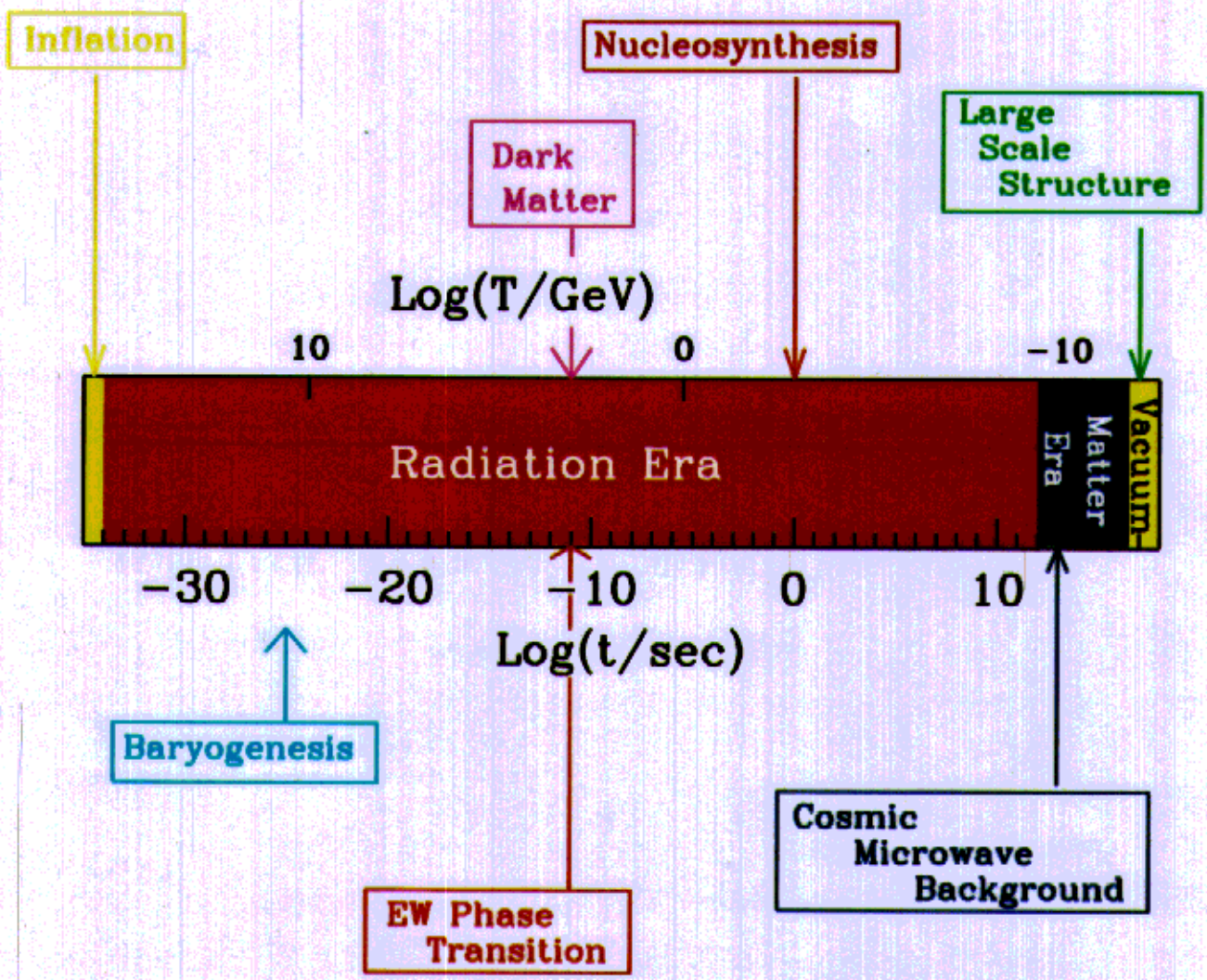
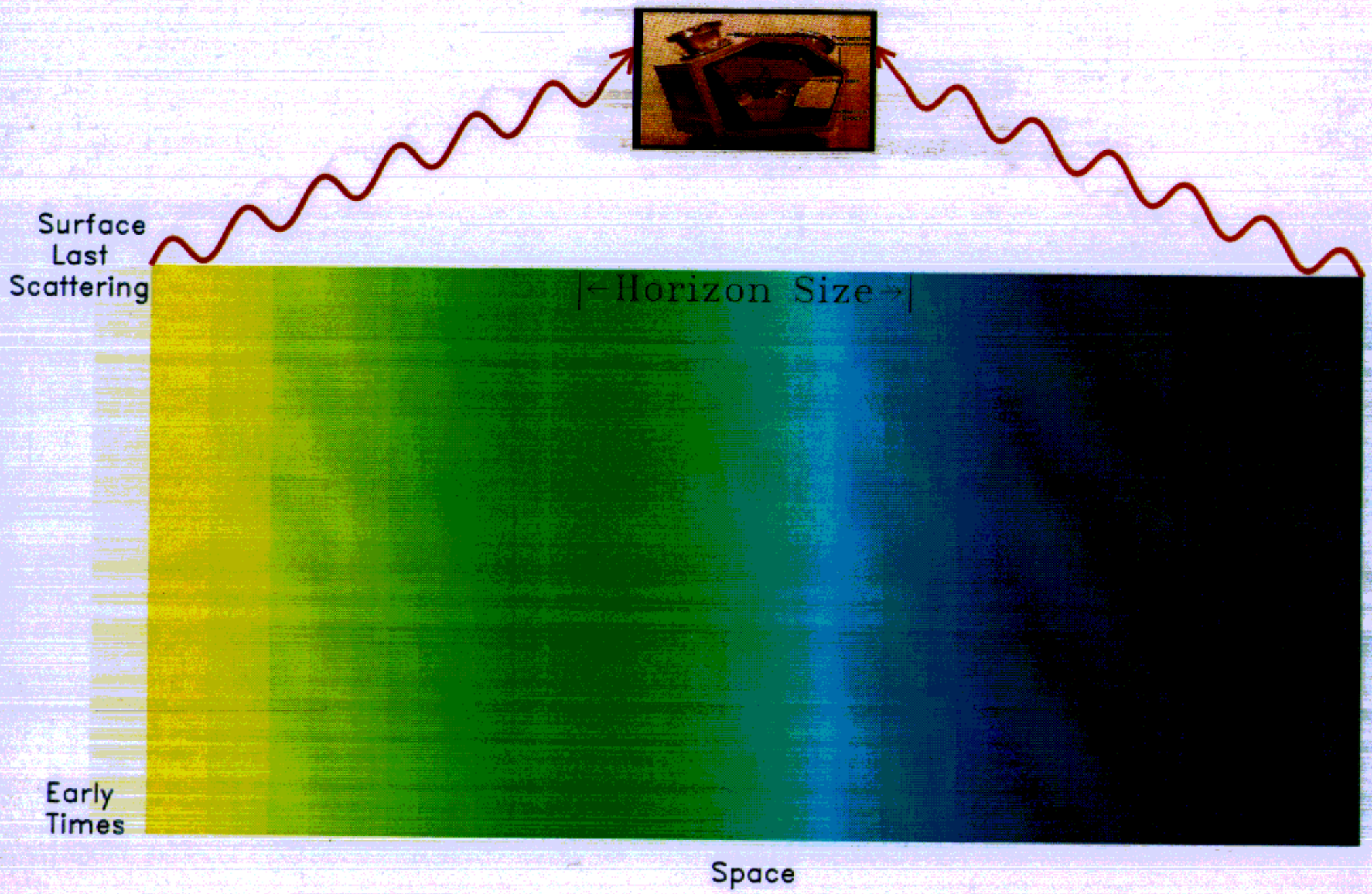
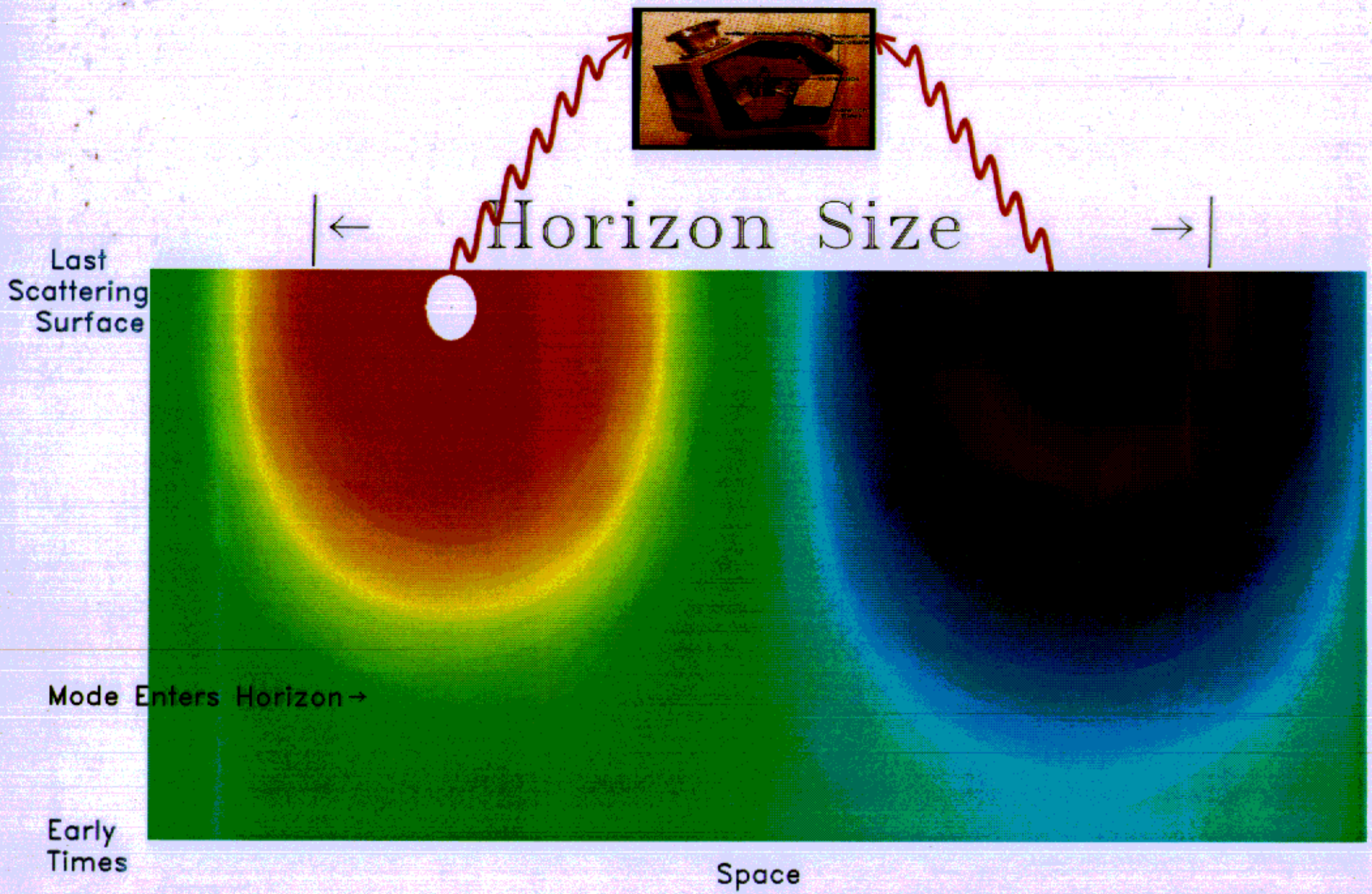
STANDARD MODEL OF COSMOLOGY



