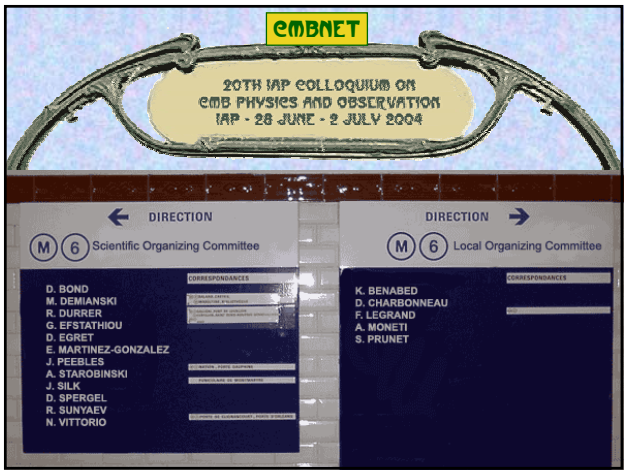
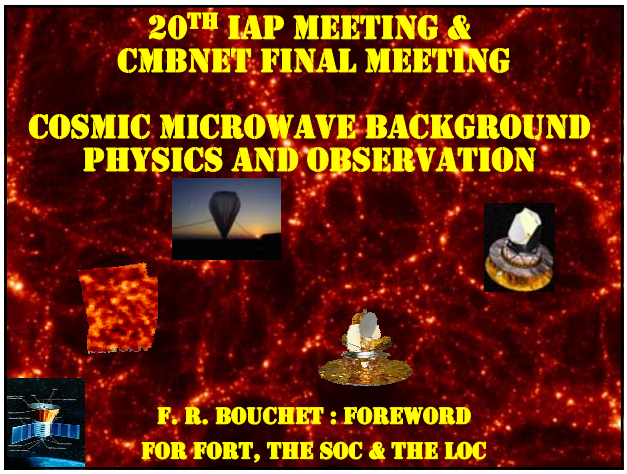
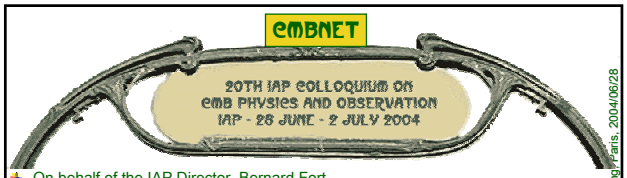


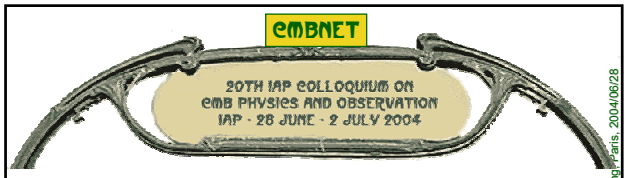




- On behalf of the IAP Director, Bernard Fort,

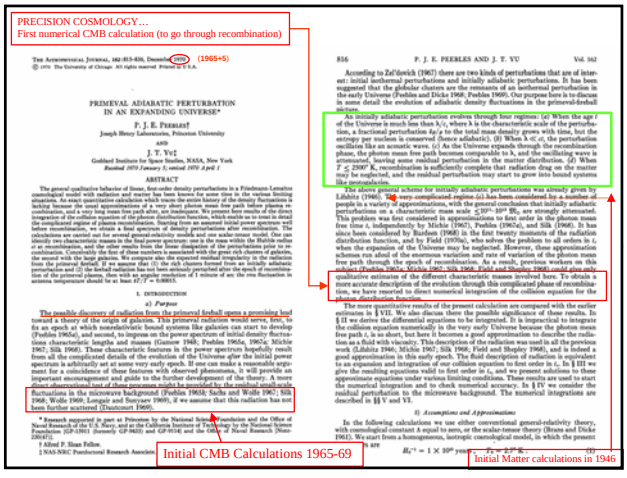
WELCOME!

