

CONTENTS

Publications in the Series of Proceedings	v
Sponsors	vii
Organizing Committees and Acknowledgements	viii
Marcel Grossmann Awards	x
Preface	xvii

PART A

PLENARY AND REVIEW TALKS

Space-Time from the Spectral Point of View <i>Chamseddine, Ali H.; Connes, Alain</i>	3
The Formation of Black Holes in General Relativity <i>Christodoulou, Demetrios</i>	24
Matching Conditions in Relativistic Astrophysics <i>Quevedo, Hernando</i>	35
Black Holes as a Source of Information <i>Maldacena, Juan</i>	53
Black Hole Microstate Counting and Its Macroscopic Counterpart <i>Mandal, Ipsita; Sen, Ashoke</i>	64
Transplanckian String Collisions: An Update <i>Veneziano, Gabriele</i>	95
Ultraviolet Divergences and Scale-Dependent Gravitational Couplings <i>Hamber, Herbert W.</i>	108
The Black Hole Stability Problem for Linear Scalar Perturbations <i>Dafermos, Mihalis; Rodnianski, Igor</i>	132
The Global Network of Laser Interferometer Gravitational Wave Detectors <i>Reitze, David H.</i>	190
Analytical Relativity of Black Holes <i>Damour, Thibault</i>	206
Detection of Gravitational Waves Using Pulsar Timing <i>Manchester, Richard N.</i>	226
Relativistic Spin-Precession in Binary Pulsars <i>Kramer, Michael</i>	241

xxiv

Supernovae and Gamma-Ray Bursts: 10 Years of Observations <i>Della Valle, Massimo</i>	261
Gamma-Ray Bursts as Relativistic Objects <i>Piran, Tsvi</i>	269
Fundamental Physics from Black Holes, Neutron Stars and Gamma-Ray Bursts <i>Ruffini, Remo</i>	286
The Fascinating TeV Sky <i>Aharonian, Felix</i>	368
Galaxy Clusters and Their Central Supermassive Black Holes: Case of M87 <i>Churazov, Eugene; Sazonov, Sergey; Sunyaev, Rashid; Forman, William; Jones, Christine; Böhringer, Hans</i>	381
Intergalactic Shock Fronts <i>Markevitch, Maxim</i>	397
Studies of Dark Energy with X-Ray Observations of Galaxy Clusters <i>Vikhlinin, Alexey</i>	411
Bringing our Galaxy's Central Supermassive Black Hole and its Environs into Focus with Laser Guide Star Adaptive Optics <i>Ghez, Andrea M; Morris, Mark R; Do, Tuan; Yelda, Sylvana; Lu, Jessica R; Matthews, Keith</i>	420
Dark Energy from Cosmic Structure <i>Wiltshire, David L.</i>	434
Two Hundred Years of Galactic Studies in Tartu Observatory <i>Einasto, Jaan</i>	453
Shocks, Cold Fronts and Supermassive Black Holes Outbursts in Clusters of Galaxies <i>Jones, Christine</i>	473
Active Galactic Nuclei and Gamma Rays <i>Giebels, Berrie; Aharonian, Felix; Sol, Hélène</i>	495
Black Holes in Higher Dimensions (Black Strings and Black Rings) <i>Kunz, Jutta</i>	506
On the Black Hole Species (by Means of Natural Selection) <i>Rodriguez, Maria J.</i>	523
MHD Processes Near Black Holes and Magnetorotational Supernovae (Review) <i>Moiseenko, Sergey</i>	543

Cosmological Backreaction <i>Schwarz, Dominik J.</i>	563
Averaging Space-Time: Where Do We Go from Here? <i>Van Den Hoogen, Robert J.</i>	578
Quantum Cosmology for the XXIst Century: A Debate <i>Bojowald, Martin; Kiefer, Claus; Vargas Moniz, Paulo</i>	589
Testing Lorentz Invariance <i>Herrmann, Sven; Lämmerzahl, Claus</i>	609
Second Generation Gravitational Wave Detectors <i>Harry, Gregory M.</i>	628
Thirty Years of Studies of Integrable Reductions of Einstein's Field Equations <i>Alekseev, George A.</i>	645
Primordial Gravitational Waves and Cosmic Microwave Background Radiation <i>Baskaran, Deepak; Grishchuk, Leonid P.; Zhao, Wen</i>	667
The Soft and the Hard Way to Look for the Old Quantum Theory of Gravity <i>Amelino-Camelia, Giovanni</i>	684

