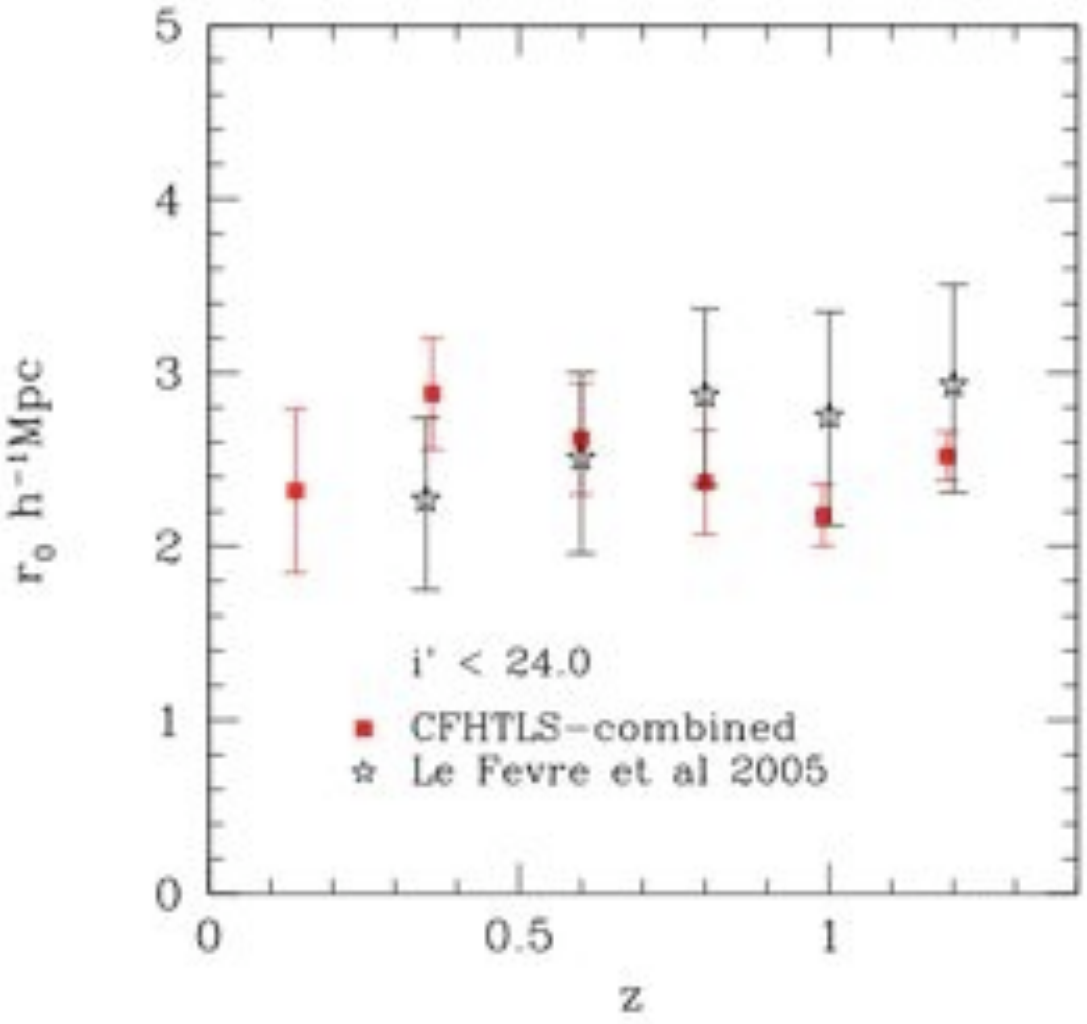
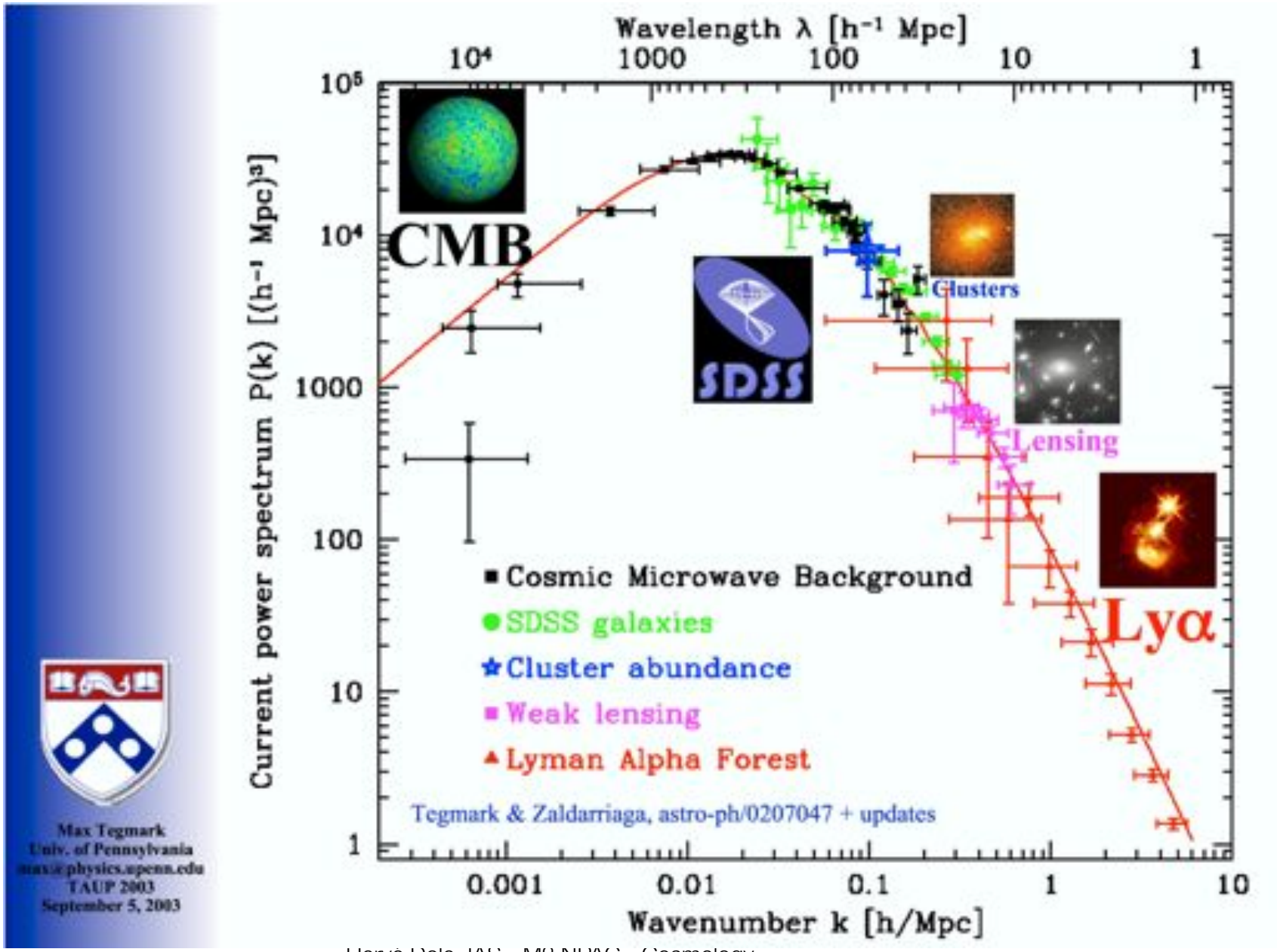


Fig. 3. The comoving correlation length, r_0 as a function of redshift for the four combined CFHTLS fields (filled squares) compared to literature values (open symbols) com-

I. Correlation function of galaxies and bias

3. P(k)

P(k)


Wavelength λ [h⁻¹ Mpc]
10⁴
1000
100
10
1
10⁵
10⁴
1000
100
10
1
Current power spectrum P(k) [(h⁻¹ Mpc)³]
CMB
SDSS
Clusters
Lensing
Lyα
Cosmic Microwave Background
SDSS galaxies
Cluster abundance
Weak lensing
Lyman Alpha Forest
Tegmark & Zaldarriaga, astro-ph/0207047 + updates
0.001
0.01
0.1
1
10
Wavenumber k [h/Mpc]
Max Tegmark
Univ. of Pennsylvania
TAUP 2003
September 5, 2003