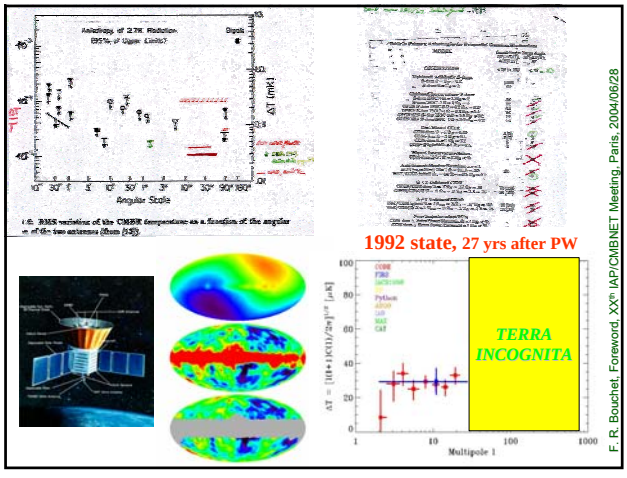
- to the 20th in the series of **IAP** meetings, which were devoted in the recent past to:
  - 1999: DYNAMICS OF GALAXIES: FROM THE EARLY UNIVERSE TO THE PRESENT
  - 2000: CONSTRUCTING THE UNIVERSE WITH CLUSTERS OF GALAXIES
  - 2001: GASEOUS MATTER IN GALAXIES AND INTERGALACTIC SPACE
  - 2002: ON THE NATURE OF DARK ENERGY
  - 2003: EXTRASOLAR PLANETS, TODAY AND TOMORROW
- This meeting is special, since it is as well the concluding meeting of the European network **EMBNET**, and the SOC was indeed build around a core of all **EMBNET** node heads. I wish to thanks them all for their active participation in the organisation of the Program. On Friday, we shall have a panel discussion of what is next in CMB science.



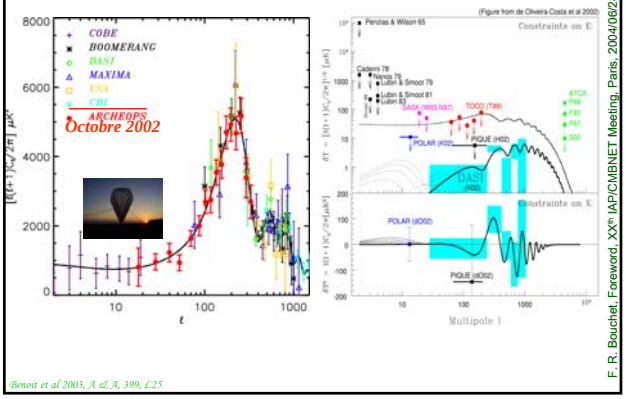
LIVING THROUGH EXTRAORDINARY TIMES...

- With a so-far concordant model, a sustained rhythm of announcements of new results and most of the upcoming CMB experiments targeting polarization, with an imminent release of WMAP 2nd year analysis, Planck slanted for launch 3 years from now, and proposals for ESA's cosmic Vision being made in parallel to the Einstein probe program,
- It is a good time
  - to assess what we have learnt as of today, both from the theoretical and experimental points of view, from this very rich period;
  - to discuss the likely stumbling block on the way forward, and new physics that the future CMB experiments presented will be able to help reveal,
  - To review the new experimental and data-processing techniques that need to be developed in their context.
- I am impressed by what has been accomplished so far, with many important contributions from people in this room, but not depressed since so much remains to be done.





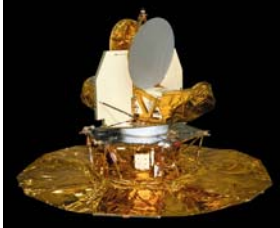
END OF 2002 STATUS...



