

## Contents

Preface . . . . .	xiii
-------------------	------

<b>I INTRODUCTORY REVIEW</b>	<b>1</b>
------------------------------	----------

<i>The Determination of Cosmological Parameters</i> . . . . .	3
<i>Malcolm S. Longair</i>	

<b>II PRIMORDIAL CMB OBSERVATIONS: GROUND BASED</b>	<b>15</b>
---	-----------

<i>The Very Small Array</i> . . . . .	17
<i>Paul F. Scott</i>	

<i>The Cosmic Background Imager</i> . . . . .	23
<i>T. J. Pearson, B. S. Mason, S. Padin, A. C. S. Readhead, M. C. Shepherd, J. Sievers, P. S. Udomprasert, and J. K. Cartwright</i>	

<i>DASI: The Degree Angular Scale Interferometer</i> . . . . .	33
<i>E. M. Leitch, J. E. Carlstrom, G. Davidson, M. Dragovan, N. W. Halverson, W. L. Holzapfel, S. Laroque, J. Kovac, C. Pryke, E. Schartman, and M. J. Yamasaki</i>	

<i>The Jodrell Bank – IAC 33 GHz Interferometer</i> . . . . .	43
<i>D. L. Harrison, R. A. Watson, J. A. Rubiño-Martin, J. F. Macias-Perez, R. D. Davies, R. Rebolo, C. M. Gutiérrez, and R. J. Davis</i>	

<i>Radio Source Counts at 15 GHz: Implications for CMB Experiments</i> . . . . .	48
<i>Angela C. Taylor</i>	

<b>III PRIMORDIAL CMB OBSERVATIONS: BALLOON AND SATELLITE BASED</b>	53
<i>Detection of Anisotropy in the Cosmic Microwave Background at Horizon and Sub-Horizon Scales with the BOOMERanG Experiment</i> . . . . .	55
P. de Bernardis, P. A. R. Ade, J. J. Bock, J. R. Bond, J. Borrill, A. Boscaleri, K. Coble, B. P. Crill, G. De Gasperis, G. De Troia, P. C. Farese, P. G. Ferreira, K. Ganga, M. Giacometti, E. Hivon, V. V. Hristov, A. Iacoangeli, A. H. Jaffe, A. E. Lange, L. Martinis, S. Masi, P. Mason, P. D. Mauskopf, A. Melchiorri, L. Miglio, T. Montroy, C. B. Netterfield, E. Pascale, F. Piacentini, D. Pogosyan, F. Pongetti, S. Prunet, S. Rao, G. Romeo, J. E. Ruhl, F. Scaramuzzi, D. Sforna, and N. Vittorio	
<i>The TopHat Cosmic Microwave Background Anisotropy Experiment</i> . . . . .	65
Robert F. Silverberg and the TopHat Collaboration	
<i>Foreground Separation Methods for Satellite and Balloon Experiments</i> . . . . .	71
R. Belén Barreiro, M. P. Hobson, A. N. Lasenby, P. Vielva, E. Martínez-González, J. L. Sanz, and L. Toffolatti	
<i>The MAP Satellite Mission to Map the CMB Anisotropy</i> . . . . .	75
Lyman Page	
<i>The Planck Mission</i> . . . . .	86
J. A. Tauber	
<i>Developments at 30 GHz for Planck LFI</i> . . . . .	98
R. J. Davis, N. Roddis, D. Kettle, F. Winder, A. Wilkinson, B. Maddison, R. Hoyland, E. Artal, E. Martínez, and C. Castelli	
<b>IV INTERPRETING CMB OBSERVATIONS</b>	103
<i>Polarized Microwave Radiation from Dust</i> . . . . .	105
A. Lazarian	
<i>Mapping the Galactic Free-Free Foreground via Interstellar H<math>\alpha</math> Emission</i> . . . . .	116
R. J. Reynolds and L. M. Haffner	
<i>Estimation of Signal and Noise Parameters from CMB Polarization Observations</i> . . . . .	126
P. Naselsky, D. Novikov, I. Novikov, and J. Silk	
<i>Amplitude-Phase Analysis of Cosmic Microwave Background Maps</i> . . . . .	134
D. Novikov, P. Naselsky and J. Silk	
<i>A New Radio Continuum Survey of the Sky at 1465 MHz between declinations <math>-52^\circ</math> and <math>+68^\circ</math></i> . . . . .	138
C. Tello, T. Villela, G. F. Smoot, S. Torres, and M. Bersanelli	

