

## Table of Contents

Preface . . . . .	xv
List of Participants . . . . .	xix
Conference Photo . . . . .	xxiii

### Part 1: Radio Source Surveys and Cosmology

Radio Source Surveys . . . . .	3
<i>J.J. Condon</i>	
The Sydney University Molonglo Sky Survey (SUMSS) and Optical Redshift Surveys of the Southern Sky . . . . .	11
<i>E.M. Sadler and R.W. Hunstead</i>	
Cambridge Low Frequency Surveys . . . . .	21
<i>D.A. Green</i>	
A Low-frequency Southern Sky Survey Using the Mauritius Radio Telescope . . . . .	25
<i>N. Udaya Shankar</i>	
WSRT 1.4 GHz Observations of the Hubble Deep Field . . . . .	32
<i>M.A. Garrett, G. de Bruyn, W. Baan and R.T. Schilizzi</i>	
Cosmological Studies from Radio Source Samples . . . . .	34
<i>S. Rawlings</i>	
Radio Source Evolution Derived from Low Frequency Surveys . . . . .	50
<i>C.A. Jackson and J.V. Wall</i>	
Large Scale Structure Among $z \sim 2$ Quasars as a Cosmological Standard Ruler . . . . .	54
<i>B.F. Roukema and G.A. Mamon</i>	
The Luminosity Periodicity of Galaxies and Quasars in the Decametric Range . . . . .	56
<i>A.P. Miroshnichenko</i>	
Cosmic Microwave Background at Low Frequencies . . . . .	58
<i>R. Subrahmanyan</i>	
Absorption Against the Cosmic 2.7 K Background . . . . .	66
<i>S. Chandra and W.H. Kegele</i>	

### Part 2: Extragalactic Neutral Hydrogen and Cosmology

Signatures of HI in the Early Universe: The End of the Dark Ages . . .	71
<i>A. Meiksin</i>	
A Step to the Reionization Epoch . . . . .	79
<i>P.A. Shaver</i>	

21 cm Absorption Lines at High Redshift from Intervening Galaxies . . . . .	83
<i>F.H. Briggs</i>	
Associated HI in Absorbers at High Redshift . . . . .	91
<i>R.C. Vermeulen</i>	
HI with GMRT . . . . .	96
<i>J.N. Chengalur</i>	
A WSRT Survey for HI Absorption at Moderate Redshifts . . . . .	102
<i>W.M. Lane and F.H. Briggs</i>	
Probing HI in the Universe with SKA . . . . .	106
<i>J.M. van der Hulst</i>	
Probing Large Scale Structures in HI with GMRT . . . . .	108
<i>S. Bharadwaj, B.B. Nath and S.K. Sethi</i>	
Probes of Low Surface Brightness Galaxies through Low Frequency Spectroscopy with GMRT . . . . .	110
<i>D. Narasimha and S.M. Chitre</i>	
Using Gravitational Lenses to Probe HI at High z . . . . .	114
<i>T.D. Saini, S.K. Sethi and S. Bharadwaj</i>	
Search for Radio Recombination Lines towards the Gravitational Lens PKS1830-211 . . . . .	116
<i>N.R. Mohan, K.R. Anantharamaiah and W.M. Goss</i>	
HI absorption in Radio Galaxies . . . . .	118
<i>R. Morganti, T.A. Oosterloo, G. van Moorsel, C.N. Tadhunter and N. Killeen</i>	
Atomic Hydrogen Gas Images of QSO Host Galaxies . . . . .	122
<i>J. Lim and P.T.P. Ho</i>	
An HI Search for the Host Galaxies of 27 Radio-loud AGN at $z \sim 2.3$ .	127
<i>T. Ghosh, M.M. Davis, C.J. Salter and M.C. Aller</i>	
HI in Active Galactic Nuclei . . . . .	129
<i>Z. Yu and D. Jiang</i>	