Benoit et al 2003, A &A, 399, L25

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

WMAP



- nearly 1,000,000 independent pixels
- large redundancy of measures
- Full sky coverage
- Five frequencies for better(/COBE) foreground removal

- tight calibration from the dipole (0.5%)
- compare and unify other CMB observations
- cosmic variance limited @ large scales (> l=350, ~1/2 degree)

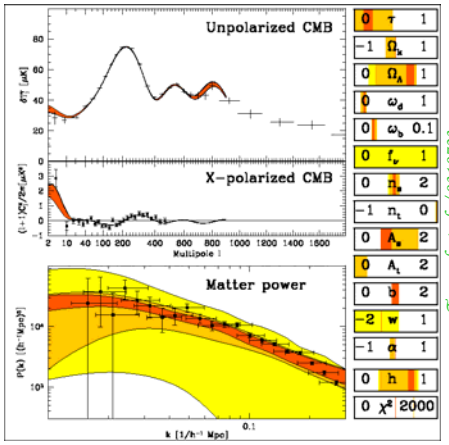
First round of analyses & data release (1 year) in March 2003…

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

CMB

W =-1 & f_ν=0

r = Ω_k = α =0



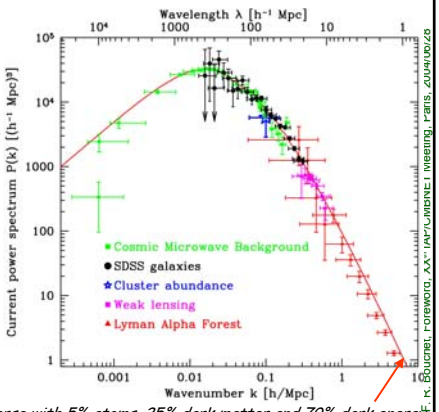
Tegmark et al. / 0310723

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

COSMOLOGY HAS A CONSISTENT MODEL

CMB consistent with:

- BBN estimate of baryon density
- HST measurements of expansion rate
- Supernova Distance Measurements
- Stellar evolution estimates of stellar ages
- Estimates of density fluctuations
  - Gravitational lensing
  - Clusters
  - Large scale structure
  - Lyman α forest



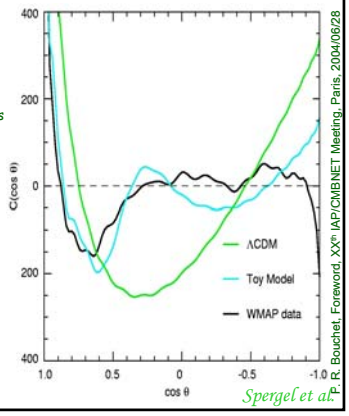
Theory for a Universe with 5% atoms, 25% dark matter and 70% dark energy.

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

TOO LITTLE LARGE SCALE POWER?

- Seen in COBE but much more significant now.
- Is it just chance? (debate)
- Why has this received so much attention?
  - Other glitches are more statistically significant, but this is at a very interesting scale, the present horizon, and is not constrained on larger scales
  - Difficult to produce by additional effects because it requires cancelling large scale power
- Some proposed solutions:

1) Running spectra tilt
2) Some minimum k cutoff
3) Related to curvature scale
4) High frequency oscillations in spectrum
5) SZ from local supercluster
6) Related to topology of the universe



Spergel et al.

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

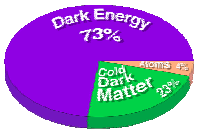
NON-GAUSSIANITY IN WMAP?

- Initial analyses indicated that the WMAP results were consistent with Gaussianity:
  1) Three point tests are consistent up to known point source contribution (Komatsu et al., Gaztanaga & Wagg)
  2) Apparent non-Gaussianities in COBE bispectrum do not appear in WMAP (Magueijo & Madeiros)
  3) Topological tests (Minkowski functionals, genus) also consistent (Komatsu et al., Colley & Gott)
- Limits not sufficient yet to probe the levels predicted by inflation models
- But recent analyses point to possible inconsistencies:
  1) Evidence that north ecliptic hemisphere has less large scale power than southern (Eriksen et al.)
  2) A wavelet analysis shows evidence for non-Gaussianity in the southern Galactic hemisphere (Vielva et al.)
  3) Asymmetry between some genus statistics for north and south Galactic hemispheres (Park)
  4) Some strange alignments seen in the quadrupole and octupole moments (Tegmark et al.)
  5) Multipole vector analysis indicates unexpected alignments at low l (Copi et al.)
  6) Evidence for strange phase correlations at l=16 (Coles et al.) and at very high l (Chiang et al.)
- Is it significant?
  - Most authors argue against foreground being responsible, but its not impossible
  - Possibly a problem with *a posteriori* statistics, but many seem to be pointing to similar problems
  - Could it be similar to COBE problems, where some of the data was contaminated? This seems unlikely for the large scale problems.
- The jury is still out, and more investigation is needed!