<b>V LARGE SCALE STRUCTURE</b>	143
<i>The Matter Power Spectrum</i> . . . . .	145
J. A. Peacock	
<i>Cosmological Parameters from the 2dF Galaxy Redshift Survey</i> . . . . .	158
Matthew Colless and the 2dFGRS Team	
<i>(Non-)fractality on Large Scales</i> . . . . .	168
Vicent J. Martínez	
<b>VI DETERMINATION OF <math>H_0</math></b>	179
<i>Local Distance Indicators</i> . . . . .	181
Michael Feast	
<i>The Hubble Space Telescope <math>H_0</math> Key Project</i> . . . . .	190
Wendy Freedman, Robert C. Kennicutt, Jeremy R. Mould, and Barry F. Madore	
<i>Type Ia Supernovae and the Value of the Hubble Constant</i> . . . . .	200
Brad K. Gibson and Chris B. Brook	
<i><math>H_0</math> from Gravitational Lenses: Recent Results</i> . . . . .	209
Paul L. Schechter	
<i>The Sunyaev-Zeldovich Effect Imaging and Interferometry: BIMA-CBI-OVRO State of the Art and Future Prospects</i> . . . . .	219
Steven T. Myers	
<b>VII EVIDENCE FOR NON-ZERO <math>\Lambda</math></b>	229
<i>Verifying the Use of Supernovae as Probes of the Cosmic Expansion</i> . . . . .	231
Richard Ellis and Mark Sullivan	
<i>The Rise Time of the Normal Type Ia SN 1990N</i> . . . . .	241
Paolo A. Mazzali and Brian P. Schmidt	
<i>Constraints in the <math>\lambda_0</math>-<math>\Omega_0</math> plane from gravitational lensing</i> . . . . .	245
Phillip Helbig	
<i>Properties of the Dark Energy</i> . . . . .	255
Peter M. Garnavich and Yun Wang	
<i>Scalar Field Models for an Accelerating Universe</i> . . . . .	260
Varun Sahni	
<i>FRIIb Radio Galaxies, Cosmology, and Quintessence</i> . . . . .	264
Ruth A. Daly and Erick J. Guerra	