PARALLEL SESSIONS

• Post-Newtonian and Analytic Approximations

Chairperson: Blanchet, Luc

Transformation Law of the Gravimagnetic Field in Harmonic Coordinates <i>Abdildin, Meirkhan M.; Abishev, Medeu E.; Boshkayev, Kuantay A.;</i> <i>Taukenova, Aliya S.</i>	709
Choreography and Gravitational Waves for 2-Body and 3-Body Gravitating Systems <i>Asada, Hideki</i>	713
Non-Axisymmetric Configurations in the Post-Newtonian Approximation to General Relativity <i>Gürlebeck, Norman; Petroff, David</i>	716
Post-Minkowskian Closed-Form Hamiltonian for Gravitating N -Body Systems <i>Ledvinka, Tomáš; Schäfer, Gerhard; Bičák, Jiří</i>	719

xxvi

Extension of the IAU Metric to be Considered for Inner Solar System Laser Experiments <i>Minazzoli, Olivier; Chauvineau, Bertrand</i>	722
Subleading Spin-Orbit Correction to the Newtonian Potential in Effective Field Theory Formalism <i>Perrodin, Delphine L.</i>	725
ADM Canonical Formulation with Spin and Application to Post- Newtonian Approximations <i>Steinhoff, Jan; Hergt, Steven; Schäfer, Gerhard</i>	728
On the Nonlinear Asymptotics of Travelling Gravitational Waves in the Harmonic Gauge <i>Szpak, Nikodem</i>	731
Circular Inspiral Templates <i>Tessmer, Manuel</i>	734
Compact Binaries on Hyperbolic Orbits <i>Vasúth, Máttyás; Majár, János; Forgács, Péter</i>	737
• Compact Binary Simulations: Spins and Gravitational Recoil, Comparisons with Post-Newtonian Results <i>Chairperson: Pablo Laguna</i>	
Inferring the Neutron Star Equation of State from Binary Inspiral Waveforms <i>Markakis, Charalampos; Read, Jocelyn S.; Shibata, Masaru; Uryū, Kōji; Creighton, Jolien D.E.; Friedman, John L.</i>	743
• Interfacing Numerical and Analytical Relativity <i>Chairperson: Alessandra Buonanno</i>	
Constant-Expansion Surfaces for Finite-Distance Angular Momentum Estimates in Numerical Relativity <i>Bentivegna, Eloisa; Schnetter, Erik</i>	749
Constraint-Preserving Boundary Conditions: The Gowdy Waves Test-Bed <i>Bona, Carles; Bona-Casas, Carles</i>	752

PART B

PARALLEL SESSIONS

• Numerical Methods in General Relativity and Algebraic Computation <i>Chairperson: Klein, Christian</i>	
The Cosmic No-Hair Conjecture: A Study of the Nariai Solutions <i>Beyer, Florian</i>	759

