

7th International Conference on Gravitation and Cosmology 2011

Vishwa Mimansa: An Interpretive Exposition of the Universe

Journal of Physics: Conference Series Volume 484

**Goa, India
14-19 December 2011**

Editors:

**B. S. Sathyaprakash
Tejinder P. Singh**

**ISBN: 978-1-63266-705-2
ISSN: 1742-6588**

Printed from e-media with permission by:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571



Some format issues inherent in the e-media version may also appear in this print version.

Copyright© by the Institute of Physics
All rights reserved.

Printed by Curran Associates, Inc. (2014)

For permission requests, please contact the Institute of Physics
at the address below.

Institute of Physics
Dirac House, Temple Back
Bristol BS1 6BE UK

Phone: 44 1 17 929 7481
Fax: 44 1 17 920 0979

techtracking@iop.org

Additional copies of this publication are available from:

Curran Associates, Inc.
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: 845-758-0400
Fax: 845-758-2634
Email: curran@proceedings.com
Web: www.proceedings.com

TABLE OF CONTENTS

PREFACE

Acknowledgements, Preface, Introduction	1
<i>B.S. Sathyaprakash, T.P. Singh</i>	
Inaugural Address: From Jets to Cosmos to Cosmic Censorship	13
<i>P.S. Joshi</i>	

CONFERENCE PROGRAMME

Programme	16
<i>N/A</i>	

PAPERS

KEYNOTE ADDRESS

The Natural Science of Cosmology	33
<i>P.J.E. Peebles</i>	

PLENARY LECTURE

Using General Relativity to Study Superconductivity	44
<i>G.T. Horowitz</i>	

MINI-SESSION: 1 GRAVITY AS AN EMERGENT PHENOMENON

Coordinator: T. Padmanabhan

Connections Between Gravitational Dynamics and Thermodynamics	57
<i>R.-G. Cai</i>	
Expressing Entropy Globally in Terms of (4D) Field-Correlations	66
<i>R.D. Sorkin</i>	

MINI-SESSION: 2 DARK ENERGY

Coordinator: Varun Sahni

Effects of Inhomogeneities on the Expansion of the Universe: A Challenge to Dark Energy?	75
<i>M.-N. Celerier</i>	
The Direction of Gravity	84
<i>E.V. Linder</i>	

MINI-SESSION: 3 ASTRONOMY WITH A GLOBAL NETWORK OF GRAVITATIONAL WAVE DETECTORS

Coordinator: B.S. Sathyaprakash

Improved Source Localization with LIGO-India	92
<i>S. Fairhurst</i>	
Astrophysics, Cosmology, and Fundamental Physics with Compact Binary Coalescence and the Einstein Telescope	99
<i>C. Van Den Broeck</i>	

WORKSHOP: 1 CLASSICAL GENERAL RELATIVITY AND GRAVITATIONAL WAVES

Coordinators: Sukanta Bose, Sanjay Jhingan

Exact Solutions for Isometric Embeddings of Pseudo-Riemannian Manifolds	109
<i>G. Amery, J. Moodley</i>	
Symmetry Reduction on Non-Expanding Horizons	113
<i>R. Basu, A. Chatterjee, A. Ghosh</i>	