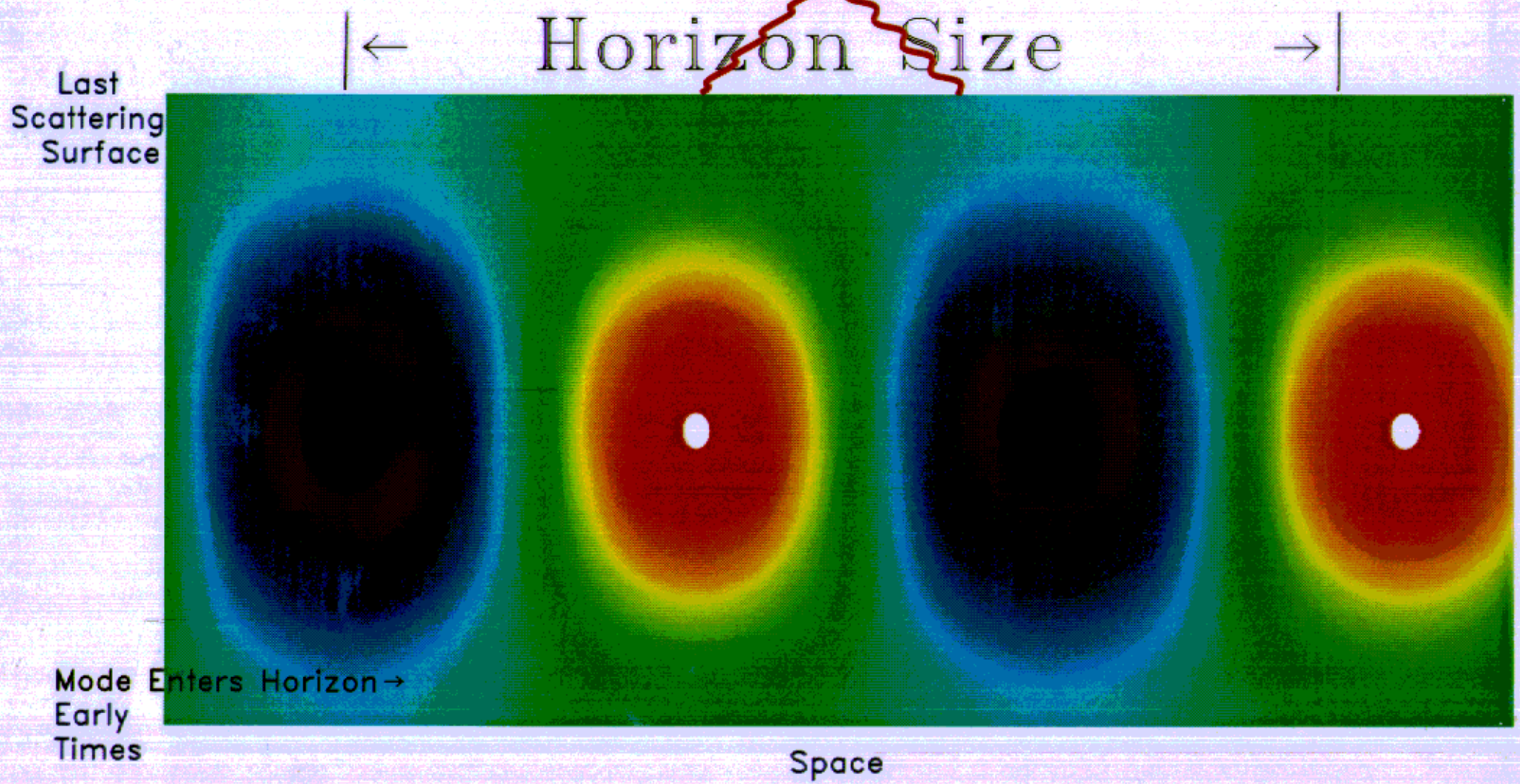
Sachs–Wolfe Effect



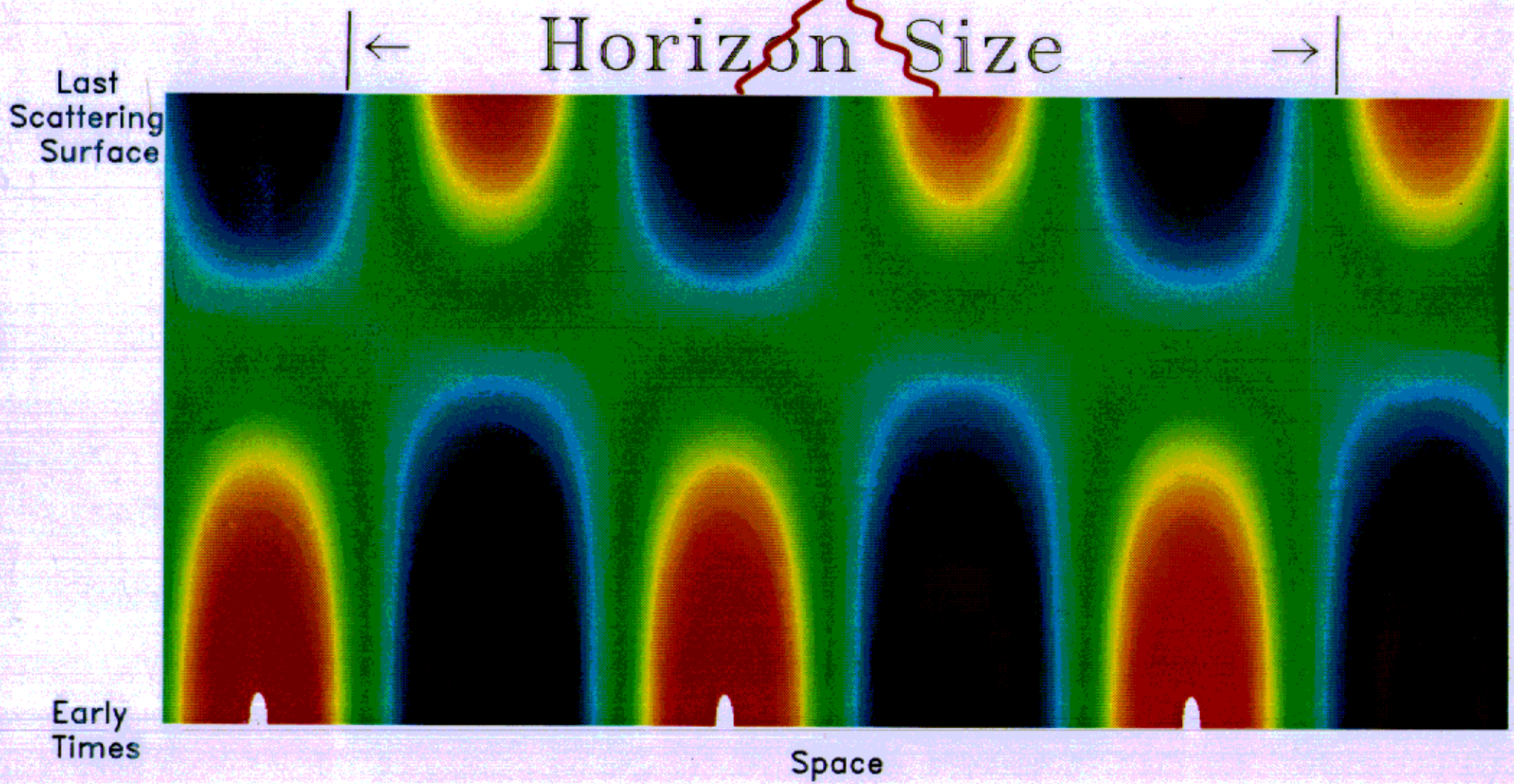
First Doppler Peak

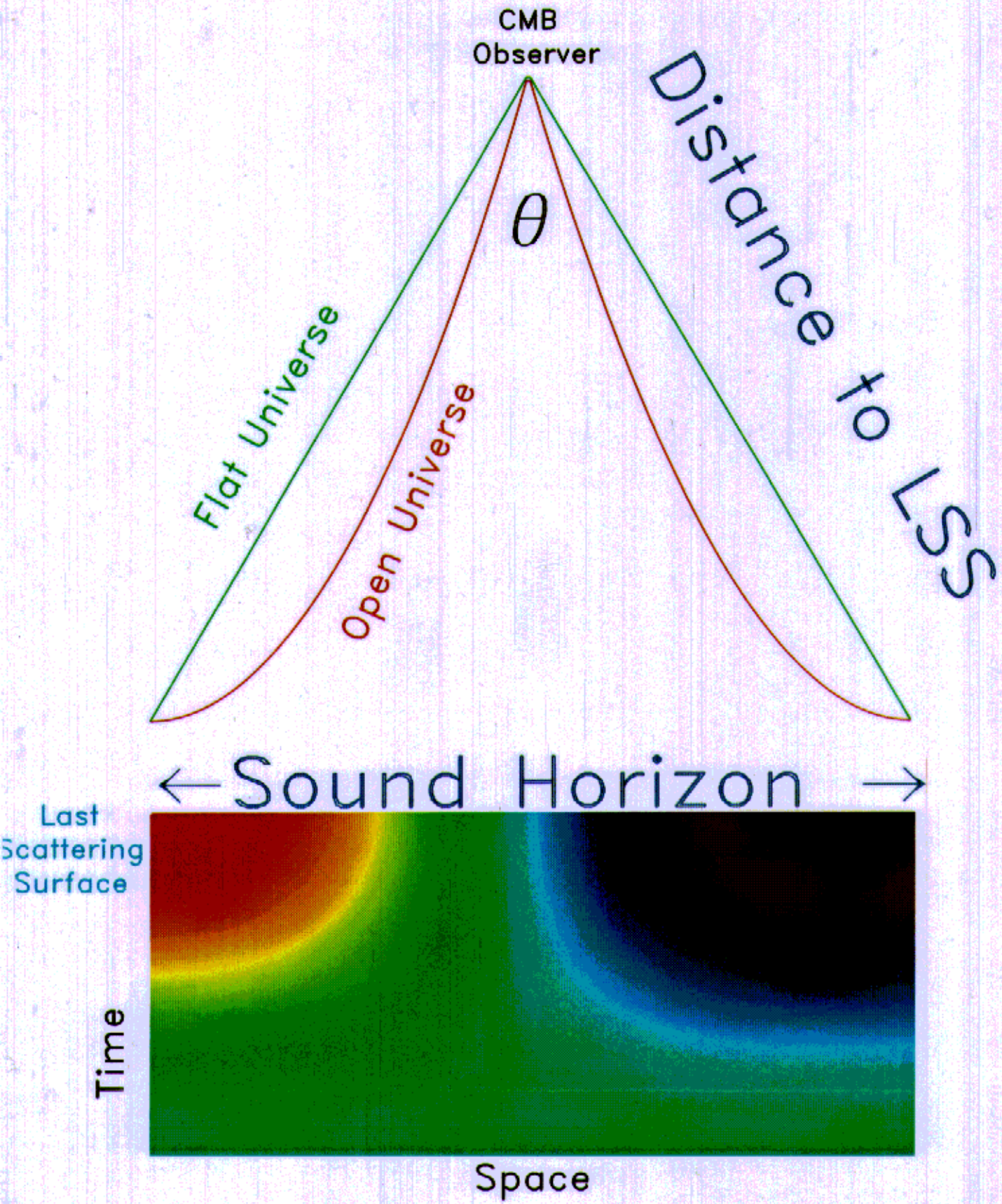