F. R. Bouchet, Foreword, XX^e IAP/CMBNET Meeting, Paris, 2004/06/28

PARAMETERS LIST, WANTED!

- Minimal set
  - Ω_Λ or $\Omega_K = 1 - \Omega_{CDM} - \Omega_B - \Omega_\Lambda$ ($\Omega_X = \rho_x/\rho_c = 8\pi G\,\rho_x/(3H^2)$, H=1/a da/dt)
  - Ω_{CDM}
  - Ω_B
  - H
  - (τ)



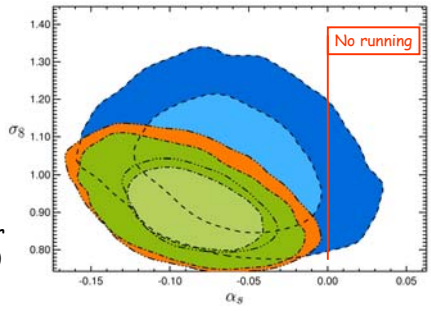
- Initial Conditions
  - n_s
  - As,or C_2, or σ_8
  - (n_T)
  - (A_T or $r = A_S/A_T$)

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

RUNNING SPECTRAL INDEX CONSTRAINTS

$n_s = n_s(k_0) + \alpha_s \,\mathrm{Ln}\,(k/k_0)$

WMAP
WMAP + CBI
ALL = all CMB
+ LSS (as prior on $\Gamma_{eff}, \sigma_8\Omega_m^{.6}$)



Readhead et al. 0402359

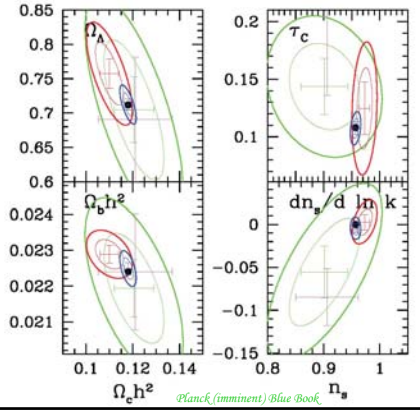
F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

MEME ERROR FORECASTS

7 parameters
A_S, n_s,n_{run}
+ ω_b, ω_c,
+ h, τ

Assumed flat
+ weak priors
(0.45<h<0.9)
(t_U > 10Gyr)

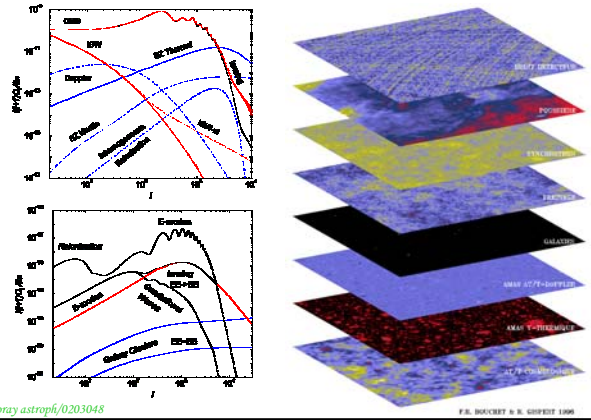
Current CMB
WMAP 4 years
WMAP 4+ACT
Planck 1 year
Input



Planck (imminent) Blue Book

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

NON-LINEAR PHYSICS, FOREGROUNDS…



Cooray astroph/0203048

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

EMBNET

20TH IAP COLLOQUIUM ON
CMB PHYSICS AND OBSERVATION
IAP - 28 JUNE - 2 JULY 2004

ON THE PRACTICAL SIDE

- Posters
- Remaining wired
- Videos & Proceedings
- Social events
- Panel session
- Euro's live

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

EMBNET

20TH IAP COLLOQUIUM ON
CMB PHYSICS AND OBSERVATION
IAP - 28 JUNE - 2 JULY 2004

POSTERS

- Posters are located in the « Entresol » room.
- Please follow the signs on the walls
- Room is open at all times during the day, and closed at night
- Please ask someone from LOC before installing your poster
- If you have an electronic version of your poster, please give it to us for addition on the web site.