Compatible Discretisations in General Relativity <i>Frauenthiener, Jorg</i>	762
A New Numerical Code for the Dynamics of Scalar Fields in Spherically Symmetric Space-times <i>De Oliveira, Henrique P.; Skea, J.F.E.</i>	765
Non-overlapping Marginally Trapped Surfaces <i>Lages, Norbert; Brügmann, Bernd</i>	769
Boundary Conditions for the BSSN System <i>Ledvinka, Tomáš</i>	773
Uniqueness Issue in a Constrained Scheme for the Einstein Equations <i>Novak, Jérôme;ourgoulhon, Eric; Cordero-Carrion, Isabel; Cerda-Duran, Pablo; Dimmelmeier, Harald; Jaramillo, José Luis</i>	776
Isolated Horizons in Numerical Relativity: Constructing the Excised Kerr Spacetime in Dirac Gauge <i>Vasset, Nicolas; Novak, Jérôme; Jaramillo, José Luis</i>	779
• Supernova Explosions and Neutron Star Oscillations <i>Chairperson: Kokkotas, Kostas</i>	
Dynamical Mini-Collapses Induced by Phase Transition Instabilities in Rotating Neutron Stars <i>Bejger, Michal; Dimmelmeier, Harald; Haensel, Pawel; Zdunik, J. Leszek</i>	785
Alfvén QPOs in Magnetars in the Anelastic Approximation <i>Cerdá-Durán, Pablo; Stergioulas, Nikolaos; Font, José Antonio</i>	788
On Quasi Periodic Oscillations in Magnetars <i>Colaiuda, A.; Kokkotas, Kostas D.</i>	791
g-Modes in Rotating Neutron Stars <i>Gaertig, Erich; Kokkotas, Kostas D.</i>	794
Dynamics of Rotating, Magnetized Neutron Stars <i>Liebling, Steven L.</i>	797
Collapse of a Differentially Rotating Supermassive Star to a Super- massive Black Hole <i>Saijo, Motoyuki; Hawke, Ian</i>	801
Alfvén Polar Oscillations in Magnetars <i>Sotani, Hajime; Kokkotas, Kostas D.</i>	804
Frequencies of Nonaxisymmetric <i>F</i> -Modes in Rapidly Rotating Polytropes in Full General Relativity <i>Zink, Burkhard; Stergioulas, Nikolaos; Korobkin, Oleg; Schnetter, Erik; Diener, Peter; Tiglio, Manuel</i>	807

xxviii

• **Compact Binary Simulations: Miscellaneous**

Chairperson: Pretorius, Frans

Mass-Energy Extraction and Momentum Loss by Gravitational Radiation Emission in the Collision of Two Schwarzschild Black Holes <i>Aranha, Rafael F.; Soares, Ivano Damião.; Tonini, Eduardo V.</i>	813
Determination of Unambiguous Binary Black Hole Merger Waveforms at Scri <i>Bishop, Nigel T.; Reisswig, Christian; Pollney, Denis; Szilágyi, Bela</i>	816
Ultra-Relativistic Grazing Collisions of Black Holes <i>Sperhake, Ulrich; Cardoso, Vitor; Pretorius, Frans; Berti, Emanuele; Hinderer, Tanja; Yunes, Nicolas</i>	820
LISA Parameter Estimation Accuracy for Compact Binaries on Eccentric Orbits <i>Vasúth, Máttyás; Mikóczi, Balázs; Kocsis, Bence; Forgács, Péter</i>	823
Using OpenGR for Numerical Relativity <i>Walter, Paul; Allen, Jon; Matzner, Richard; Anderson, Matt; Nerozzi, Andrea; Sperhake, Ulrich</i>	826
Black Holes in a Box <i>Witek, Helvi; Cardoso, Vitor; Herdeiro, Carlos A.R.; Nerozzi, Andrea; Sperhake, Ulrich; Zilhão, Miguel</i>	829
• Self Forces, Black Hole Perturbations	
<i>Chairperson: Poisson, Eric</i>	
Self-Force and Radial Fall: New Integration Method for the Zerilli Wave Equation <i>Aoudia, Sofiane; Spallicci Di Filottrano, Alessandro D.A.M.</i>	835
A Transport Equation Approach to Green Functions and Self-Force Calculations <i>Wardell, Barry; Ottewill, Adrian C.</i>	838
Modelling Extreme-Mass-Ratio Inspirals Using Pseudospectral Methods <i>Canizares Martinez, Priscilla; Sopuerta, Carlos F.</i>	841
Method of Matched Expansions and the Singularity Structure of the Green Function <i>Casals, Marc; Dolan, Samuel R.; Ottewill, Adrian C.; Wardell, Barry</i>	844
Effects of the Singular Self-Field on the Motion of an Extended Body <i>Harte, Abraham I.</i>	848
Massive Scalar Self-Interaction in Curved Background Space-Time and Its Application to Proton-Pion Interaction <i>Herpay, Tamás; Forgacs, Peter; Kovacs, Peter</i>	851