I. Correlation function of galaxies and bias

4. Angular Correlation Function

angular correlation function

CFHTLS
100000 redshifts

McCracken et al., 2008
astro-ph/0711.4204

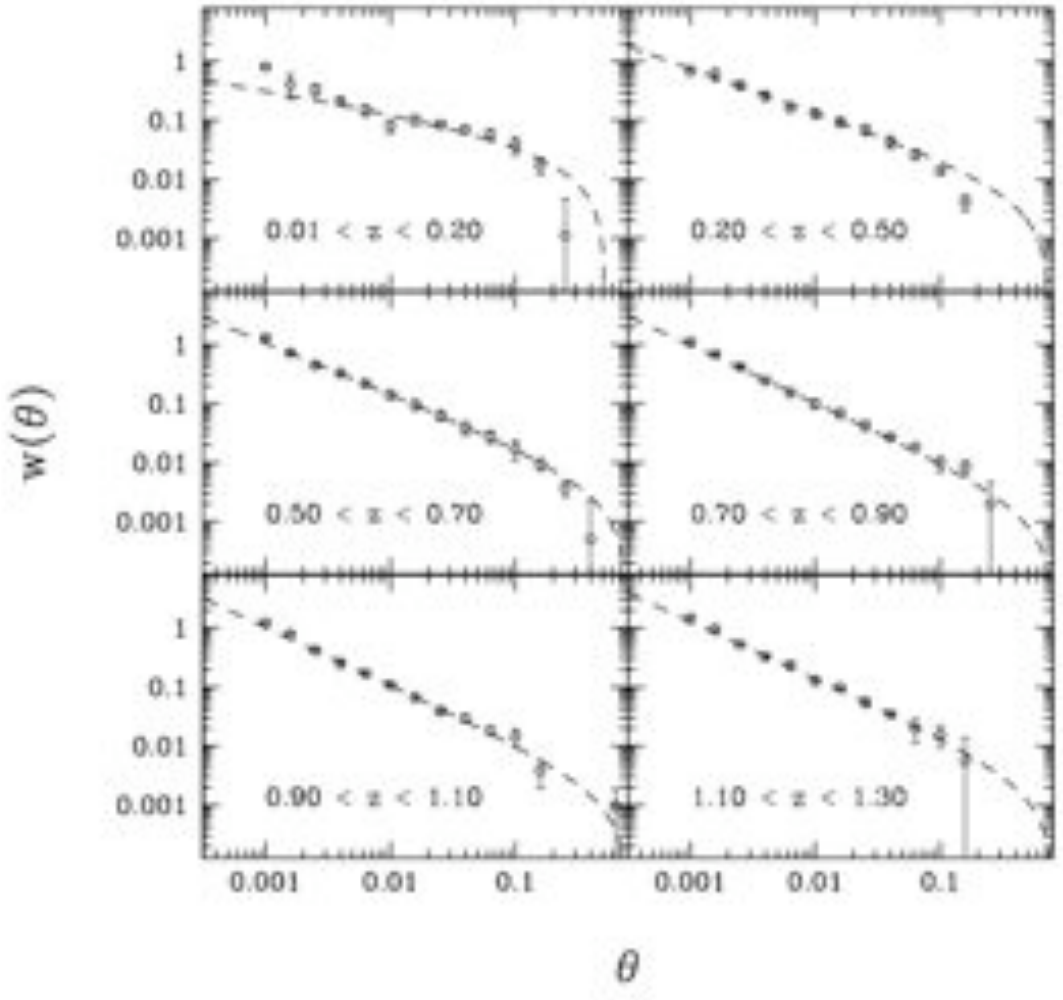


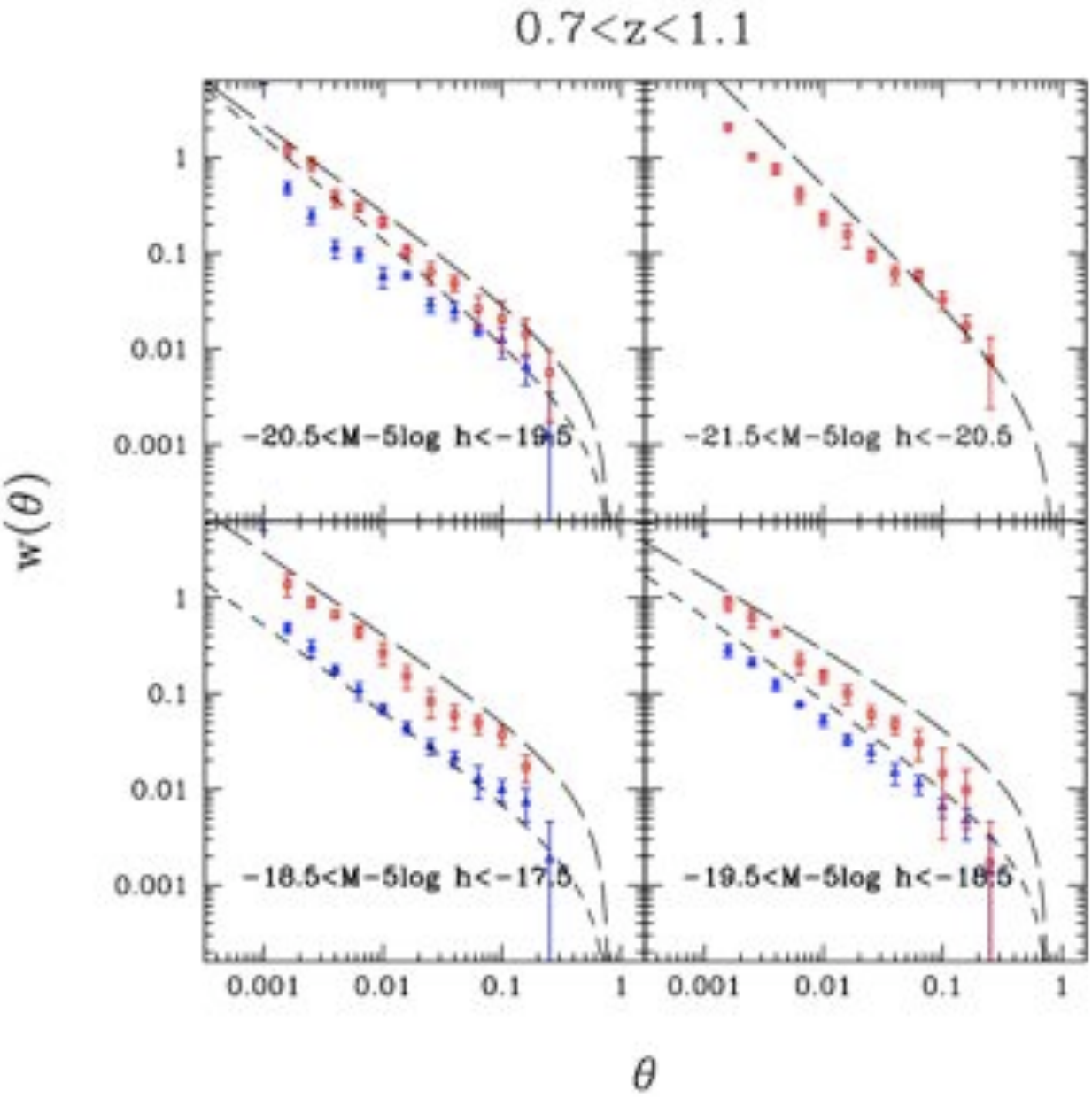
Fig. 2. The amplitude of the angular correlation w as a function of angular separation θ (in degrees) for $17.5 < i' < 24$ galaxies selected in the four deep fields of the CFHTLS in a range of redshift slices. The error bars correspond to

angular correlation function

CFHTLS
100000 redshifts

ACF par redshift,
luminosité absolue,
et type (bleu/rouge)

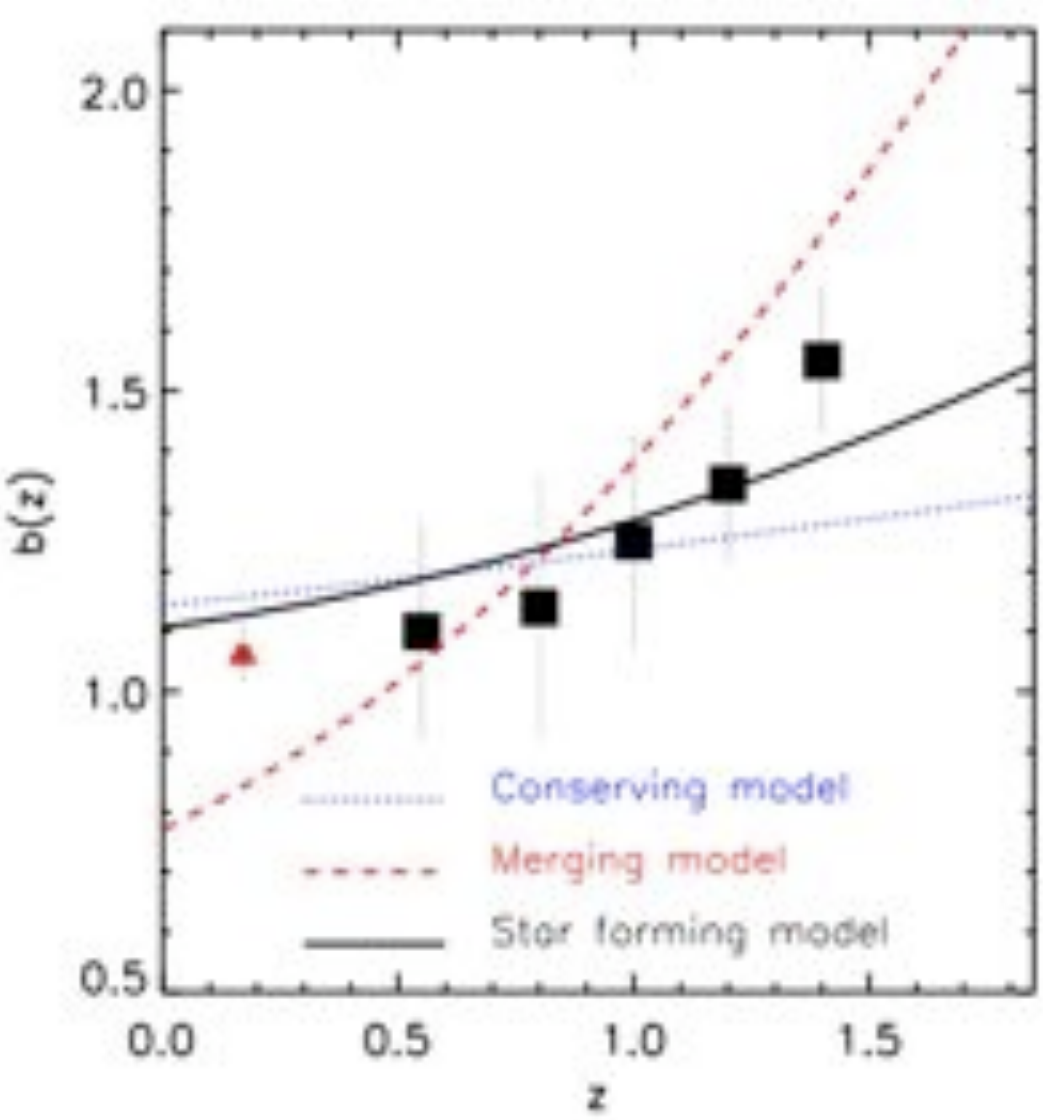
McCracken et al., 2008
astro-ph/0711.4204