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

COMPUTER ROOMS

- One in the Mezzanine, with 4 PCs.
  - NOT FOR LAPTOPS
  - PLEASE DON'T DISCONNECT THE PCS
- One in the basement with spares sockets for laptops.
- 3 accounts for the colloque participants:

Username	Password
coll01	Plk128
coll02	bGt349
coll03	cRu267

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

VIDEO & PROCEEDINGS

- Please sign the agreement if you are a speaker
- You can watch the colloque on http://www.canalu.com/canalu/colloques/index_colloques.htm
- Many videos will be included in the proceedings
- Please give to LOC a copy of your slides (web and proceedings)

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

LUNCH

- Lunch is included in registration fees. It is at the "Cantine de l'Observatoire" (~3 mn walk).
- One ticket = three "small" items to select (appetizers, desserts…) and one main dish.
- Coffee is offered at the IAP (not at "l'Observatoire")

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

COCKTAIL

- Tonight!
- On the garden terrace of the old building of the « Observatoire de Paris »
- Come and visit the Observatoire, the historical salle Cassini, and the Venus exhibition.

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

BANQUET

- Thursday at l'Hotel des Invalides
- Don't lose the explanation sheet in your registration kit: it is your entry ticket!
- Cocktail with a Jazz Big Band
- Enjoy one of the most beautiful and secret view of Paris, from the Grand Salon, Louis XIV style!
- Dine twenty meters away from Napoleon's tomb!!!!!!

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

CMBNET

20TH IAP COLLOQUIUM ON CMB PHYSICS AND OBSERVATION IAP - 28 JUNE - 2 JULY 2004

PANEL SESSION ON FRIDAY (BEFORE JIM PEEBLE'S SUMMARY)

- Devoted to « CMB: Where to go next? »
- the ESA/NASA perspective
- J. Silk will chair it.

- NB: if sufficient interest, we can organize for EURO TV projection live in the amphitheatre (after 19:00)

F. R. Bouchet, Foreword, XX^th IAP/CMBNET Meeting, Paris, 2004/06/28

	Monday	Tuesday	Wednesday	Thursday	Friday
9h					
9h05					
9h10	*Registration*	R. Bond Cosmological parameters	R. Crittenden ISW Correlation with galaxy surveys	B. Barreiro Source Extraction	P. Natoli Map-Making
9h15					
9h20					
9h25					
9h30					
9h35					
9h40	by F. Bouchet	B. Lew An alternative way of using high redshift AGNs to constrainlocal cosmological parameters	P. Fosalba Detection of the ISW effect	M . Lopez-Caniego Bayesian Approach for the Detection of Compact Sources	T. Souradeep Statistical isotropy of CMB maps : A Bipolar Spherical harmonic analysis.
9h45					
9h50	Foreword by J. Silk				
9h55					
10h	A. Kogut WMAP				
10h05		J. Muecket Measuring the Mach Number of the Universe via the Sunyaev-Zeldovich Effect	C. Hernandez-Monteagudo On the Hot Gas Induced Signal in WMAP's First Year Data	S. Majumdar Self Calibration in Upcoming SZ Cluster Surveys	A. Jaffe Cl extraction
10h10					
10h15					
10h20					
10h25					
10h30					
10h35					
10h40		*Pause*			
10h45					
10h50					*Pause*
10h55					
11h	*Pause*				
11h05		D. Pogosian Imaging the Topology of the Universe	F. Bernardeau Weak lensing in CMB / Correlation with other catalogs	B. Guiderdoni IR and Radio foregrounds	M. Douspis Initial Power Spectrum and
11h10					
11h15					
11h20					
11h25					
11h30	A. Riazuelo				

F. R. Bouchet, Foreword, XXth IAP/CMBNET Meeting, Paris, 2004/06/28