

International Conference on Non-Perturbative/Background Independent Quantum Gravity

(LOOPS'11)

Journal of Physics: Conference Series Volume 360

**Madrid, Spain
23-28 May 2011**

Editors:

**Guillermo A Mena Marugán Eduardo J S Villaseñor
J Fernando Barbero G Javier Olmedo
Luis J Garay**

**ISBN: 978-1-62276-777-9
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© (2011) 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

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

PLENARY CONTRIBUTIONS

012001 Some Recent Advances in Loop Quantum Cosmology	1
<i>A Ashtekar</i>	
012002 Ten Questions on Group Field Theory (and Their Tentative Answers)	10
<i>A Baratin, D Oriti</i>	
012003 Chiral Vacuum Fluctuations in Quantum Gravity	20
<i>L Bethke, J Magueijo</i>	
012004 Towards Computational Insights Into the Large-scale Structure of Spin Foams	29
<i>B Dittrich, F C Eckert</i>	
012005 Quantum Scalar Field in Quantum Gravity with Spherical Symmetry	39
<i>R Gambini, J Pullin, S Rastgoo</i>	
012006 Extension of Loop Quantum Gravity to Metric Theories Beyond General Relativity	42
<i>Y Ma</i>	
012007 New Insights in Quantum Geometry	52
<i>H Sahlmann</i>	
012008 Bianchi-I Spacetimes in Loop Quantum Cosmology: Physics of Singularity Resolution	62
<i>P Singh</i>	
012009 The Diffeomorphism Constraint Operator in Loop Quantum Gravity	72
<i>M Varadarajan</i>	

FOUNDATIONS OF QUANTUM GRAVITY

012010 3D Gravity and Quantum Deformations: A Drinfel'd Double Approach	81
<i>A Ballesteros, F J Herranz, C Meusburger</i>	
012011 Perturbative Running of the Immirzi Parameter	85
<i>D Benedetti, S Speziale</i>	
012012 S-Matrix for AdS from General Boundary QFT	89
<i>D Colosi, M Dohse, R Oeckl</i>	
012013 A Systematic Construction of Curved Phase Space: A Gravitational Gauge Theory with Symplectic Form	93
<i>J S Hazboun, J T Wheeler</i>	
012014 Effective Relational Dynamics	97
<i>P A Höhn</i>	
012015 A View on the Problems of Quantum Gravity	101
<i>T P Shestakova</i>	
012016 Loop Quantum Effect and the Fate of Tachyon Field Collapse	105
<i>Y Tavakoli, P V Moniz, J Marto, A H Ziaie</i>	
012017 The Geometric Role of Symmetry Breaking in Gravity	109
<i>D K Wise</i>	

HAMILTONIAN LOOP QUANTUM GRAVITY

012018 Complete Loop Quantization of a Dimension 1+2 Lorentzian Gravity Theory	113
<i>R M S Barbosa, C P Constantinidis, Z Oporto, O Piguet</i>	
012019 Dynamics for a Simple Graph Using the U(N) Framework for Loop Quantum Gravity	117
<i>E F Borja, J Díaz-Polo, L Freidel, I Garay, E R Livine</i>	
012020 SU(2) Gauge Symmetry in Gravity Phase Space	122
<i>F Cianfrani</i>	
012021 Boundary Terms and the 3 + 1 Decomposition of the Holst Action	126
<i>A Corichi, J D Reyes</i>	
012022 On Ashtekar's Formulation of General Relativity	130
<i>C Fleischhack</i>	
012023 Loop Gravity in Terms of Spinors	140
<i>E Livine, J Tambornino</i>	

012024 SU(2) Gauge Theory of Gravity with Topological Invariants	145
<i>S Sengupta</i>	
012025 Perfect Discretization of Path Integrals	149
<i>S Steinhaus</i>	