I. Correlation function of galaxies and bias

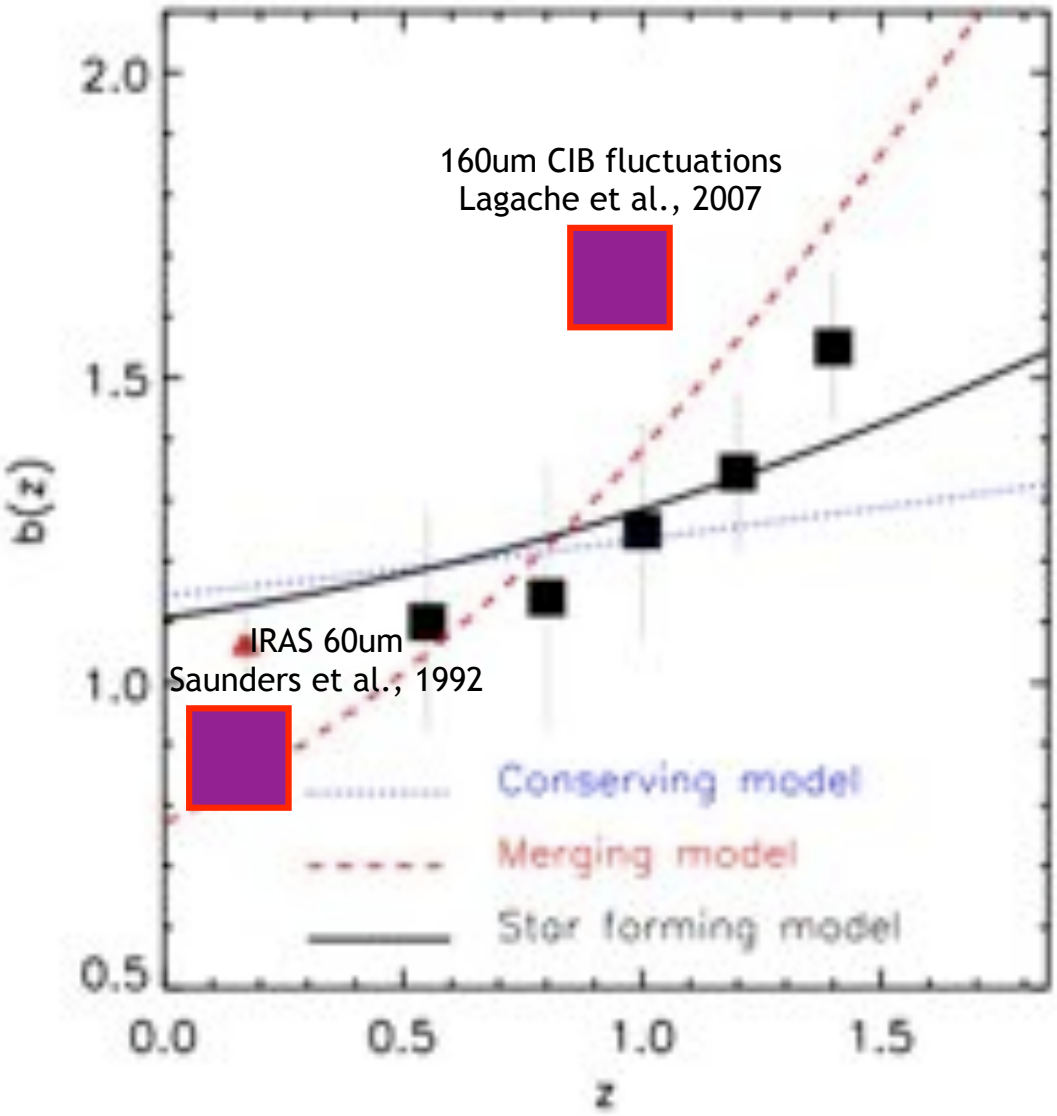
5. Bias galaxies - matter

VVDS: contraintes sur le biais



Marinoni et al., 2005, A&A

Bias of Infrared galaxies

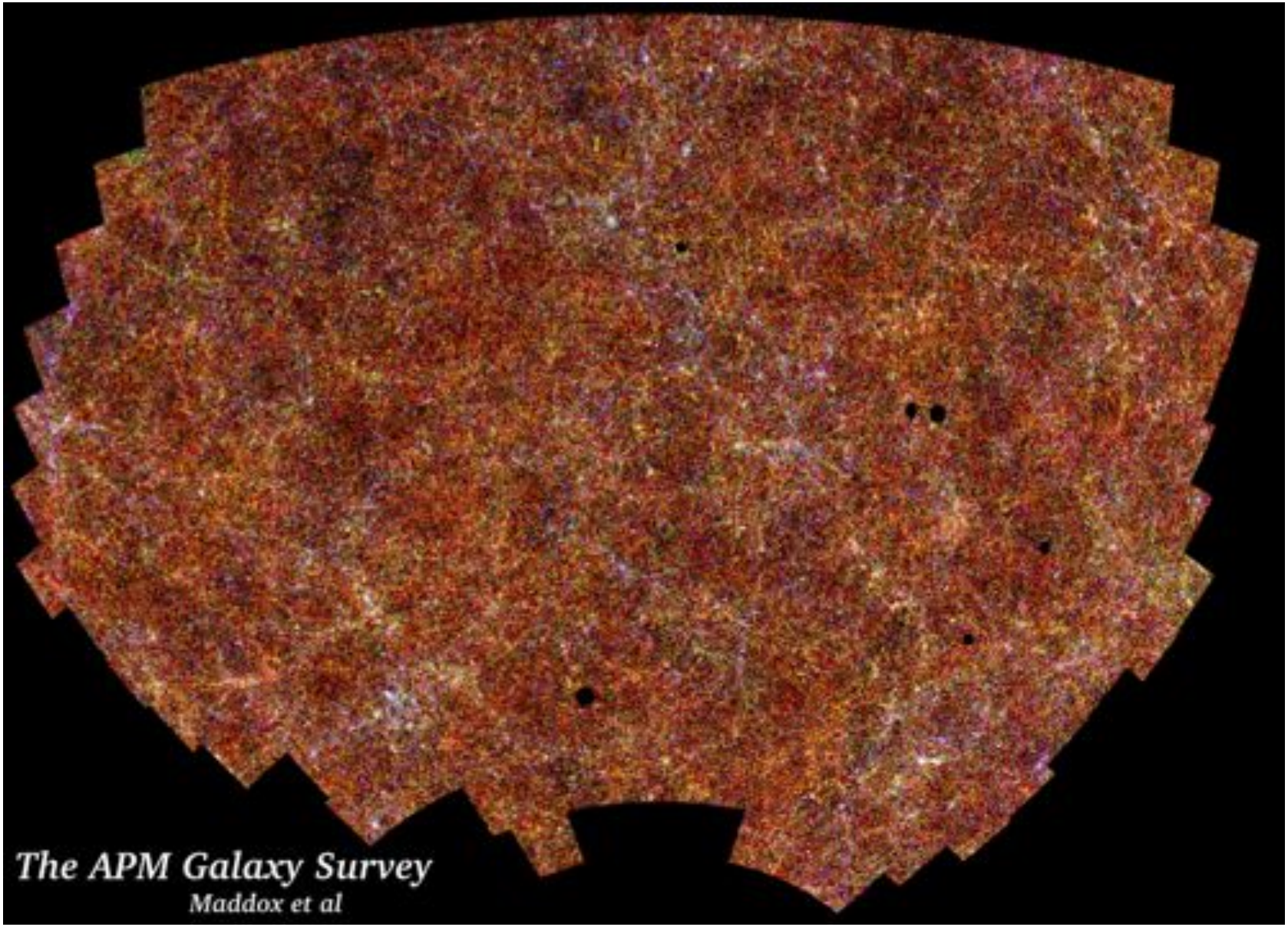


Adapted from Marinoni et al., 2005

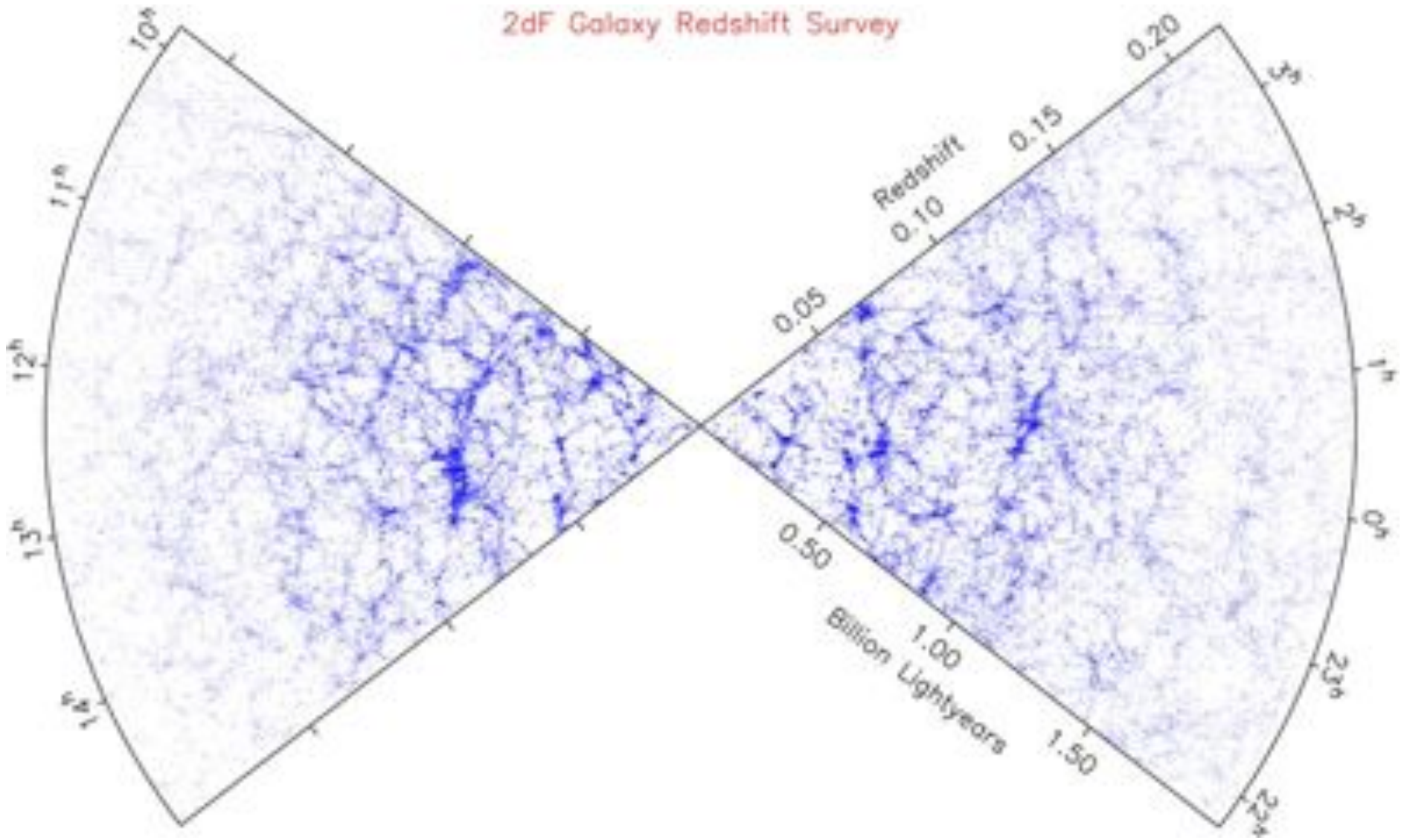
II. Observations

1. Galaxy surveys

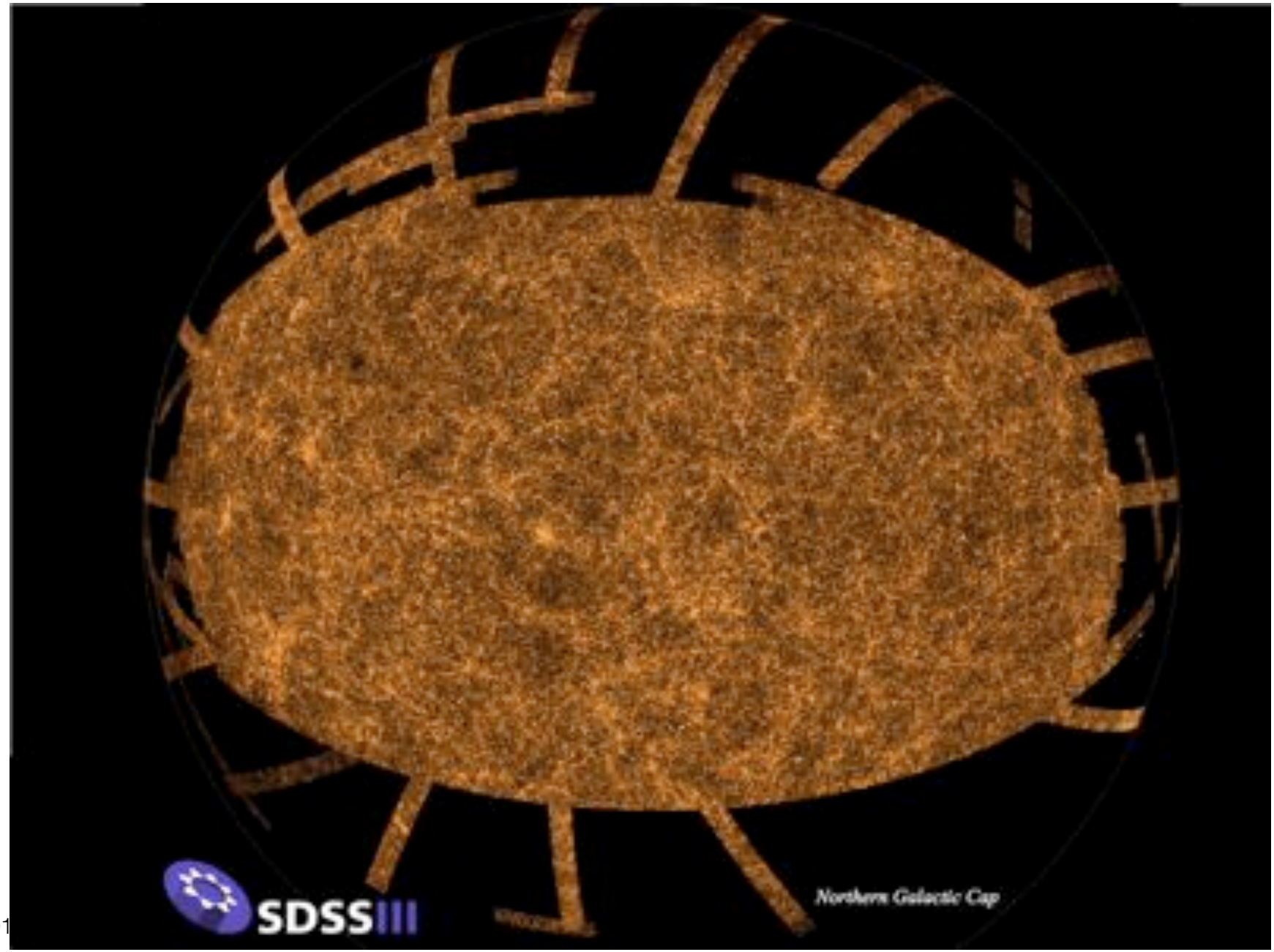
photométrique survey APM, 1990



spectroscopic survey 2dF