### Part 3: Clusters of Galaxies

Observational Properties of Diffuse Halos in Clusters . . . . .	133
<i>L. Feretti</i>	
Theoretical Implications of Diffuse Non-Thermal Emission from Clusters of Galaxies . . . . .	141
<i>T.A. Enßlin</i>	
Radio Halos and Relics in Clusters of Galaxies and Detection Statistics	149
<i>G. Giovannini, L. Feretti and F. Govoni</i>	
Diffuse Sources in Clusters: What Turns them on . . . . .	151
<i>T. Murphy and R.W. Hunstead</i>	
Extreme Relic Radio Sources in Four Southern Clusters . . . . .	153
<i>H. Andernach, O.B. Slee, A.L. Roy and M.Ehle</i>	

The Dual Radio Relics of A3667 . . . . .	157
<i>M. Johnston-Hollitt, R. W. Clay, R. D. Ekers, M. H. Wieringa and R. W. Hunstead</i>	
A Large Diffuse Radio Source in a Cluster of Galaxies at $z=0.13$ . . . . .	159
<i>Gopal-Krishna, V.K. Kulkarni, J. Bagchi and J. Melnick</i>	
Active Galaxies and Candidate Remnants in the Core of the Shapley Concentration . . . . .	161
<i>T. Venturi, S. Bardelli, D. Dallacasa, R.W. Hunstead, R. Morganti and T. Tzioumis</i>	
Environmental Effects and the Dynamical State of Coma from a VLA HI Survey . . . . .	163
<i>H. Bravo-Alfaro, J. H. van Gorkom, V. Cayatte and C. Balkowski</i>	
Coma Southwest — as seen by the GMRT . . . . .	166
<i>K.S. Dwarakanath and J.N. Chengalur</i>	

### Part 4: Extragalactic Radio Sources

Extended Extragalactic Radio Emission . . . . .	171
<i>F.N. Owen, M.J. Ledlow, J.A. Eilek, N.E. Kassim, N. Miller, K.S. Dwarakanath and R.J. Ivison</i>	
Spectral Mapping of Classical Double Radio Sources . . . . .	179
<i>J.P. Leahy and T.W.B. Muxlow</i>	
3C Radio Sources as They've Never Been Seen Before . . . . .	189
<i>K.M. Blundell, N.E. Kassim and R.A. Perley</i>	
VLA Images of Two Extended Radio Galaxies . . . . .	193
<i>W. Junor, F. Mantovani, R. Morganti and L. Padrielli</i>	
Giant Radio Galaxies and the Inter Galactic Medium . . . . .	195
<i>A.P. Schoenmakers, A.G. de Bruyn, H.J.A. Röttgering and H. van der Laan</i>	
Giant Radio Sources: Evolution and GMRT Observations . . . . .	199
<i>C.H. Ishwar-Chandra and D.J. Saikia</i>	
Statistics of Giant Radio Sources . . . . .	203
<i>J. Machalski and M. Jamrozy</i>	
Statistical Study on Large Samples of Radio Sources . . . . .	207
<i>X.Z. Zhang, B. Peng and P.C. Chen</i>	
Compact Steep Spectrum Radio Sources . . . . .	209
<i>S. Jeyakumar and D.J. Saikia</i>	
Physical Conditions in CSS Radio Sources . . . . .	211
<i>S.A. Tyul'bashev and P.A. Tchernikov</i>	