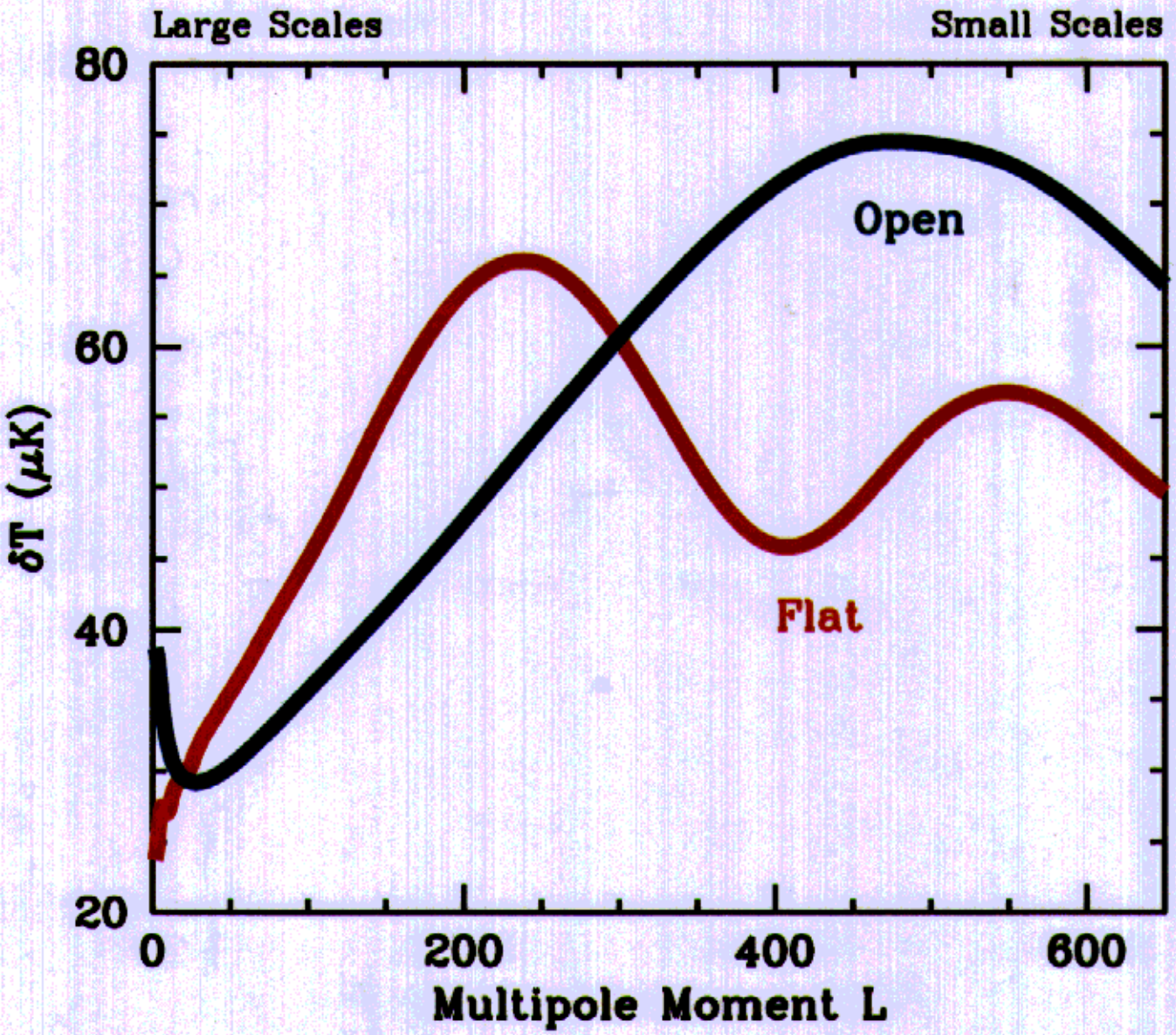
First Doppler Trough

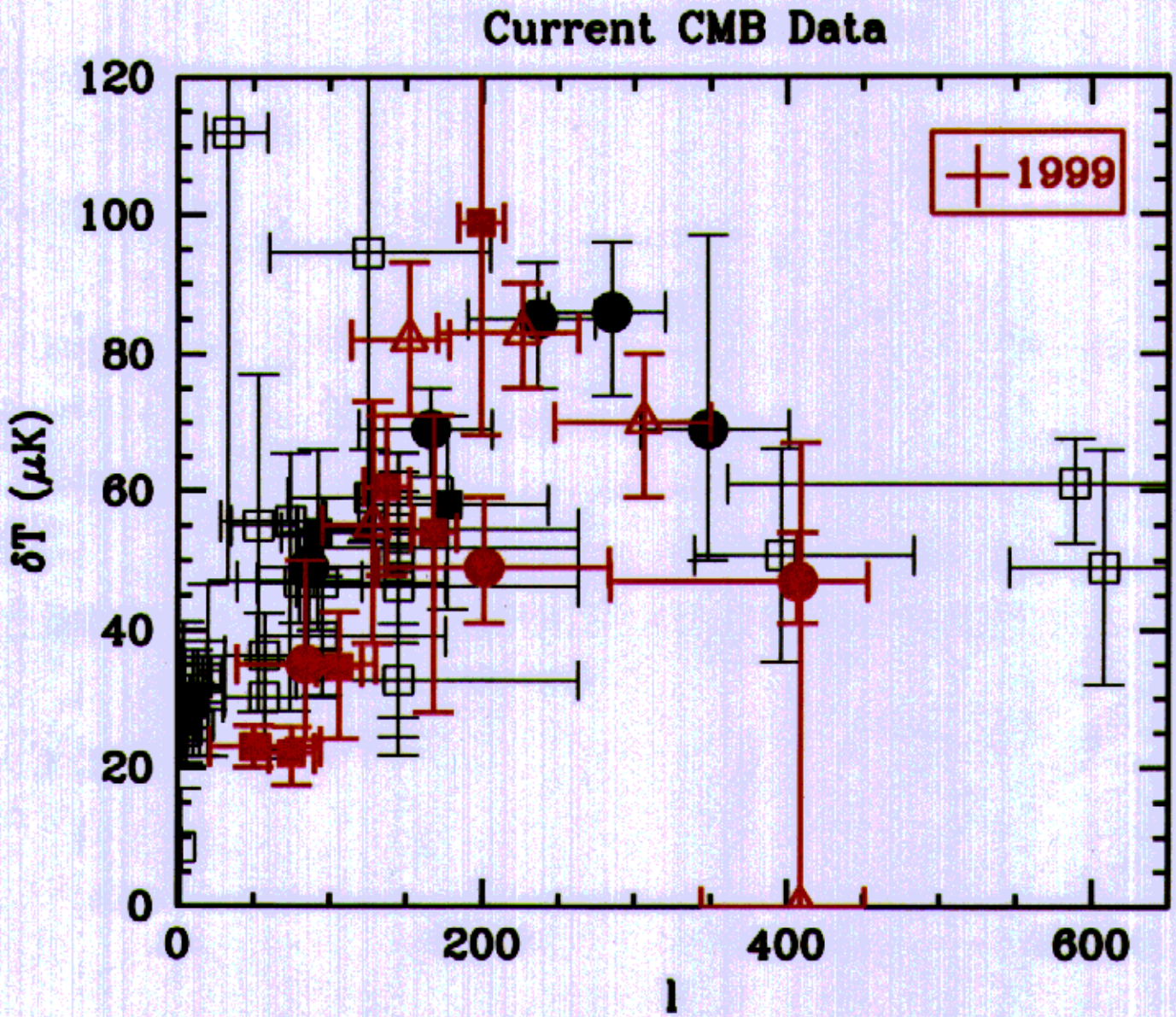


Second Doppler Peak