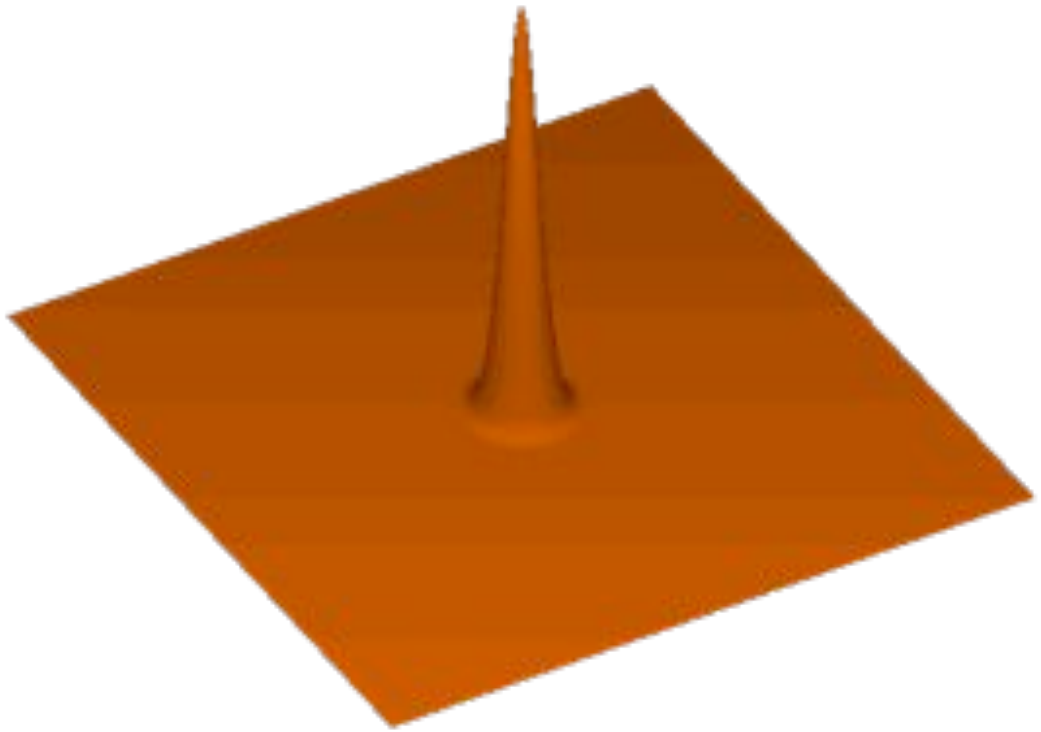
spectro/photometric survey SDSS



II. Observations

2. Baryonic Acoustic Oscillations

BAO: une oscillation



D. Eisenstein, UofA, SDSS, 2005

http://cmb.as.arizona.edu/~eisenste/acousticpeak/

BAO: l'histoire d'un pic

-Densité de la perturbation

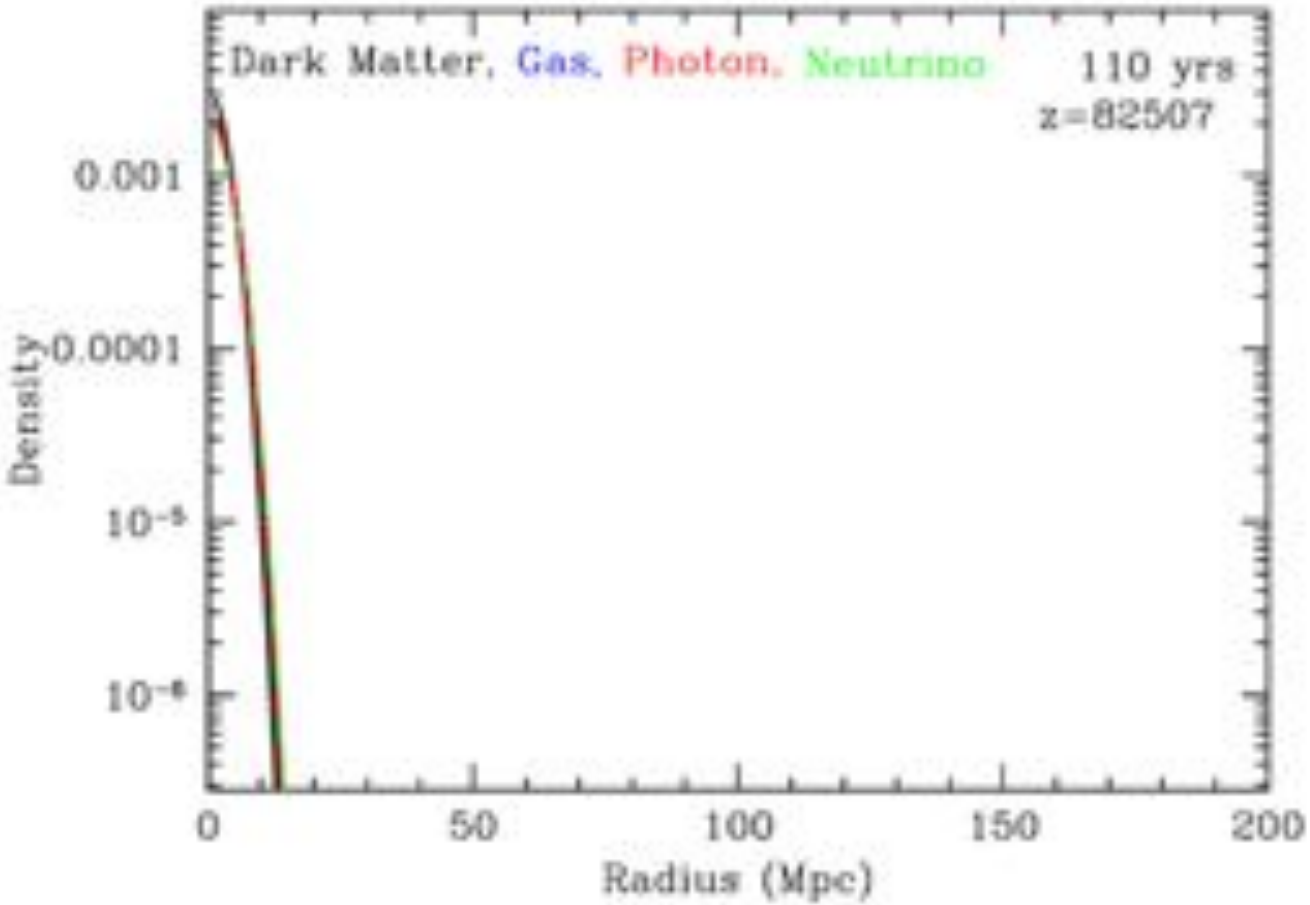
- petite perturbation
- la matière noire évolue selon la gravité
- la densité est dominée par les photons+neutrinos => la matière noire tombe doucement dedans (élargissement)