Interferometer Observations of Extragalactic Radio Sources at Decameter Wavelengths . . . . .	213	Radio Continuum Surveys of the Galaxy and Galaxies . . . . .	262
<i>A.V. Mogn, S.Ya. Braude, S.L. Rashkovsky, V.A. Shepelev,     N.K.Sharykin and G.A. Inyutin</i>		<i>R. Wielebinski</i>	
The Problem of Identifying Decametric Sources . . . . .	215	The Galactic Center at 327 MHz . . . . .	268
<i>O.V. Verkhodanov, H. Andernach and N.V. Verkhodanova</i>		<i>T.N. LaRosa, N.E. Kassim, T.J.W. Lazio and S.D. Hyman</i>	
Radio-optical Identification of Very-Steep Spectrum Radio Sources from the UTR-2 Catalogue . . . . .	217	VLA Observations of the Galactic Center at 74 MHz . . . . .	272
<i>H. Andernach, O.V. Verkhodanov and N.V. Verkhodanova</i>		<i>K.R. Anantharamaiah, N.E. Kassim, T.J.W. Lazio, W.M. Goss     and H. Falcke</i>	
BVRI-Photometry of Distant Radio Galaxies from RC Catalogue in SAO RAS . . . . .	219	GMRT Observations of the Galactic Centre region . . . . .	274
<i>Yu.N. Parijski, W.M. Goss, A.I. Kopylov, N.S. Soboleva,     O.V. Verkhodanov, A.V. Temirova and O.P.Zhelenkova</i>		<i>S. Roy and A.P. Rao</i>	
Study of Objects of Low Radio Frequency Catalogues and IRAS Data — Cross-Identification . . . . .	221	Radio Observations of Galactic SNRs . . . . .	276
<i>O.V. Verkhodanov and S.A. Trushkin</i>		<i>D.A. Green</i>	
The Nuclear Structure of the Giant Radio Galaxy, 3C236 . . . . .	225	Radio Observations of Supernova Remnants and the Surrounding Interstellar Medium . . . . .	284
<i>W.W. Tian, R.T. Schilizzi and R. Nan</i>		<i>G. Dubner</i>	
Extended X-ray Emission from FRIIs and RL Quasars . . . . .	227	Low Frequency Insights into Supernova Remnants . . . . .	291
<i>G. Setti, G. Brunetti and A. Comastri</i>		<i>K.K. Dyer, S.P. Reynolds, K.J. Borkowski N.E. Kassim     and C.K. Lacey</i>	
Effects of Synchrotron Loss on the Low-Frequency Spectra of Extragalactic Radio Sources with Inhomogeneities . . . . .	231	Radio Spectra of Complete Sample of Galactic Supernova Remnants .	295
<i>N. Tsvyk</i>		<i>S.A. Trushkin</i>	
Outflows and the Disk-Halo Connection in Galaxies . . . . .	233	On the Association of G343.1-2.3 and PSR 1706-44 . . . . .	299
<i>J.A. Irwin</i>		<i>R. Dodson, K. Golap, J. Osborne and N. UdayaShankar</i>	
GMRT Observations of M 82 and NGC 3079 . . . . .	241	The Radio Spectral Index of 3C58 . . . . .	303
<i>J.A. Irwin and D.J. Saikia</i>		<i>M.F. Bietenholz, N. Kassim and K. Weiler</i>	
Radio Recombination Lines from Starburst Galaxies: High and Low Density Ionized Gas . . . . .	243	Deep Imaging of SNRs at Low Frequencies Using the GMRT . . . . .	307
<i>N.R. Mohan, K.R. Anantharamaiah and W.M. Goss</i>		<i>S. Bhatnagar</i>	
Low Frequency Catalogues of the CATS Database . . . . .	245	A Multifrequency Radio Spectral Study of SNR HB21 . . . . .	309
<i>O.V. Verkhodanov, S.A. Trushkin and H. Andernach</i>		<i>X.Z. Zhang, L.A. Higgs, T.L. Landecker, S.J. Qian     and X.J Wu</i>	
The SEDs Database to Study Evolution of Radio Galaxies . . . . .	247	Supernova Remnant G11.2-0.3 and the ISM . . . . .	311
<i>O.V. Verkhodanov, A.I. Kopylov, O.P. Zhelenkova,     N.V. Verkhodanova, V.N. Chernenkov, Yu.N. Parijskij,     N.S. Soboleva and A.V. Temirova</i>		<i>A.C. Seth</i>	
<b>Part 5: Galactic Surveys and Extended Emission</b>		Multifrequency GMRT observations of HII regions . . . . .	313
Galactic Plane Surveys at Low Frequencies . . . . .	251	<i>A. Omar, J.N. Chengalur and D.A. Roshi</i>	
<i>A.R. Taylor</i>		Anisotropy of Hectometric Cosmic Background . . . . .	315
The Molonglo Galactic Plane Survey: MGPS2 . . . . .	259	<i>Y.V. Tokarev, M.L. Kaiser, G.N. Boiko and P.V. Gustov</i>	
<i>A.J. Green</i>			
<b>Part 6: Spectral Studies of our Galaxy</b>			
Low frequency Recombination Lines of Hydrogen . . . . .	319		
<i>K.R. Anantharamaiah</i>			
Low frequency Carbon Recombination Lines . . . . .	327		
<i>A.A. Konovalenko</i>			
A Study of Low density Ionized Gas in the Galactic Plane . . . . .	335		
<i>D.A. Roshi and K.R. Anantharamaiah</i>			