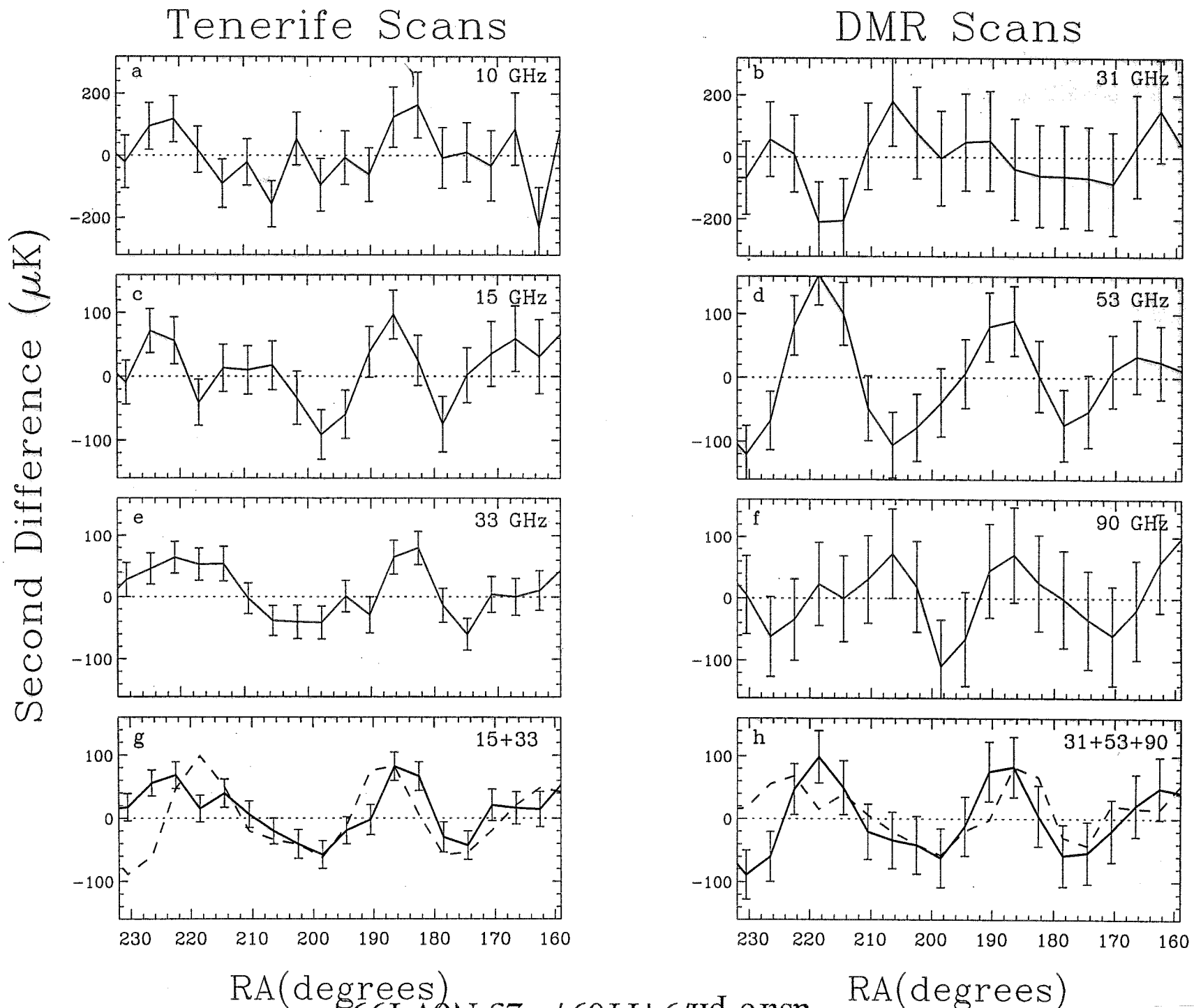



CMB
Observer
θ
Distance to LSS
Flat Universe
Open Universe
←Sound Horizon →
Last
Scattering
Surface
Time
Space