- les photons commencent à sortir du plasma qui devient neutre (Silk damping) z~1200

-Les photons sont découplés (CMB): le gaz « libre » peut enfin s'effondrer z < 1000
-Vitesse du son diminue

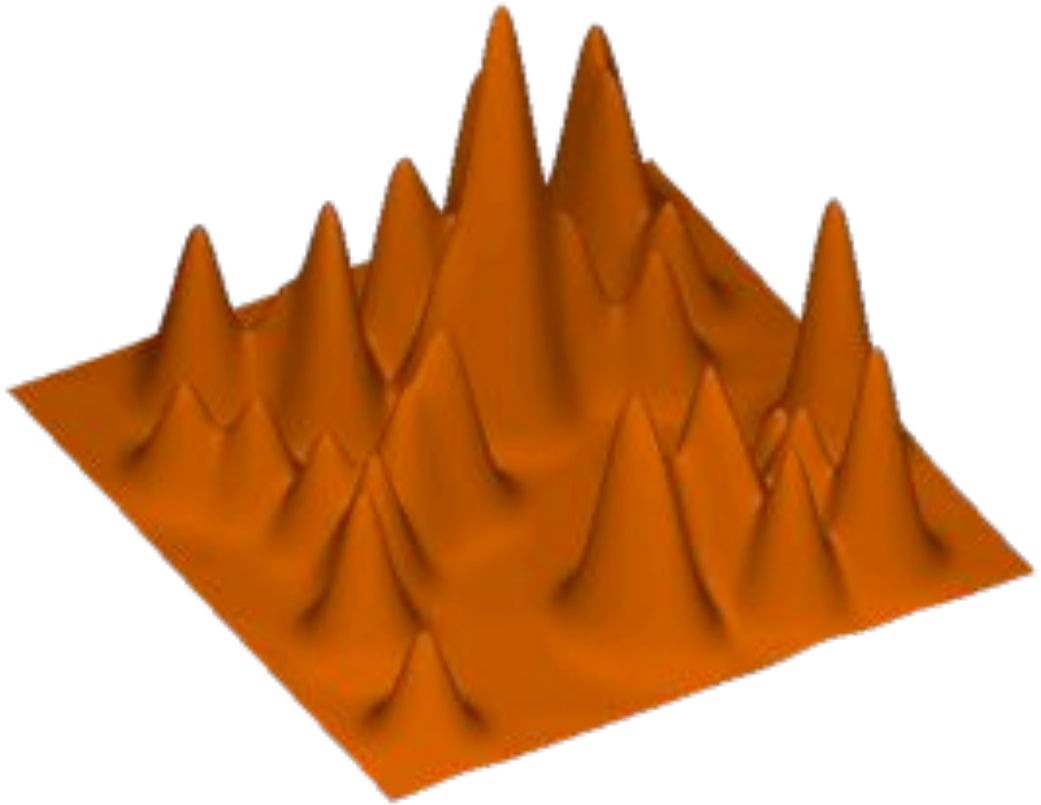
-La matière noire (en surdensité à l'origine) tombe doucement dans les régions surdenses formant une coquille de rayon 150 Mpc; le gaz suit la matière noire et revient aussi en r=0