A Galactic Plane Survey in the CO (2-1) Line with the 60 cm Telescopes to Address Physical Condition of the Interstellar Matter . . . . .	339
<i>T. Handa, T. Hasegawa, J.I. Morino, T. Sawada, S. Sakamoto, K.S. Usuda, A. Luna, L. Bronfman and M. Hayashi</i>	
HI 21 cm-line Observations with the GMRT Towards Interstellar Clouds Previously Seen in Optical Absorption . . . . .	341
<i>R. Mohan, K.S. Dwarakanath, G. Srinivasan and J.N. Chengalur</i>	
Preliminary Results of Galactic Radio Recombination Line Observations using the GMRT . . . . .	343
<i>N.G. Kantharia and D.A. Roshi</i>	
Galactic Carbon Recombination Lines near 327 MHz . . . . .	345
<i>D.A. Roshi, N.G. Kantharia and K.R. Anantharamaiah</i>	
Carbon Recombination Lines at 34.5 MHz from the Galactic Plane . .	347
<i>N.G. Kantharia and K.R. Anantharamaiah</i>	
Recombination Radio Lines at Very Low Frequencies . . . . .	349
<i>A.A. Konovalenko, S.V. Stepkin and D.V. Shalunov</i>	
Populations of Hydrogen-like Atoms or Ions and Radio Recombination Lines (RRL's) Interpretation . . . . .	351
<i>N.I. Roveneskaya</i>	

## Part 7: Pulsars and other Compact Galactic Objects

Pulsars: An Observational Overview . . . . .	355
<i>R.N. Manchester</i>	
Pulsars and the ISM . . . . .	363
<i>Y. Gupta</i>	
First Results from Simultaneous Dual Frequency Observations of Pulsars . . . . .	369
<i>Y. Gupta, P. Gothiskar and N.D.R. Bhat</i>	
Detection of New Emission Components in PSR B0329+54 . . . . .	373
<i>R.T. Gangadhara, Y. Gupta and D.R. Lorimer</i>	
Orthogonal Polarization Modes from PSR B0301+19 and B0355+54 .	375
<i>R.T. Gangadhara</i>	
Low-frequency Emission Regions in Pulsars . . . . .	377
<i>J. Kijak</i>	
Low-frequency Profiles of the Crab Pulsar . . . . .	379
<i>A. Kuzmin</i>	
Giant Pulses from Two Pulsars . . . . .	381
<i>A.K. Singal, P.K. Manoharan and R.G. Strom</i>	
The NFRA Pulsar Machine PuMA . . . . .	383
<i>R.G. Strom</i>	

A WSRT Search for Millisecond Pulsars . . . . .	387
<i>W.W. Tian, R. G. Strom, B. W. Stappers, X. Z. Zhang, X. J. Wu and R. Ramachandran</i>	
Low-frequency Observations of Millisecond Pulsars . . . . .	389
<i>A. Kuzmin</i>	
Unique Radio Pulsar Geminga . . . . .	393
<i>V.M. Malofeev and O.I. Malov</i>	
A VLA search for the Geminga Pulsar at 74 and 326 MHz . . . . .	395
<i>T.J.W. Lazio and N.E. Kassim</i>	
Radio Variability of the Galactic X-ray Binaries with Relativistic Jets . . . . .	397
<i>S.A. Trushkin and N.N. Bursov</i>	
New Radiation Formulae of Relativistic Electrons in Curved Magnetic Field Lines . . . . .	400
<i>Ya.M. Sobolev</i>	
Frequency Spectra Fluctuations in the Radio Interferometry of Polarised Radiation . . . . .	402
<i>M.R. Olyak</i>	