Large Scales
Small Scales
80
60
40
20
δT (μK)
Open
Flat
0
200
400
600
Multipole Moment L


Current CMB Data
1999
δT (μK)
l
0
20
40
60
80
100
120
0
200
400
600

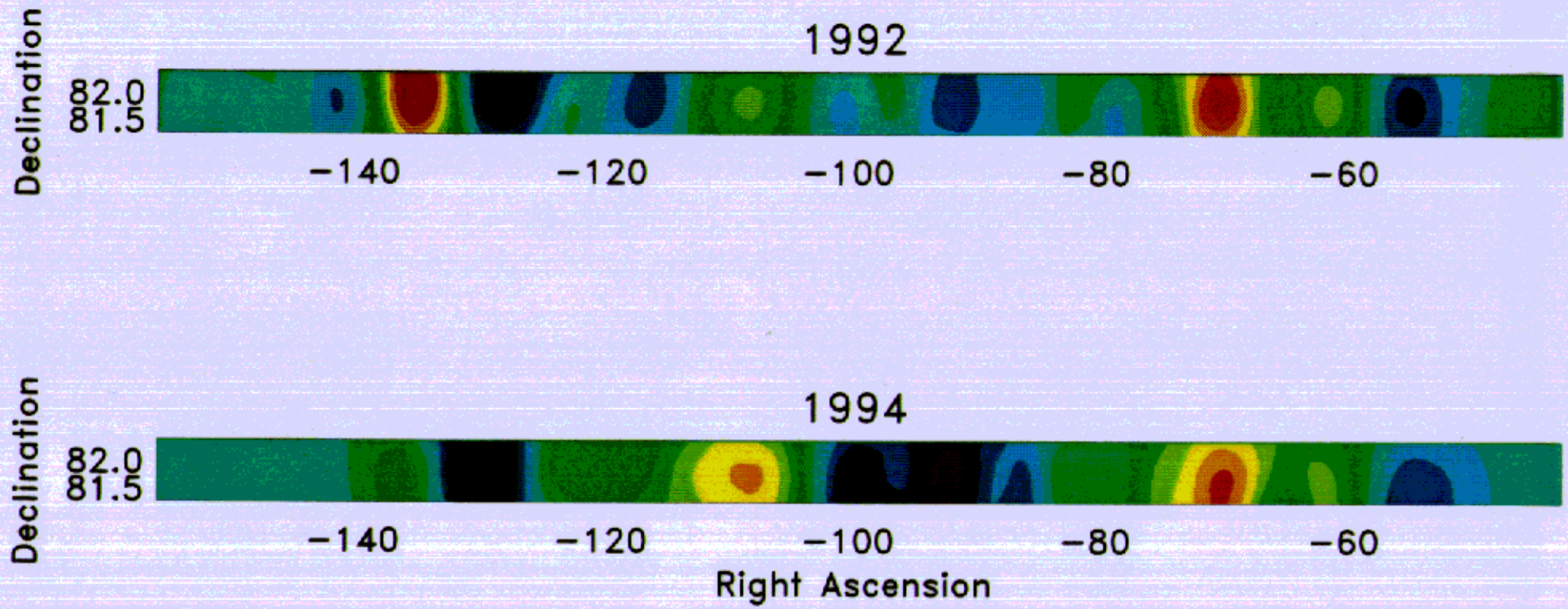
Lineweaver et al



MSAM

Balloon Bourne Bolometer

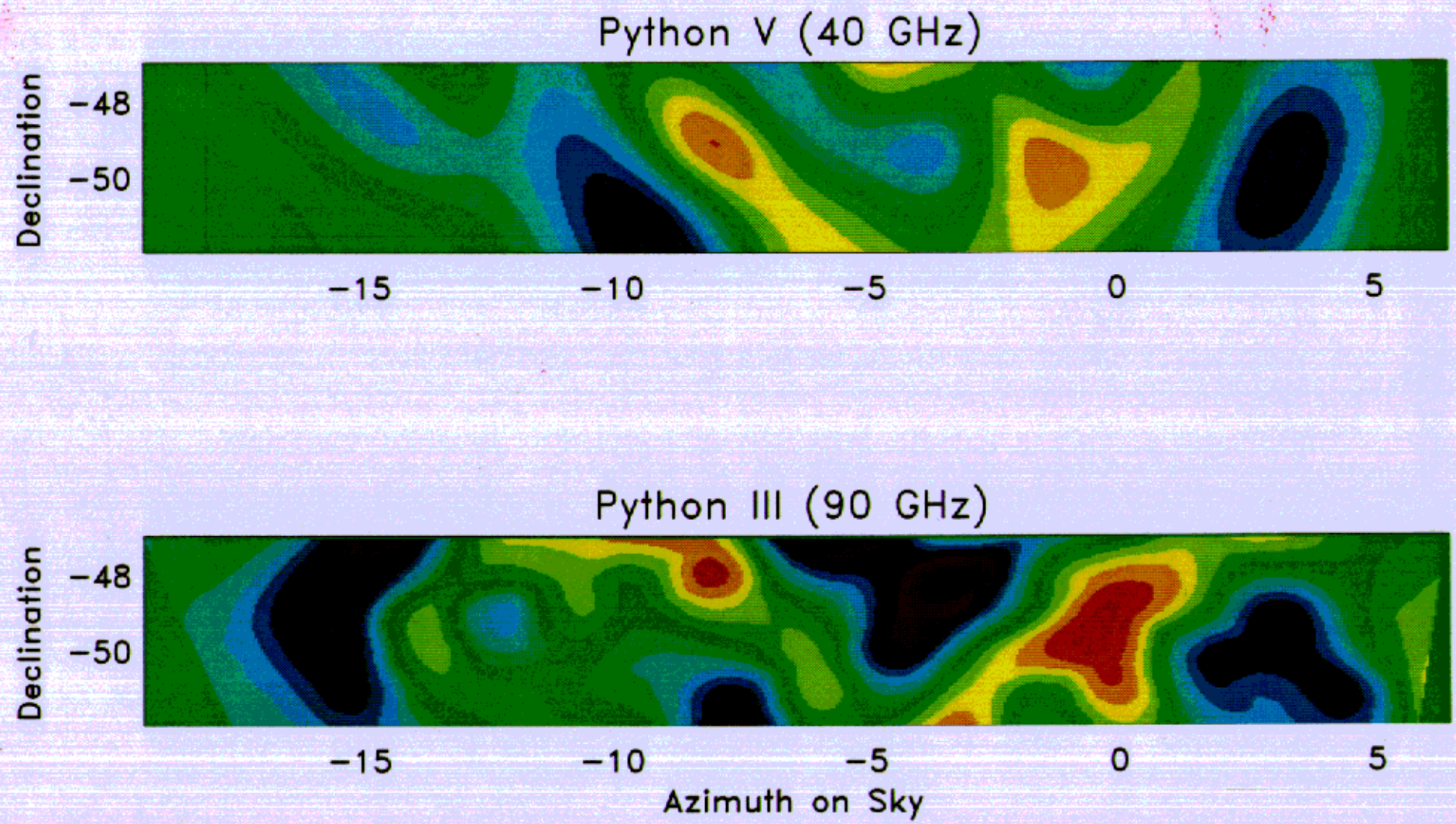
Cheng et al. (94)
Cheng et al. (96)
Fixsen et al. (96)
Cheng et al. (98)
Wilson et al. (99)