-Les galaxies se forment plus (1%) dans cette coquille de 150 Mpc: ce sont les pics acoustiques



D. Eisenstein, UofA, SDSS, 2005
http://cmb.as.arizona.edu/~eisenste/acousticpeak/acoustic_physics.html

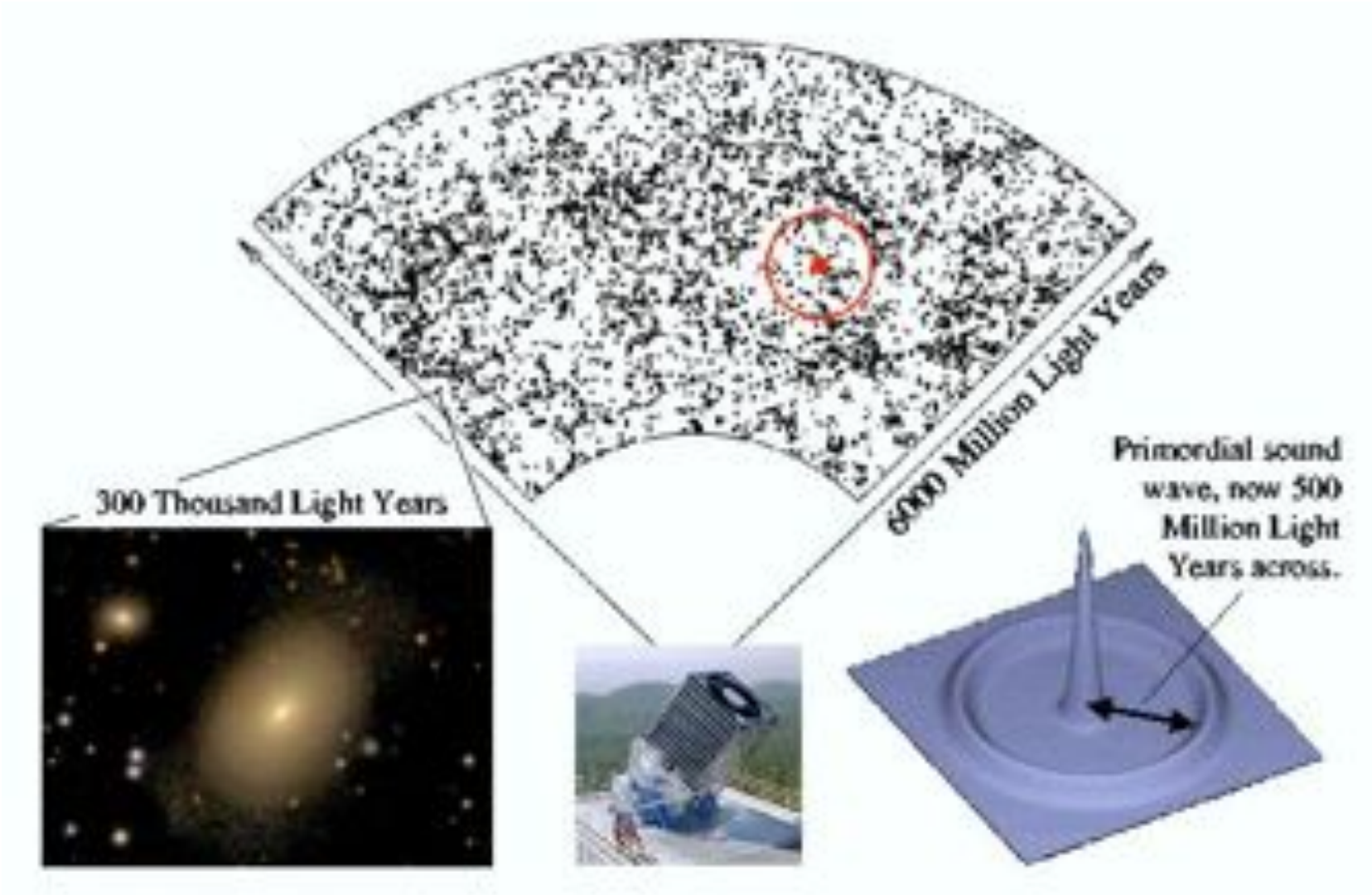
BAO: plusieurs oscillations



D. Eisenstein, UofA, SDSS, 2005

http://cmb.as.arizona.edu/~eisenste/acousticpeak/

BAO: sur le ciel

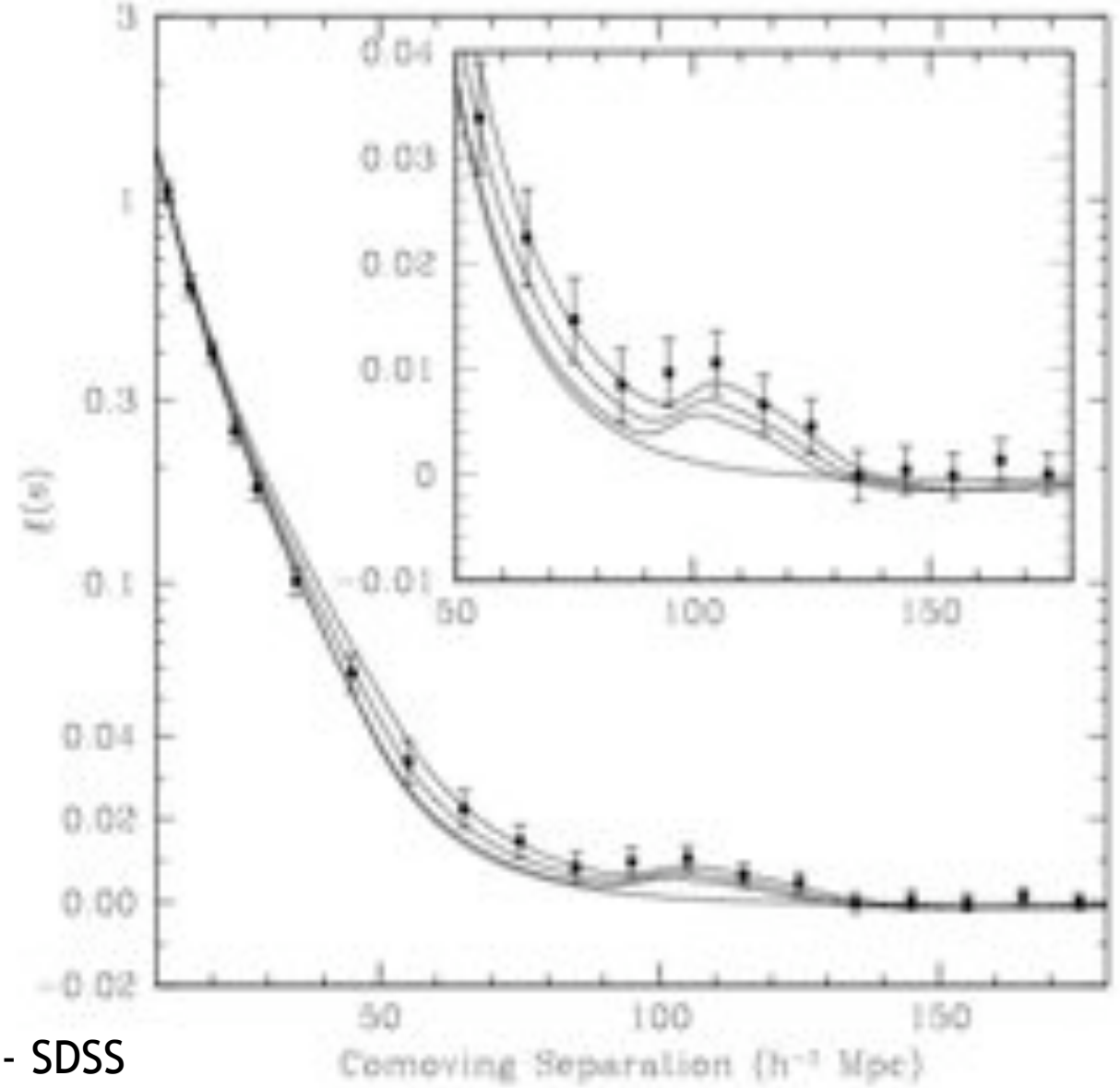


D. Eisenstein, UofA, SDSS, 2005

http://cmb.as.arizona.edu/~eisenste/acousticpeak/

BAO: fonction de corrélation

Quelle distance physique ?