## Part 8: Sun and Planetary Systems

Low Frequency Planetary Radio Astronomy . . . . .	407
<i>R.J. Sault</i>	
Solar Radio Astronomy at Low Frequencies . . . . .	415
<i>M. Pick</i>	
Radio Astronomical Scintillation in the Solar Wind Plasma: Imaging Interplanetary Disturbances . . . . .	426
<i>P.K. Manoharan, M. Pick and LASCO Consortium</i>	
Solar Observation with Miyun Radio Telescope . . . . .	430
<i>X.Z. Zhang, T.Y. Piao, L.S. Kang and L. Pang</i>	
Observations of Solar Bursts Using the New Radio Spectrograph . .	432
<i>A. Shanmugaraju, S. Umapathy and V. Balasubramanian</i>	
Interpretation of James' Experiments in Plasma Theory of Solar Radar Echoes . . . . .	434
<i>V.N. Mel'nik</i>	

## Part 9: Instrumentation and Techniques

GMRT — Current Status . . . . .	439
<i>A.P. Rao</i>	
The 74 MHz System on the VLA . . . . .	447
<i>R. A. Perley, W.C. Erickson and N.E. Kassim</i>	

Practical Lessons from Low Frequency Imaging with the VLA . . . . .	455
<i>C.K. Lacey and N.E. Kassim</i>	
Low Frequency Science with the Square Kilometre Array . . . . .	459
<i>A.R. Taylor</i>	
Concepts and Technical Studies of the Square Kilometre Array . . . . .	467
<i>A. van Ardenne</i>	
The Low-Frequency Array (LOFAR): Opening a New Window on the Universe . . . . .	474
<i>N.E. Kassim, T. J.W. Lazio, W.C. Erickson, P.C. Crane,         R.A. Perley and B. Hicks</i>	
Towards a Concept Design for a LOFAR . . . . .	484
<i>J.D. Bregman</i>	
ALOFT: A Potential Low Frequency Space VLBI Mission . . . . .	486
<i>H. Hirabayashi, I.M. Avruch and D.W. Murphy</i>	
Low Frequency Radio Astronomy from Above the Ionosphere . . . . .	488
<i>D.L. Jones</i>	
The Universe at Very Low Radio Frequencies . . . . .	490
<i>S.Ya. Braude, A. A. Konovalenko and A. V. Mign</i>	
Low Frequency VLBI Project . . . . .	492
<i>I.E. Molotov, S.F. Likhachev, A.A. Chuprikov, A. Dementiev,         B. Lipatov, M. Nechaeva, S. Snegirev, N. Dugin,         S. Ananthakrishnan, V. Balasubramanian, A. Benz,         F. Mantovani, X. Liu, X. Hong, A. Kus, E.P. Molotov,         S.P. Ignatov, B.A. Poperechenko, Y.N. Gorshenkov         and A.A. Konovalenko</i>	
The Development of the FAST Project in China . . . . .	494
<i>R. Nan, B. Peng, Y. Qiu, L. Zhu, Y. Su and W. Zhu</i>	
Radio Frequency Interference . . . . .	498
<i>R. D. Ekers and J. F. Bell</i>	
High dynamic range, Interferences Tolerant, Digital Receivers for Radioastronomy: Results and Projects at Paris and Nanay Observatory . . . . .	506
<i>C. Rosolen, A. Lecacheux, E. Gerard, V. Clerc and L. Denis</i>	
Wide Field Imaging at Low Frequencies . . . . .	508
<i>R.J. Sault</i>	
Filter CLEAN — An Improved Method for CLEANing Images . . . . .	512
<i>A. McPhail</i>	
Geometric Phase in Phasing of Antenna Arrays . . . . .	514
<i>R. Bhandari</i>	
Author Index . . . . .	517