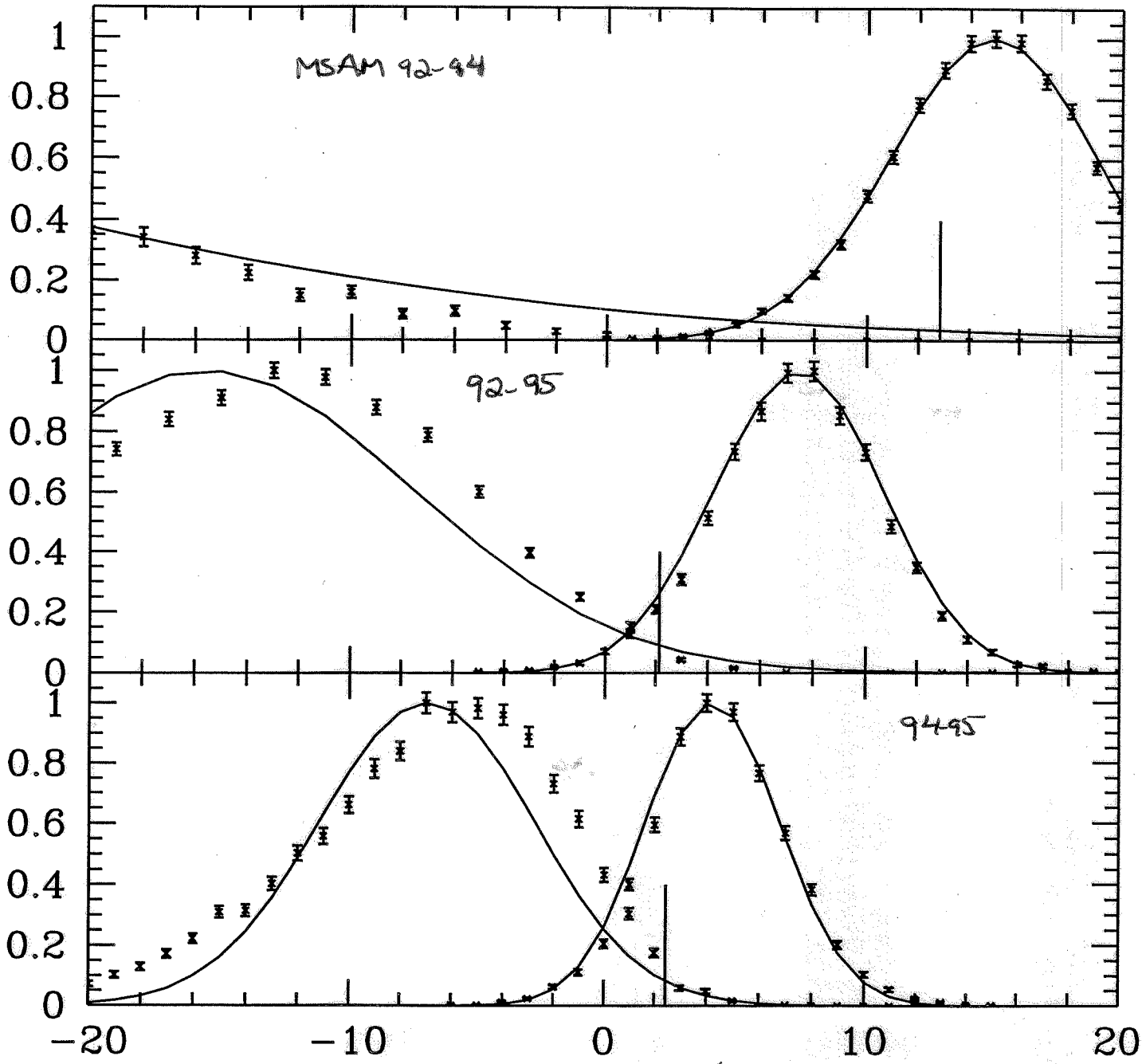
PYTHON

South Pole: Ground Based

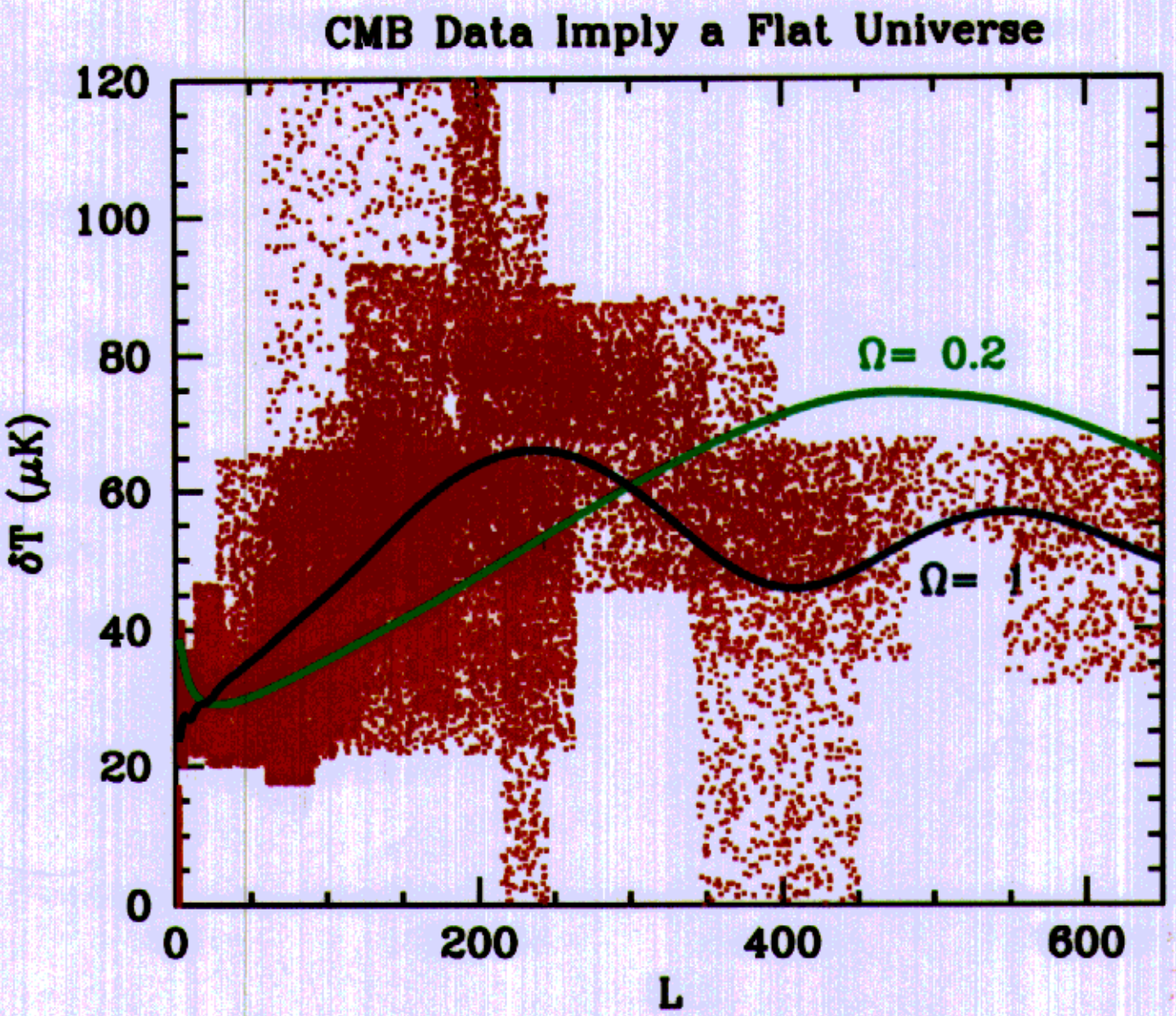
Platt et al. (97)
Coble et al. (99)



Bond, Jaffe, Knox (98)