Localizing the Energy and Momentum of Linear Gravity	118
<i>L.M. Butcher</i>	
Spherical Gravitational Wave Detectors: MiniGRAIL and Mario Schenberg	122
<i>C.F. Da Silva Costa, O.D. Aguiar</i>	
Spherical Gravitational Collapse in 5D Einstein-Gauss-Bonnet Gravity	127
<i>S. Ghosh, S. Jhingan, D.W. Deshkar</i>	
Generalized Junction Conditions for Collapsing Models	132
<i>G. Govender, S.D. Maharaj, M. Govender</i>	
Gravity in Five-Dimensional Warped Product Spacetimes with Time-Dependent Warp Factor	137
<i>S. Guha, P. Bhattacharya</i>	
High-Velocity Collision of Particles Around a Rapidly Rotating Black Hole	142
<i>T. Harada</i>	
Optical Analogues of Spherically Symmetric Black Hole Spacetimes	146
<i>S.S. Hegde, C.V. Vishveshwara</i>	
On the Comparison of Results Regarding the Post-Newtonian Approximate Treatment of the Dynamics of Extended Spinning Compact Binaries	150
<i>S. Hergt, J. Steinhoff, G. Schafer</i>	
Confinement and Focusing of Geodesics in Warped Spacetimes	155
<i>S. Kar, A. Das Gupta, S. Ghosh, H. Nandan</i>	
Galaxy Rotation Curves from a Fourth Order Gravity	159
<i>P. Mishra, T.P. Singh</i>	
Future Non-Linear Stability of the Einstein-Vlasov System with Bianchi II Symmetry	163
<i>E. Nungesser</i>	
Variational Principle for Gravity in the Extended Phase-Space	167
<i>P. Sharan</i>	
Spacetime Inhomogeneity and Gravitational Collapse	171
<i>R. Sharma</i>	
Full-Analytic Frequency Domain Gravitational Wave Forms from Eccentric Compact Binaries to Second Post-Newtonian Accuracy	175
<i>M. Tessmer, G. Schafer</i>	
Black Hole Binary OJ287 as a Testing Platform for General Relativity	179
<i>M.J. Valtonen, A. Gopakumar, S. Mikkola, K. Wiik, H.J. Lehto</i>	
Effect of Calibration Errors on Bayesian Parameter Estimation for Gravitational Wave Signals from Inspirial Binary Systems in the Advanced Detectors Era: Further Investigations	183
<i>S. Vitale, W. Del Pozzo, T.G.F. Li, C. Van Den Broeck, B. Aylott, J. Veitch</i>	
Treatment of Calibration Uncertainty in Multi-Baseline Cross-Correlation Searches for Gravitational Waves	188
<i>J.T. Whelan, E.L. Robinson, J.D. Romano, E.H. Thrane</i>	

WORKSHOP: 2 COSMOLOGY

Coordinators: E. Komatsu, L. Sriramkumar

Residual Foreground Contamination in the WMAP Data	192
<i>P. Chingangbam, C. Park</i>	
Dipole Leakage and Low CMB Multipoles	197
<i>S. Das, T. Souradeep</i>	
Measuring the Hubble Constant Using Gravitational Waves	201
<i>W. Del Pozzo</i>	
Evolution of Spherical Over-Density in Thawing Dark Energy Models	205
<i>N.C. Devi, A.A. Sen, T.R. Choudhury</i>	
Characterizing the Diffuse Foreground for Redshifted 21-cm HI signal: GMRT 153 MHz Observation	210
<i>A. Ghosh, J. Prasad, S. Bharadwaj, S.S. Ali, J.N. Chengalur</i>	
The Cross-Correlation of Redshifted 21-cm Signal and Lyman-α Forest: A Cosmological Probe	215
<i>T. Guha Sarkar, S. Bharadwaj</i>	
Cosmic Microwave and Infrared Backgrounds Cross-Correlation for ISW Detection	221
<i>S. Ilic</i>	
Observational Cosmology and the Cosmic Distance Duality Relation	226
<i>S. Jhingan, D. Jain, R. Nair</i>	
Weighing Neutrinos Using High Redshift Galaxy Luminosity Functions	230
<i>C. Jose, S. Samui, K. Subramanian, R. Srianand</i>	
Non-Gaussianity from Extragalactic Point Sources	234
<i>F. Lacasa</i>	