LOOP QUANTUM COSMOLOGY

012026 Quantum Back-reaction in a Universe with Positive Cosmological Constant	153
<i>D Brizuela</i>	
012027 Inflationary Spectra and Observations in Loop Quantum Cosmology	157
<i>G Calcagni</i>	
012028 Consistent Probabilities in sLQC	161
<i>D A Craig, P Singh</i>	
012029 2-point Functions in Quantum Cosmology	165
<i>S Gielen</i>	
012030 Plane Gravitational Waves and Loop Quantization	169
<i>F Hinterleitner, S Major</i>	
012031 Loop Quantum Cosmology of the Bianchi I Model: Complete Quantization	173
<i>M Martín-Benito, L J Garay, G A Mena Marugán, E Wilson-Ewing</i>	
012032 Inhomogenous Loop Quantum Cosmology with Matter	177
<i>D Martín-De Bias, M Martín-Benito, G A Mena Marugán</i>	
012033 Inflation and Inhomogeneities: A Hybrid Quantization	181
<i>J Olmedo, M Fernández-Méndez, G A Mena Marugán</i>	
012034 Palatini Approach to Bouncing Cosmologies and DSR-like Effects	185
<i>G J Olmo</i>	

BLACK HOLE PHYSICS AND DYNAMICAL TRIANGULATIONS

012035 Black Hole Entropy in Loop Quantum Gravity	189
<i>I Agulló, J F Barbero G, E F Borja, J Díaz-Polo, E J S Villaseñor</i>	
012036 Hawking Radiation from Loop Black Holes	193
<i>E Alesci, L Modesto</i>	
012037 Entropy of Generic Quantum Isolated Horizons	197
<i>C Beetle, J Engle</i>	
012038 The Effective Kinetic Term in CDT	201
<i>T G Budd</i>	
012039 Curved Geometry and Graphs	205
<i>F Caravelli</i>	
012040 Non-commutative Holonomies in 2 + 1 LQG and Kauffman's Brackets	209
<i>K Noui, A Perez, D Pranzetti</i>	

COVARIANT LOOP QUANTUM GRAVITY AND SPINFOAMS

012041 Regularized Hamiltonians and Spinfoams	213
<i>E Alesci</i>	
012042 Operator Spin Foams: Holonomy Formulation and Coarse Graining	217
<i>B Bahr</i>	
012043 Scalar-tensor Theory As a Singular Subsector of $\Lambda(\Phi)$ Plebanski Gravity	222
<i>D Beke</i>	
012044 The Time-oriented Boundary States and the Lorentzian-Spinfoam Correlation Functions	227
<i>E Bianchi, Y Ding</i>	
012045 Singular Topologies in the Boulatov Model	231
<i>S Carrozza</i>	
012046 Holomorphic Simplicity Constraints for 4D Riemannian Spinfoam Models	235
<i>M Dupuis, E R Livine</i>	
012047 Canonical Formalism for Simplicial Gravity	239
<i>P A Höhn</i>	
012048 Dynamics of Loop Quantum Gravity Encoded in Graphs	243
<i>M Kisielowski</i>	

012049 Effective Action for EPRL/FK Spin Foam Models	247
<i>A Mikovic, M Vojinovic</i>	
012050 Einstein-Regge Equations in Spinfoams	251
<i>C Perini</i>	
012051 Shape of Spinfoams Encoded in Graphs	255
<i>J Puchta</i>	
012052 Non-commutative Dual Representation for Quantum Systems on Lie Groups	260
<i>M Raasakka</i>	
012053 Spinfoams: Summing Or Refining?	264
<i>M Smerlak</i>	
012054 Local Gauge Theory and Coarse Graining	267
<i>J A Zapata</i>	
012055 Loop Quantum Brans-Dicke Theory	272
<i>X Zhang, Y Ma</i>	

SHAPE DYNAMICS AND PHENOMENOLOGY DERIVED FROM QUANTUM GRAVITY

012056 Braided Topology and the Emergence of Matter	276
<i>S Bilson-Thompson</i>	
012057 Observable Consequences of Quantum Gravity: Can Light Fermions Exist?	280
<i>A Eichhorn</i>	
012058 The Coupling of Shape Dynamics to Matter	284
<i>H Gomes</i>	
012059 Shape Dynamics	289
<i>T Koslowski</i>	
012060 Longitudinal and Transverse Relativity of Spacetime Locality in Planck-scale-deformed Phase Spaces	294
<i>N Loret, L Barcaroli, G Rosati</i>	
012061 Quantum Geometry Phenomenology: Angle and Semiclassical States	298
<i>S A Major</i>	
012062 Shape Dynamics and AdS/CFT	302
<i>F Mercati</i>	
Author Index	