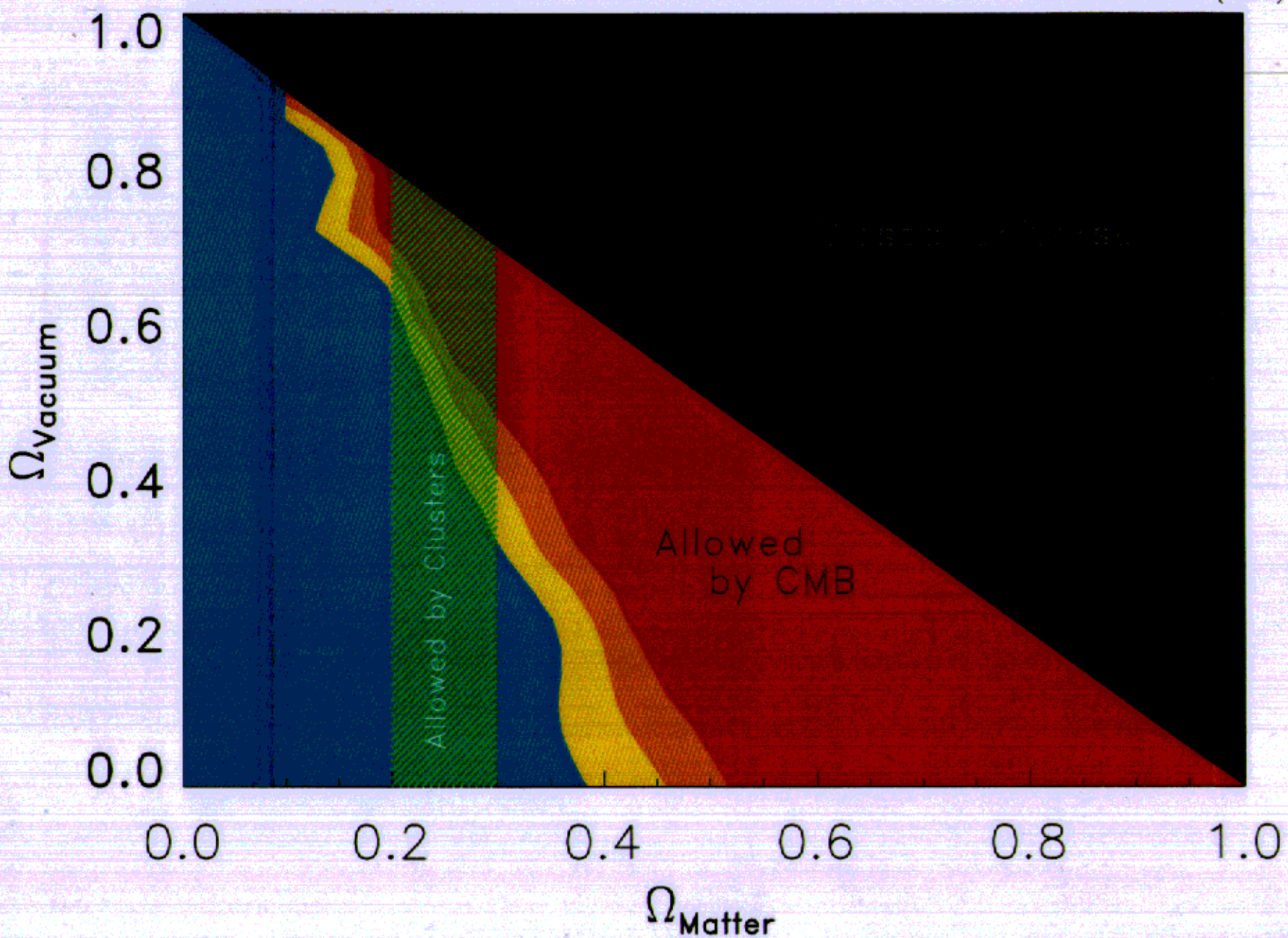


$$\beta \equiv \ln \frac{P[\text{same signal}]}{P[\text{different signals}]}$$


CMB Data Imply a Flat Universe
120
100
80
60
40
20
0
δT (μK)
0
200
400
600
L
Ω= 0.2
Ω= 1

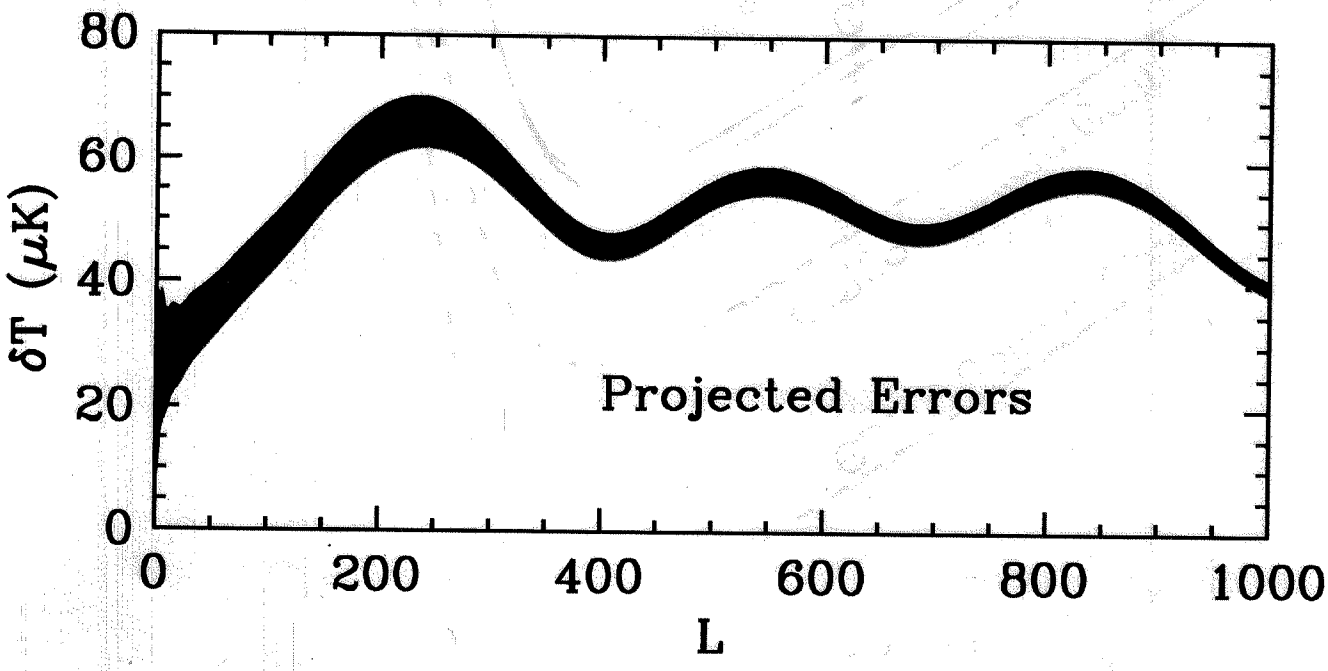
Tegmark (98)
Lineweaver (99)

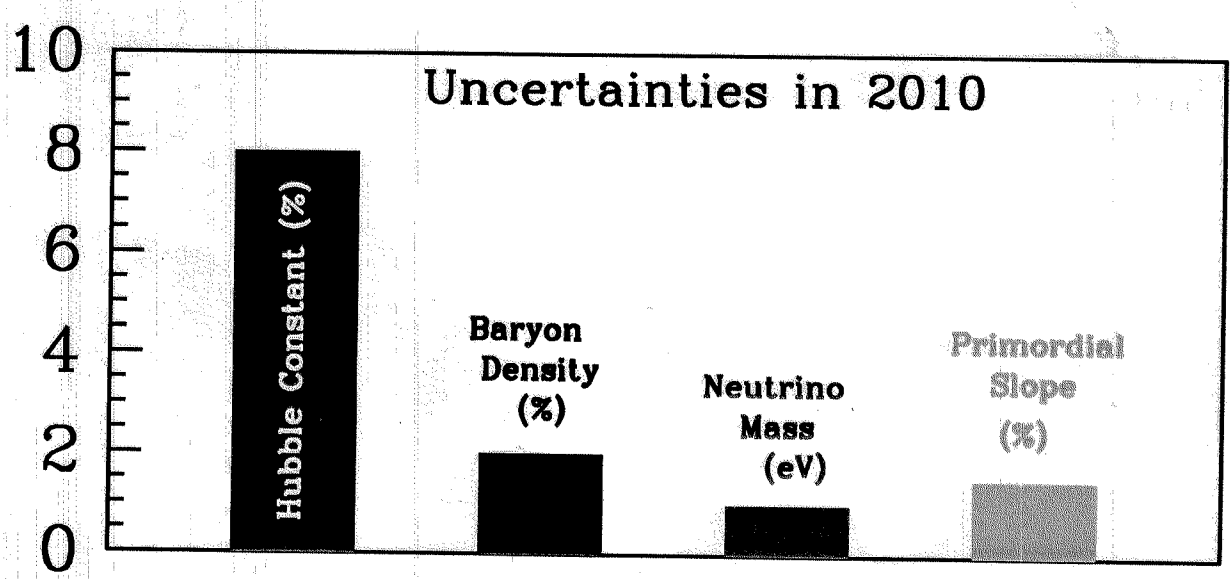
Dodelson & Knox (1999)