High-Order Clustering of WiggleZ Galaxies	239
<i>F.A. Marin</i>	
Joint QSO - CMB Constraints on Reionization History	243
<i>S. Mitra</i>	
Probing the Anisotropic Expansion History of the Universe Using CMBR	248
<i>R.K. Mohapatra, P.S. Saumia, A.M. Srivastava</i>	
The CFHTLS-Strong Lensing Legacy Survey (SL2S): Investigating the Group-Scale Lenses with the SARCS Sample	253
<i>A. More, R. Cabanac, S. More, C. Alard, M. Limousin, J.-P. Kneib, R. Gavazzi, V. Motta</i>	
The Galaxy-Dark Matter Connection: A Cosmological Perspective	261
<i>S. More, F. van den Bosch, M. Cacciato, A. More, H. Mo, X. Yang</i>	
Modelling Non-Linear Large Scale Structure Using Lagrangian Perturbation Theory Re-expansions	266
<i>S. Nadkarni-Ghosh, D.F. Chernoff</i>	
Interplay Between Cosmological Expansion and Massive Objects	270
<i>R. Nandra, A.N. Lasenby, M.P. Hobson</i>	
Higher Dimensional Cosmological Models: An Alternative Explanation for Late Time Cosmic Acceleration	275
<i>I. Pahwa</i>	
Statistics of Statistical Anisotropy Measures	279
<i>N. Pant, A. Roti, T. Souradeep</i>	
Cosmological Parameter Estimation Using Particle Swarm Optimization	283
<i>J. Prasad, T. Souradeep</i>	
Effect of Dark Energy Sound Speed and Equation of State on CDM Power Spectrum	287
<i>H.A. Rizwan, S. Unnikrishnan</i>	
Halo Shapes, Initial Shear Field, and Cosmic Web	291
<i>G. Rossi</i>	
The Luminosity, Colour and Morphology Dependence of Galaxy Structures in the Sloan Digital Sky Survey	296
<i>P. Sarkar, B. Pandey, S. Bharadwaj</i>	

WORKSHOP: 3 QUANTUM GRAVITY AND EARLY UNIVERSE

Coordinators: J. David, S. Mukohyama

Rydberg Atom in Gravity	300
<i>A. Agrawal</i>	
Cosmological Magnetogenesis	305
<i>K. Atmjeet</i>	
Baryon Inhomogeneities Due to CP Violating QCD Z(3) Walls	309
<i>A. Atreya, A. Sarkar, A.M. Srivastava</i>	
Detailed Black Hole State Counting in Loop Quantum Gravity	313
<i>G.J.F. Barbero</i>	
Effects of Radiation on Primordial Non-Gaussianity	317
<i>S. Das</i>	
Singularity Resolution in Cosmologies Using AdS/CFT	321
<i>A. Ghosh</i>	
Multi-field Inflation: Formulation, Effective Theory and Phenomenology	326
<i>J.-O. Gong</i>	
Primordial Power Spectrum Features and Consequences	330
<i>G. Goswami</i>	
Study on Caustic Formation in Dirac-Born-Infeld Type Scalar Field Systems	335
<i>U.D. Goswami, H. Nandan, M. Sami</i>	
Loop Quantum Cosmology in the Cosmic Microwave Background	339
<i>J. Grain</i>	
An Underlying Theory for Gravity	344
<i>Y.K. Ha</i>	
Generation of Helical Magnetic Fields from Inflation	348
<i>R.K. Jain, R. Durrer, L. Hollenstein</i>	
Tunnelling in a Time Dependent Quartic Potential: Possible Implications for Cosmology	352
<i>R. Kabir, A. Mukherjee</i>	
Action for Gravity: An Emergent Perspective	357
<i>S. Kolekar</i>	

Trace Dynamics As a Model for Emergent Spacetime	361
<i>K. Lochan, T.P. Singh</i>	
Remarks on Non-Gaussian Fluctuations of the Inflaton and Constancy of ζ Outside the Horizon	365
<i>N. Mahajan, R. Rangarajan</i>	
Classical and Quantum Correlation of Quantum Fluctuation	369
<i>Y. Nambu</i>	
Cosmological Singularities, AdS/CFT and de Sitter Deformations	374
<i>K. Narayan</i>	
Perturbations in Loop Quantum Cosmology	379
<i>W. Nelson, I. Agullo, A. Ashtekar</i>	
Information and Cosmological Physics	383
<i>R.R. Parwani</i>	
Upper Bound of the Time-Space Non-Commutative Parameter from Gravitational Quantum Well Experiment	387
<i>A. Saha</i>	
Universal Property of Quantum Gravity Implied by Uniqueness Theorem of Bekenstein-Hawking Entropy	392
<i>H. Saida</i>	
Highlights of Non-Commutative Spectral Geometry	396
<i>M. Sakellariadou</i>	
Super-Horizon Evolution and the Fate of f_{NL}	400
<i>N. Sivanandam</i>	
Modified Constraint Algebra in Loop Quantum Gravity and Spacetime Interpretation	404
<i>R. Tibrewala</i>	
Quantum Gravitational Collapse	409
<i>C. Vaz</i>	
Author Index	