

**International Conference on  
Modern Perspectives of  
Cosmology and Gravitation  
(COSGRAV 12)**

**Journal of Physics: Conference Series Volume 405**

**Kolkata, West Bengal, India  
7-11 February 2012**

**ISBN: 978-1-62276-871-4  
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© (2012) by the Institute of Physics  
All rights reserved.

Printed by Curran Associates, Inc. (2013)

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](mailto: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](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>12001: Quantum Gravity, Space-Time Structure, and Cosmology</b> .....	1
<i>Martin Bojowald</i>	
<b>12002: Bulk–Brane Models: An Overview and Some Queries</b> .....	9
<i>Sayan Kar</i>	
<b>12003: Non-Gaussianities from Isocurvature Modes</b> .....	17
<i>David Langlois</i>	
<b>12004: The Quantum State of Inflationary Perturbations</b> .....	25
<i>Jerome Martin</i>	
<b>12005: Black Holes and Holography</b> .....	34
<i>Samir D. Mathur</i>	
<b>12006: Finite 3D de-Sitter Quantum Gravity</b> .....	43
<i>Rudranil Basu, Samir Ka Paul</i>	
<b>12007: Study of Thermodynamic Quantities in Horava-Lifshitz and <math>f(R)</math> Gravity Theories</b> .....	47
<i>Samarpita Bhattacharya, Ujjal Debnath, Surajit Chattopadhyay</i>	
<b>12008: Increase of Entropy for Black Holes in Einstein-Gauss-Bonnet Theory</b> .....	51
<i>Ayan Chatterjee</i>	
<b>12009: Brane Inflation: A Field Theory Approach in Background Supergravity</b> .....	55
<i>Sayantana Choudhury, Supratik Pal</i>	
<b>12010: Conformally Invariant Inert Higgs Doublet Model: An Unified Model for Inflation and Dark Matter</b> .....	59
<i>Moumita Das, Subhendra Mohanty</i>	
<b>12011: Sterile Neutrino, Hidden Dark Matter and Their Cosmological Signatures</b> .....	63
<i>Subinoy Das</i>	
<b>12012: Generalized Particle Dynamics in Anti de Sitter Spaces: Mimicking a Phantom Dark Energy</b> .....	67
<i>Sudipta Das, Subir Ghosh, Jan-Willem van Holten, Supratik Pal</i>	
<b>12013: Exploring the Dark Ages and Epoch of Reionization with the HI 21 cm Signal</b> .....	71
<i>Abhirup Datta</i>	
<b>12014: Noncommutative Inspired Schwarzschild Black Hole, Voros Product and Komar Energy</b> .....	75
<i>Sunandan Gangopadhyay</i>	
<b>12015: A Discussion on Lorentz Preserving Scalar Fields in Lorentz Violating Theory</b> .....	79
<i>O. Ganguly, D. Gangopadhyay, P. Majumdar</i>	
<b>12016: Linear Higher Derivative Field Theories, Entanglement Entropy and Quantum Phase Transition</b> .....	83
<i>Suman Ghosh, S. Shankaranarayanan</i>	
<b>12017: Geodesic Motions near a Five-Dimensional Reissner–Nordström Anti-de Sitter Black Hole</b> .....	87
<i>Sarbari Guha, Pinaki Bhattacharya</i>	
<b>12018: Wide Binaries As a Critical Test for Gravity Theories</b> .....	91
<i>X. Hernandez, M.A. Jimenez, C. Allen</i>	
<b>12019: Gravitational Waves from <math>f(R)</math> Theory and Its Detection Using Spherical Antenna</b> .....	95
<i>P. Prasia, V.C. Kuriakose</i>	
<b>12020: Emergent Gravity: From Statistical Point of View</b> .....	99
<i>Bibhas Ranjan Majhi</i>	
<b>12021: Simulating Matched Filter Detection of Ionized Bubble Around a Quasar in the Epoch of Reionization</b> .....	103
<i>Suman Majumdar, Somnath Bharadwaj, Tirthankar Roy Choudhury</i>	
<b>12022: Preheating Mechanism in F-term SUSY Hybrid Inflation</b> .....	107
<i>Arindam Mazumdar</i>	
<b>12023: Generalized Smarr Formula As a Local Identity for Arbitrary Dimensional Black Holes</b> .....	111
<i>Sujoy Kumar Modak</i>	
<b>12024: Unitary and Renormalizable Theory of Higher Derivative Gravity</b> .....	115
<i>Gaurav Narain, Ramesh Anishetty</i>	
<b>12025: Possible Role of Berry Phase in Inflationary Cosmological Perturbations</b> .....	119
<i>Barun Kumar Pal, Supratik Pal, B. Basu</i>	
<b>12026: Cluster Merger Blast Wave and the Mystery of Ringlike Radio-Relic Formation Around Some Galaxy Clusters</b> .....	123
<i>Surajit Paul</i>	

<b>12027: ISCO and Principal Null Congruences in Extremal Kerr Spacetime</b> .....	127
<i>Parthapratim Pradhan</i>	
<b>12028: Trivial Symmetries in a 3D Topological Torsion Model of Gravity</b> .....	131
<i>Rabin Banerjee, Debraj Roy</i>	
<b>12029: Noncommutative Quantum Mechanics of a Test Particle Under Linearly Polarized Gravitational Waves</b> .....	135
<i>Anirban Saha</i>	
<b>12030: Exploring the Cosmic Web in the Sloan Digital Sky Survey Data Release Six using the Local Dimension</b> .....	139
<i>Prakash Sarkar</i>	
<b>12031: Horizon Entropy and Higher Curvature Equations of State</b> .....	143
<i>Raf Guedens, Ted Jacobson, Sudipta Sarkar</i>	
<b>Author Index</b>	