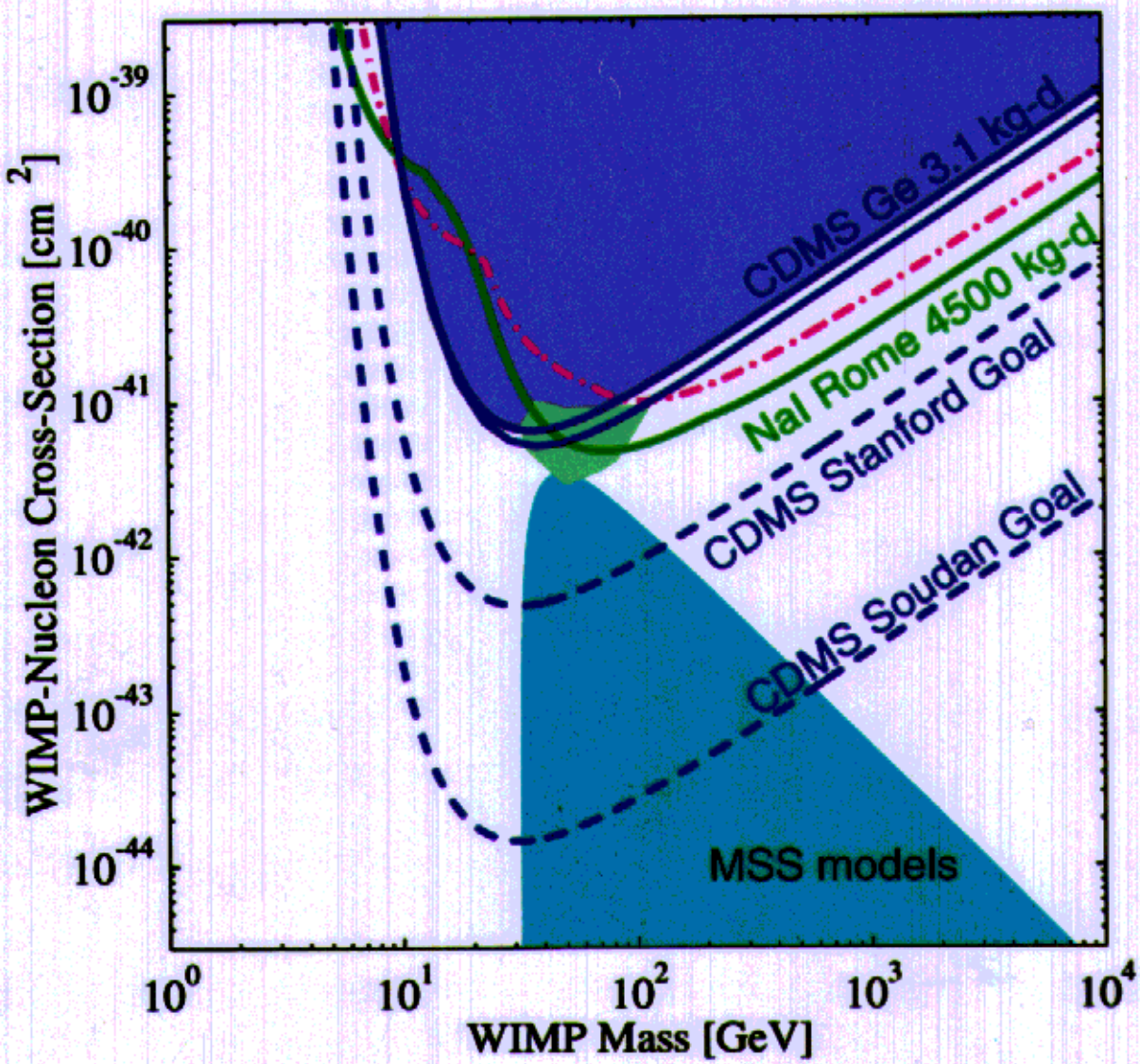


Ongoing/Planned Anisotropy Experiments

GROUND	BALLOON	SATELLITE
CAT ATCA CBI DASI VSA OVRO SUZIE Tenerife Viper CG MAT	ACE BOOMERANG BAM MSAM MAXIMA BEAST TOPHAT	NASA MAP ESA Planck






WIMP-Nucleon Cross-Section [cm 2]
10-39
10-40
10-41
10-42
10-43
10-44
CDMS Ge 3.1 kg-d
NaI Rome 4500 kg-d
CDMS Stanford Goal
CDMS Soudan Goal
MSS models
100
101
102
103
104
WIMP Mass [GeV]

Kinney (98)

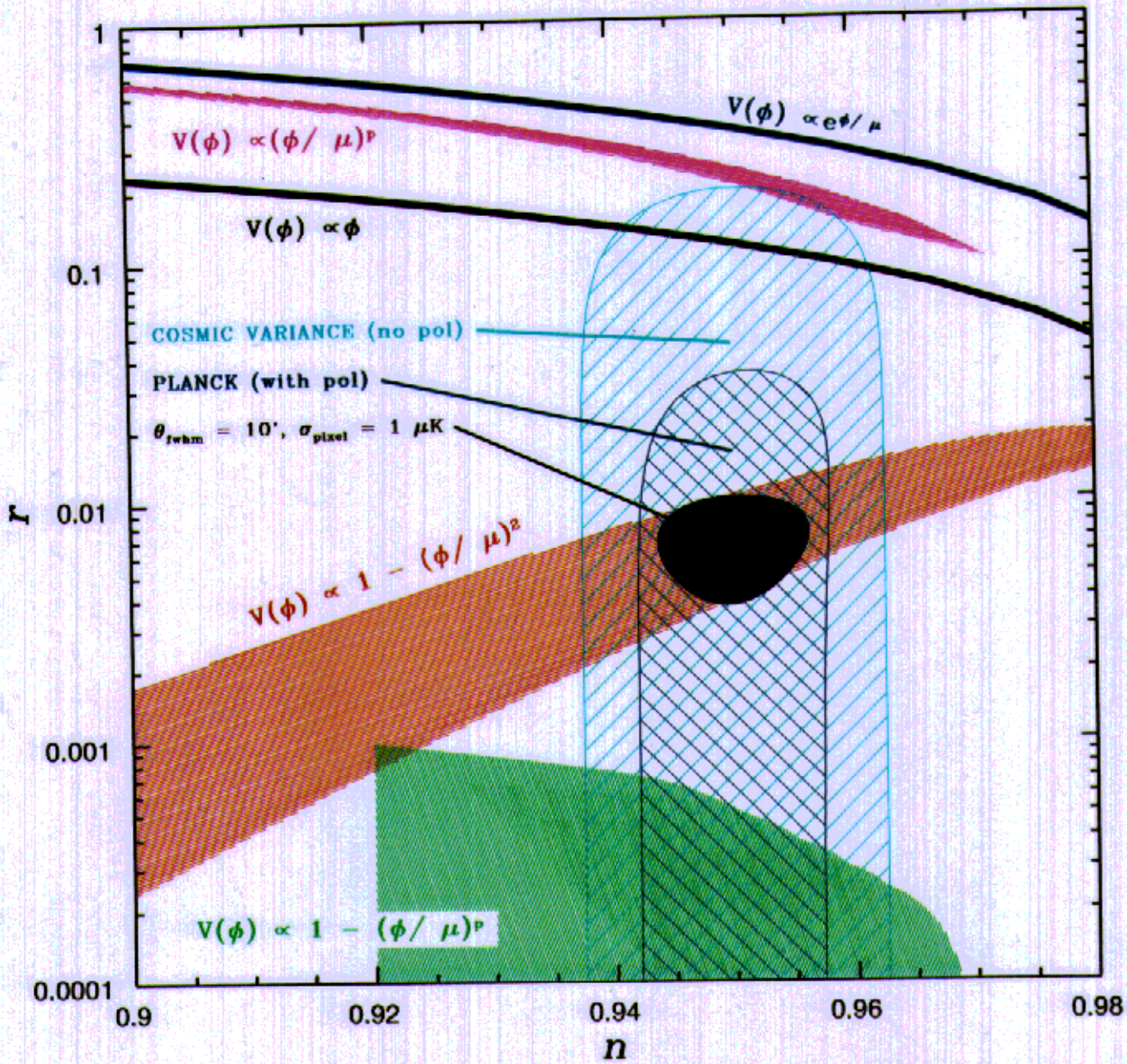


FIG. 8. The $r - n$ plane on a logarithmic scale, highlighting the predictions of small-field models. Error ellipses are for cosmic variance ($\sigma^T_{\rm pixel} = 0$), Planck (with polarization), and a hypothetical experiment with the same 10′ angular resolution as Planck but a factor of three higher sensitivity. This is sufficient to detect $r \sim 0.01$, which makes is possible to distinguish between $p = 2$ and $p > 2$ small-field models.

Tracking Models

Dodelson, Stewart, & Wang 99
Ferreira & Joyce 97
Frieman et al 95
Ratra 88
Coble et al 97
Caldwell, Dave, & Steinhardt 98
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