<b>VIII DARK MATTER AND <math>\Omega_0</math></b>	<b>269</b>
$\Omega_0$ <i>Concordance</i> . . . . .	271
Masataka Fukugita	
<i>Galaxy-Galaxy Lensing: Status &amp; Applications</i> . . . . .	282
Teresa G. Brainerd	
<i>Realistic Galaxy Models for Lensing Statistics</i> . . . . .	292
David Rusin and Max Tegmark	
<i>The Sunyaev-Zel'dovich Effect and Cosmological Parameters</i> .	296
Mark Birkinshaw	
<i>AMiBA: Array for Microwave Background Anisotropy</i> . . . . .	306
K. Y. Lo, T. H. Chueh, R. N. Martin, Kin-Wang Ng, H. Liang, Ue-li Pen, and Chung-Pei Ma	
<i>Status of Experiments for Direct Detection of Galactic Dark             Matter Particles</i> . . . . .	312
Peter Smith	
<i>The Mass Density of the Universe</i> . . . . .	322
Neta A. Bahcall	
$\Omega_0$ <i>from Clusters of Galaxies</i> . . . . .	330
Alain Blanchard, Rachida Sadat and Jim Bartlett	
<i>Weak lensing study of low mass groups:             implications for <math>\Omega_m</math></i> . . . . .	340
H. Hoekstra, M. Franx, K. Kuijken, R. G. Carlberg, and H. K. C. Yee	
<b>IX PUTTING IT ALL TOGETHER</b>	<b>345</b>
<i>CMB Analysis of Boomerang &amp; Maxima &amp; the Cosmic Parameters <math>\{\Omega_{tot}, \Omega_b h^2, \Omega_{cdm} h^2, \Omega_\Lambda, n_s\}</math></i> . . . . .	347
J. R. Bond, P. A. R. Ade, A. Balbi, J. J. Bock, J. Borrill, A. Boscaleri, K. Coble, B. P. Crill, P. de Bernardis, P. Farese, P. G. Ferreira, K. Ganga, M. Giacometti, S. Hanany, E. Hivon, V. V. Hristov, A. Iacoangeli, A. H. Jaffe, A. E. Lange, A. T. Lee, L. Martinis, S. Masi, P. D. Mauskopf, A. Melchiorri, T. Montroy, C. B. Netterfield, S. Oh, E. Pascale, F. Piacentini, D. Pogosyan, S. Prunet, B. Rabii, S. Rao, P. L. Richards, G. Romeo, J. E. Ruhl, F. Scaramuzzi, D. Sforna, K. Sigurdson, G. F. Smoot, R. Stompor, C. D. Winant, and J. H. P. Wu	
<i>Comparative CMBology: Putting Things Together</i> . . . . .	358
Charles H. Lineweaver	
<i>Cosmic Data Fusion</i> . . . . .	368
S. L. Bridle	
<i>Cosmological Parameters and Hyper-Parameters: The Hubble         Constant from Boomerang and Maxima</i> . . . . .	377
Ofer Lahav	
<i>The Large Scale Structure Peak as a Comoving Standard Ruler</i> .	388
Boudewijn F. Roukema and Gary A. Mamon	

<b>X NEW OBSERVATIONAL APPROACHES</b>	<b>393</b>
<i>Beyond FIRST and Planck</i> . . . . .	395
Matt Griffin	
<i>The X-ray Background as a Cosmological Tool</i> . . . . .	400
X. Barcons, F. J. Carrera and M. T. Ceballos	
<i>The Sky Polarisation Observatory (SPOrt) Program</i> . . . . .	408
E. Carretti, S. Cortiglioni, M. Tucci, S. Cecchini, C. Macculi, M. Orsini, J. Monari, A. Orfei, S. Poppi, S. Bonometto, G. Boella, M. Gervasi, G. Sironi, M. Zannoni, R. Fabbri, L. Nicastro, R. Tascone, and U. Pisani	
<b>XI CONCLUSIONS</b>	<b>413</b>
<i>Concluding Perspective</i> . . . . .	415
Martin J. Rees	
<i>Concluding Remarks</i> . . . . .	425
P. J. E. Peebles	
<b>XII POSTER PAPERS</b>	<b>433</b>
<i>Photometric Properties of Low-Redshift Galaxy Clusters</i> . . . . .	435
W. A. Barkhouse, H. K. C. Yee and O. López-Cruz	
<i>Gravitational Lensing as Probe of Large Scale Structure of the         Universe</i> . . . . .	437
V. B. Bhatia, D. Jain, S. Mahajan, and N. Panchapakesan	
<i>Constraining the Cosmic Mass Density from the SBF Survey         Peculiar Velocities</i> . . . . .	439
J. P. Blakeslee, J. L. Tonry, A. Dressler, E. A. Ajhar, M. Davis, J. A. Willick, M. A. Strauss, and V. K. Narayan	
<i>Globular Clusters as Probes of the Virgo gE NGC 4472</i> . . . . .	441
T. Bridges, K. Ashman, M. Beasley, D. Geisler, D. Hanes, R. Sharples, and Steve Zepf	
<i>The CLASS Gravitational Lens Search</i> . . . . .	443
I. W. A. Browne and S. T. Myers	
<i>Polarization Signatures of Clusters in the Microwave         Background</i> . . . . .	445
Anthony Challinor	
<i>Multifrequency Observations of the S-Z Effect towards A1656</i> .	447
M. De Petris, F. Melchiorri, A. Orlando, L. Lamagna, L. D'Alba, Y. Rephaeli, S. Colafrancesco, M. Signore, E. Kreysa, and C. Castagnoli	
<i>Two-point Correlation Function and Power Spectrum at Very         Large Scales</i> . . . . .	449
Z.-G. Deng and X.-Y. Xia	