Eisenstein et al., 2005, ApJ - SDSS

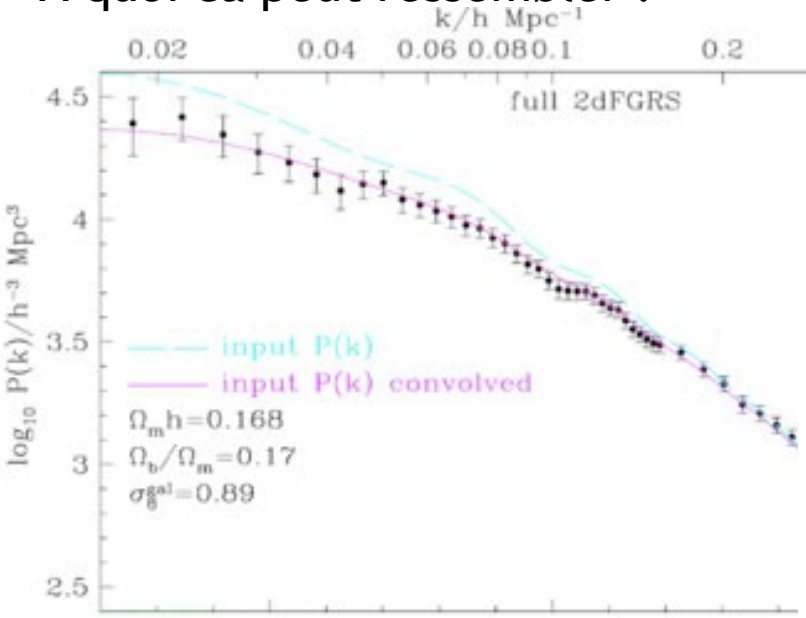
BAO: spectre de puisance P(k)

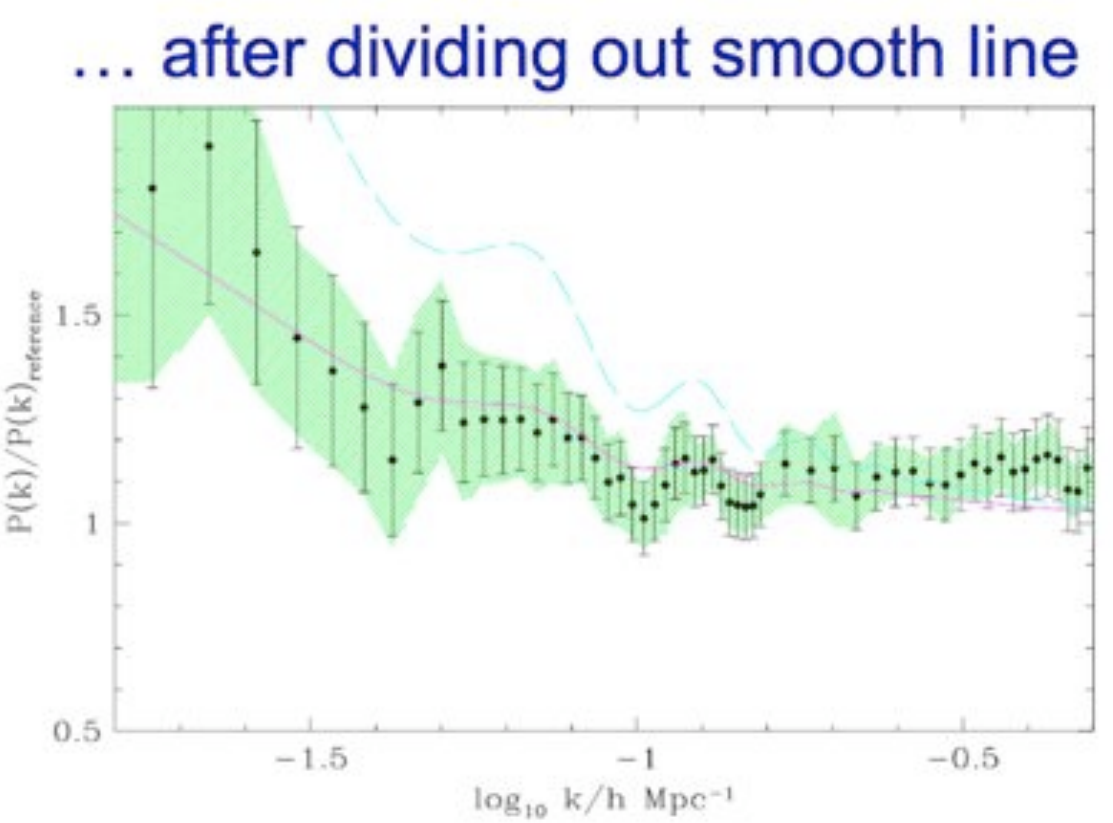
À quoi ca peut ressembler ?

Cole et al., 2005, MNRAS - 2dF

BAO: spectre de puisance P(k)

À quoi ca peut ressembler ?





Cole et al., 2005, MNRAS - 2dF

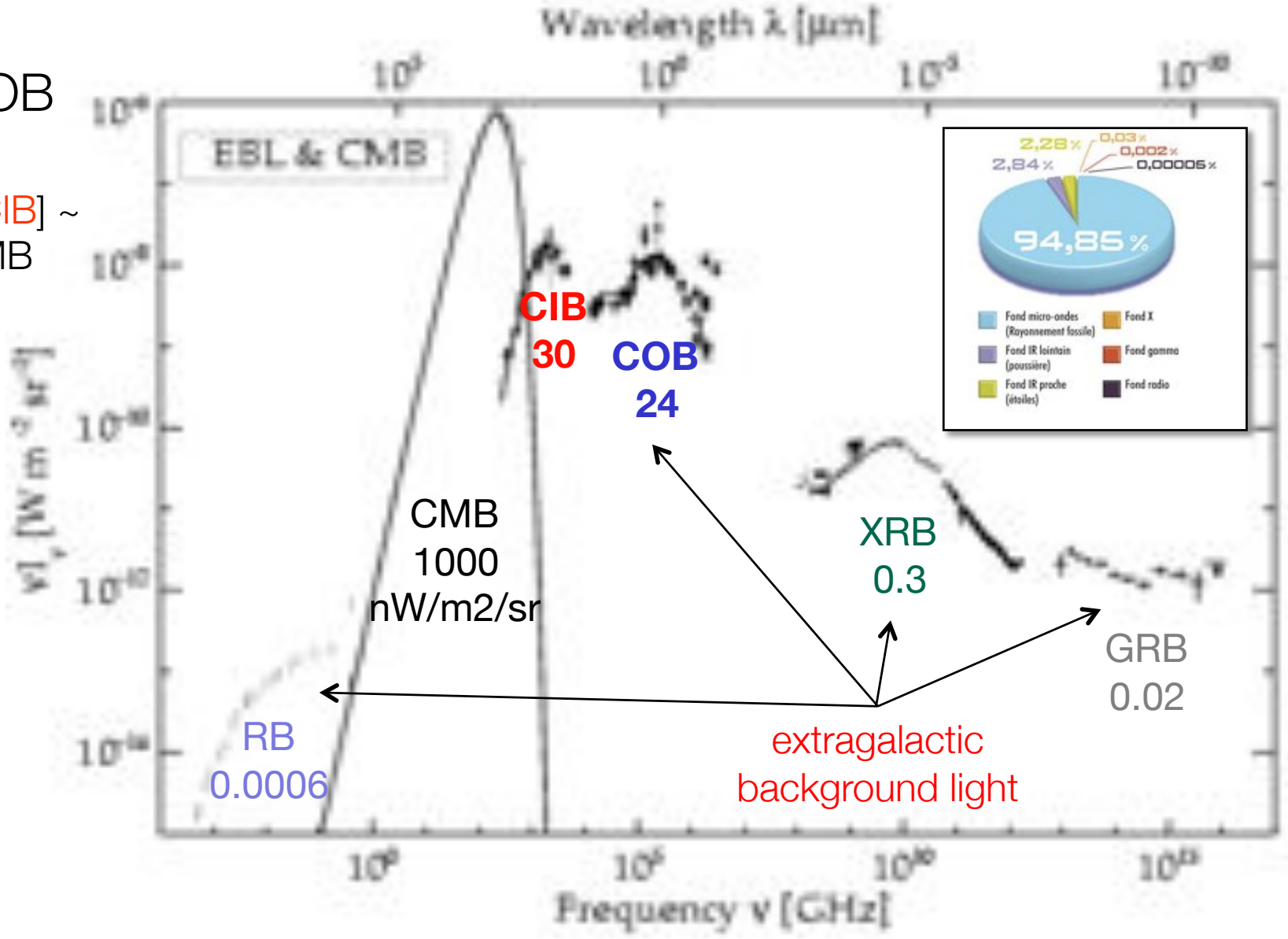
II. Observations

3. Extragalactic Background Light

extragalactic background light + CMB

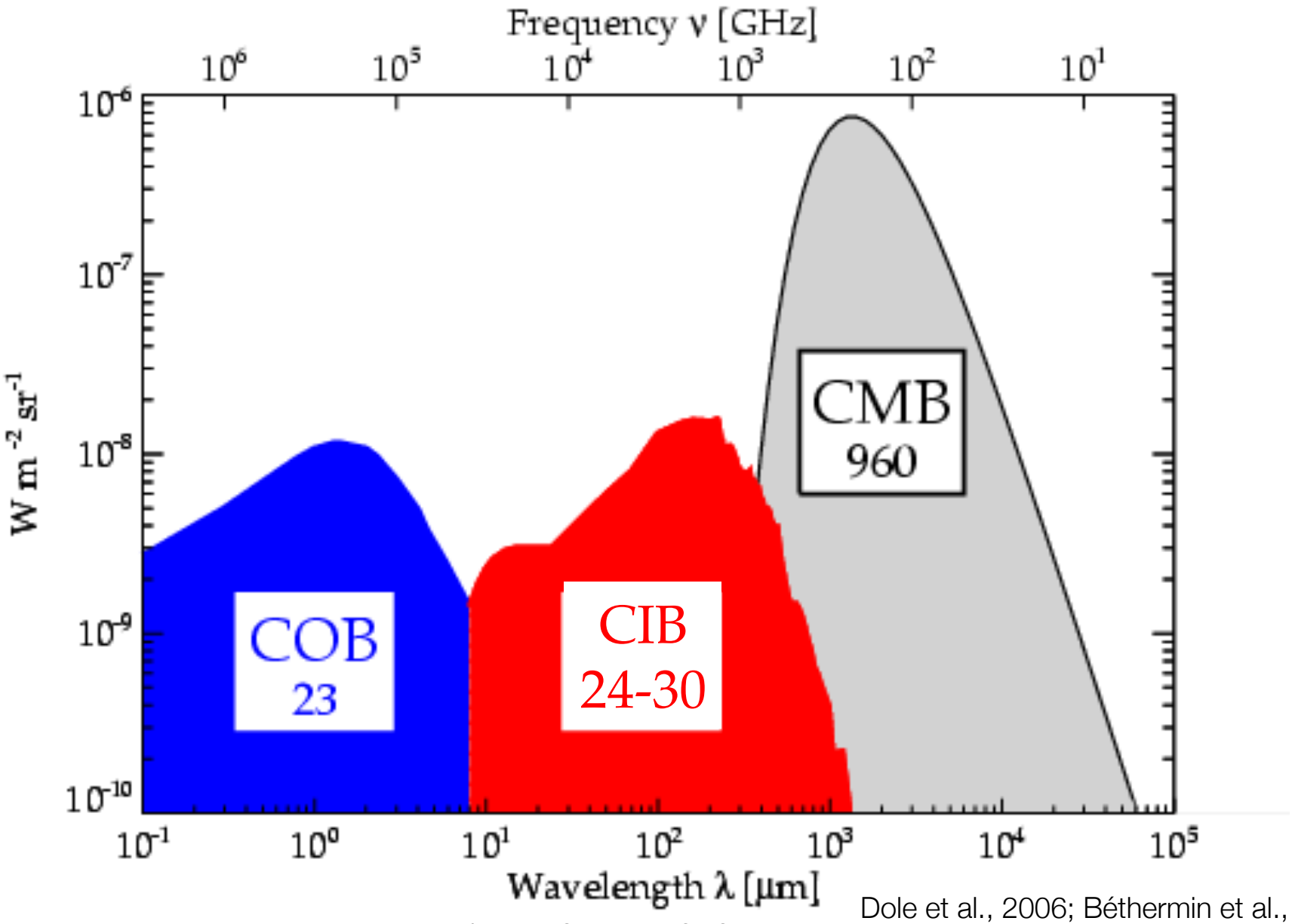
CIB > COB

EBL [COB+CIB] ~ 5% of CMB



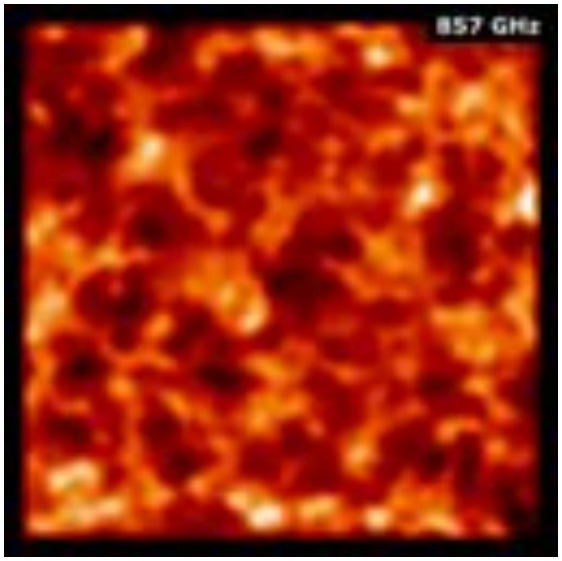
Dole et al., 2006 ; Dole 2010 HDR

cosmic infrared background + COB + CMB



Dole et al., 2006; Béthermin et al., 2010

structure of the cosmic infrared background



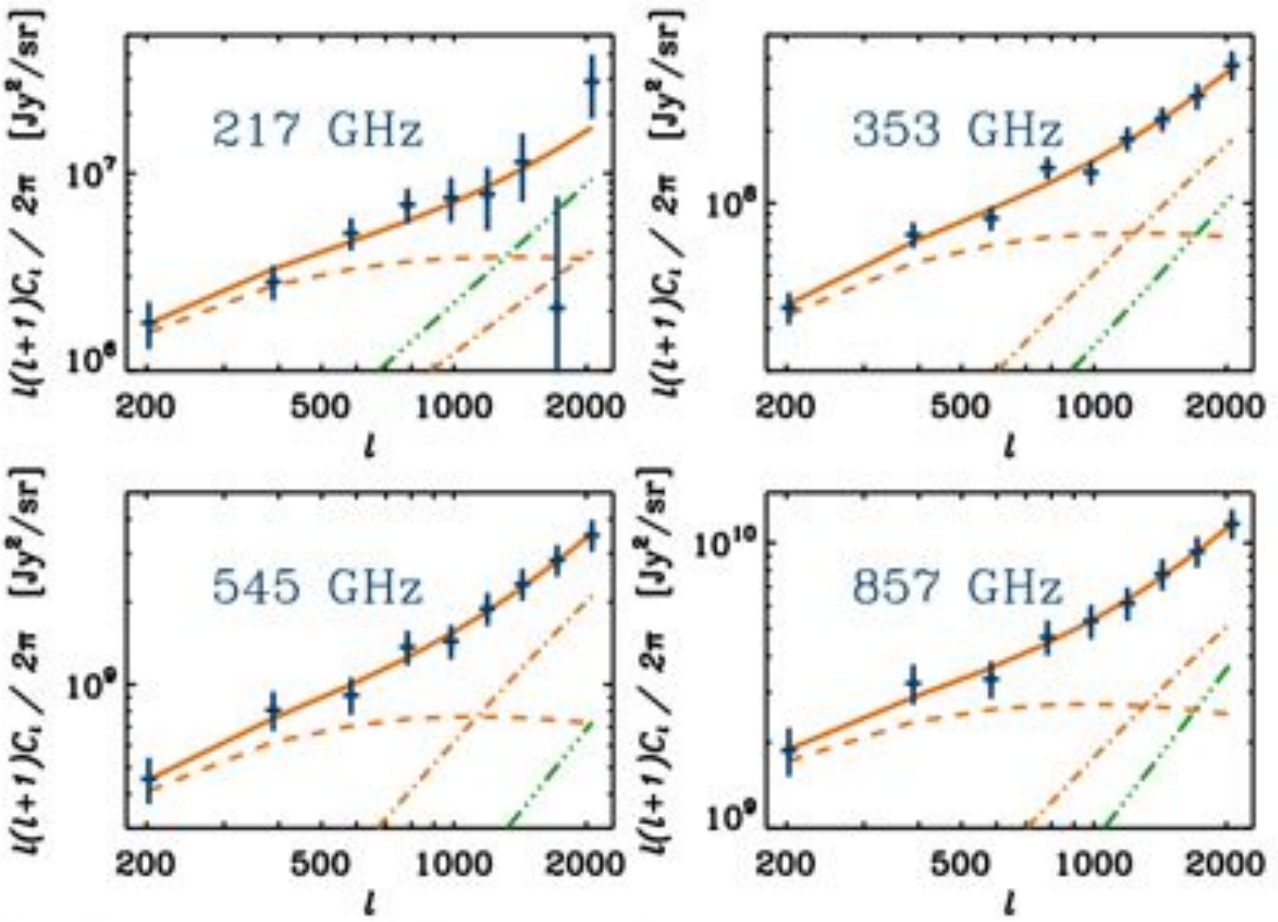


Figure 19. Each panel corresponds to one frequency. For each frequency, the blue points correspond to the angular auto power spectra as well as the associated error bars including statistical and systematic errors. The best fit model per frequency (including shot noise) corresponds to the solid orange line. The dashed (dot-dashed) orange lines correspond to the 2h (1h) contributions. The green triple dot dashed curve corresponds to the Poisson noise level, fixed to its expected value. To obtain those fits, three parameters per frequency were varied: $\log_{10} M_{min}$, σ_{sat} and j_{sat}. The fits are obviously qualitatively very good.

Planck collaboration 2011 – arXiv:1101.2028

http://sci.esa.int/science-e/www/object/index.cfm?fobjectid=48205