<i>CP violating vacuum transition and Big Bang Nucleosynthesis</i>	451
H. L. Duorah and R. K. Das	
<i>The Study of <math>^{12}C(\alpha, \gamma)^{16}O</math> in massive stars at explosive conditions</i>	453
Kalpana Duorah and Aditi Bezbarua	
<i>Time Delays in the Gravitational Lens CLASS B1608+656: Results from Second and Third Seasons of VLA Monitoring</i>	455
C. Fassnacht, E. Xanthopoulos, D. Rusin, and L. Koopmans	
<i>The X-ray Fundamental Plane of Clusters of Galaxies</i>	457
Yutaka Fujita	
<i>The Red-Sequence Cluster Survey: The Value of <math>\Omega_m</math> and <math>\sigma_8</math></i>	459
Michael D. Gladders and H. K. C. Yee	
<i>Dynamical Evolution of the Universe in the Quark-Hadron Phase Transition and Nugget Formation</i>	461
Ashok Goyal and Deepak Chandra	
<i><math>H_0</math> determinations via the S-Z &amp; X-ray route</i>	463
William F. Grainger	
<i>The Galaxy Environment of Quasars in the <math>z \simeq 1.3</math> Clowes-Campusano Large Quasar Group</i>	465
C. P. Haines, R. G. Clowes and L. E. Campusano	
<i>A Robust Technique for Estimating Cosmological Parameters</i>	467
Martin A. Hendry and Stéphane Rauzy	
<i>The Local Group Dwarf Spheroidal Galaxies: A Key to Building Blocks in the Universe</i>	469
Hiroyuki Hirashita, Naoyuki Tamura and Tsutomu T. Takeuchi	
<i>Constraints on Cosmological Models from Cosmic Flows</i>	471
M. J. Hudson, R. J. Smith, J. R. Lucey, D. J. Schlegel, and R. L. Davies	
<i>RATAN-600 as Multibeam Radio Telescope for CMBA Observations</i>	473
V. Khaikin and E. Majorova	
<i>Gravitational Lensing Studies of High Resolution Cluster Simulations</i>	476
L. King, D. Clowe, P. Schneider, and V. Springel	
<i>Radio Microlensing: Past, Present &amp; Near Future</i>	478
L. V. E. Koopmans, A. G. de Bruyn, C. D. Fassnacht, J. Wambsganss, R. D. Blandford, and the CLASS Collaboration	
<i>Period-Luminosity-Shape of Light Curve Relation for Cepheids in LMC and SMC</i>	480
P. Ligeza, P. Moskalik and A. Schwarzenberg-Czerny	
<i>Wrinkles in the Galaxy</i>	482
Martín López-Corredoira	

<i>Tenerife Experiments: Galactic Contribution to CMB Observations at <math>1^\circ</math> angular scales</i>	484
J. F. Macias-Perez, R. A. Watson, R. D. Davies, A. Wilkinson, J. A. Rubiño-Martin, C. M. Gutierrez, J. Gallegos, R. L. Rebolo, and R. J. Hoyland	
<i>Angular Distribution of Gamma-Ray Bursts: An Observational Probe of Cosmological Principle</i>	486
A. Mészáros, L. G. Balázs, R. Vavrek, I. Horváth, and Z. Bagoly	
<i>Cosmic Acceleration: A Natural Remedy For Horizon and Flatness Problems</i>	488
Abhas Mitra	
<i>Gravitational Lensing by Elliptical Galaxies</i>	490
Daniel J. Mortlock and Rachel L. Webster	
<i>Limits On The Core Radii Of JVAs/CLASS Gravitational Lenses</i>	492
M. Norbury, N. J. Jackson, I. W. A. Browne, P. N. Wilkinson, and D. Rusin	
<i>Constraints on the Tensor Mode from Large Scale Structure Observations</i>	494
B. Novosyadlyj, R. Durrer and S. Apuneych	
<i>Primordial Bubbles within Primordial Bubbles</i>	497
Franco Occhionero, Luca Amendola, and Pier Stefano Corasaniti	
<i>The Initial Condition of Cosmological High-Resolution Simulations</i>	499
T. Ogawa, S. Ebi, K. Yamashita, and M. Den	
<i>Bulk Motion of Galaxies and Hubble Flow Anisotropy on a Scale of 100 Mpc</i>	501
S. L. Parnovsky, V. E. Karachentseva, Yu. N. Kudrya, and I. D. Karachentsev	
<i>Star Formation History from Radio Observations: A New Look at an Important Cosmological Parameter</i>	503
R. B. Partridge	
<i>The JVAs/CLASS 6'' to 15'' Lens Search</i>	506
P. M. Phillips, I. W. A. Browne, P. N. Wilkinson, and N. J. Jackson	
<i>Bayesian Joint Estimation of Non-Gaussianity and the Power Spectrum</i>	508
G. Rocha, J. Magueijo, M. Hobson, and A. Lasenby	
<i>How flat is the Universe?</i>	510
M. Roos and S. M. Harun-or-Rashid	
<i>Commissioning the Very Small Array</i>	512
Ben Rusholme	
<i>The “still point” cosmology</i>	514
Ivan I. Shevchenko	

<i>The WEB Structures at Small Scale Related to <math>\Lambda_0</math> Problem . . . . .</i>	516
Marian Doru Suran and Nedelia Antonia Popescu	
<i>Galaxy Luminosity Function: Applications and Cosmological Implications . . . . .</i>	519
Tsutomu T. Takeuchi, Kohji Yoshikawa and Takako T. Ishii	
<i>Observation of the Sunyaev-Zel'dovich Effect toward CL0016+16 at 43 G Hz . . . . .</i>	521
M. Tsuboi, T. Ohno, Y. Tanabe, T. Kasuga, N. Kuno, A. Sakamoto, A. Miyazaki and H. Matsuo	
<i>Galactic Foregrounds and CMB Polarization with SPOrt . . . . .</i>	523
M. Tucci, S. Cortiglioni, E. Carretti, M. Orsini, R. Fabbri, S. Cecchini, G. Sironi, G. Boella, S. Bonometto, M. Gervasi, C. Macculi, J. Monari, L. Nicastro, A. Orfei, U. Pisani, S. Poppi, R. Tascone, and M. Zannoni	
<i>Surveying the foreground sources for the Very Small Array, with the Ryle Telescope at 15 GHz . . . . .</i>	525
E. M. Waldram and G. G. Pooley	
<i>Effect of Spin-Gravity Interaction on the Cosmological Parameters . . . . .</i>	527
M. I. Wanas	
<i>Results from the Tenerife Experiments. . . . .</i>	530
R. A. Watson, J. F. Macias-Perez, R. D. Davies, R. J. Davis, A. Wilkinson, R. Rebolo, and C. Gutierrez	
<i>VLA and MERLIN Monitoring Observations of the Gravitational Lens System B1030+074 . . . . .</i>	532
E. Xanthopoulos, I. W. A. Browne, A. R. Patnaik, and P. N. Wilkinson	
<i>To Solve Dark Matter Problems Without Dark Matter . . . . .</i>	534
Chongming Xu and Xuejun Wu	
<i>Constraining Galaxy Formation Epoch . . . . .</i>	536
S. Yi, T. Brown, S. Heap, I. Hubeny, W. Landsman, T. Lanz and A. Sweigart	
<i>The Spectral Index of the Galactic Foreground Affecting CMB Measurements . . . . .</i>	538
M. Zannoni, E. S. Battistelli, G. Boella, M. Gervasi and G. Sironi	
<i>Author Index . . . . .</i>	541