Non-Linear Effects in Late-Time Asymptotics for Self-Gravitating Massless Fields <i>Rostworowski, Andrzej</i>	854
• Collisionless Relativistic Shocks <i>Chairperson: Medvedev, Mikhail</i>	
Plasma Thermalization: Electron-Positron Pairs and Baryons <i>Aksenov, Alexey G.; Ruffini, Remo; Vereshchagin, Gregory V.</i>	859
Streaming Instabilities in the Relativistic Regime <i>Bret, Antoine</i>	862
• Search for Dark Matter <i>Chairperson: Chardin, Gabriel</i>	
Enhancement of the Dark Matter Annihilation Cross Section in Cold Substructures <i>Lattanzi, Massimiliano</i>	867
Directional Detection of Galactic Dark Matter <i>Mayet, F.; Billard, J.; Bernard, G.; Bosson, G.; Bourrion, O.; Grignon, C.; Guillaudin, O.; Koumeir, C.; Richer, J.-P.; Santos, D.; Colas, P.; Ferer, E.; Giomataris, I.; Allaoua, A.; Lebreton, L.</i>	870
The Case of 1.5 eV Neutrino Hot Dark Matter <i>Nieuwenhuizen, Theo M.</i>	873
EURECA: The Future European Cryogenic Dark Matter Search <i>Henry, Sam</i>	876
Dark Matter Searches with the Experiment EDELWEISS-II <i>Scorza, Silvia</i>	879
First Science Results from the ZEPLIN-III Direct Dark Matter Search <i>Sumner, Timothy J.</i>	882
• Neutrino Physics Astrophysics and Cosmology <i>Chairperson: Sato, Katsuhiko</i>	
On the Propagation of Gravitational Waves Across the Universe: Interaction with the Neutrino Component. <i>Benini, Riccardo; Lattanzi, Massimiliano; Montani, Giovanni</i>	887
Ultra High-Energy Neutrinos via Heavy-Meson Synchrotron Emission <i>Mathews, G.J.; Kajino, T.; Tokuhsa, A.; Yoshida, T.; Famiano, M.A.</i>	890
• Perspectives for Cosmic Rays from Space Missions: PAMELA <i>Chairperson: Picozza, Piergiorgio</i>	
Cosmic Rays in the Inner Heliosphere <i>Ferreira, Stefan E.S.; Magidimisha, E.</i>	895

xxx

Cosmic Ray Propagation Models and Interpretation of Results from Recent Space Experiments <i>Donato, Fiorenza</i>	898
Observations of the Solar Particle Event of December 13 2006 with PAMELA Experiment. <i>Casolino, Marco; De Simone, N.</i>	902
Indirect Search of Dark Matter in Space: Theoretical and Phenomenological Aspects <i>Cirelli, Marco</i>	905
Indirect Search of Dark Matter in Space: Results from the Space Mission PAMELA <i>Sparvoli, Roberta; for the PAMELA Collaboration</i>	908
Indirect Searches for Dark Matter in Space: Status, Results and Perspectives from Recent and Future Experiments <i>Coutu, Stéphane</i>	912
• Active Galactic Nuclei and Gamma Rays <i>Chairperson: Aharonian, Felix</i>	
Very High Energy Gamma-Rays and the Hubble Parameter <i>Gorecki, Alexia; Barrau, Aurélien; Grain, J.; Memola, E.</i>	917
AGN Variability Across the Electromagnetic Spectrum <i>Giebels, Berrie</i>	920
• Observations of Astrophysical Black Holes <i>Chairperson: Titarchuk, Lev</i>	
Tracing the Optical Imprints of an Intermediate-Mass Black Hole Candidate in an Interacting Galaxy Pair <i>Fuentes-Carrera, Isaura; Rosado, Margarita; Flores, Hector; Borissova, Jura</i>	923
The Signature of Tidal Disruption Phenomena in the Vicinity of a Black Hole <i>Kostić, Uros; Čadež, Andrej; Calvani, Massimo; Germanà Claudio</i>	928
Optical Phenomena in Braneworld Kerr Spacetimes <i>Schee, Jan; Stuchlík, Zdeněk</i>	931
Mass and Spin Estimates of Two Near-Extreme Kerr Black Hole Candidates GRS 1915+105 and XTE J1650-500 from the Extended Orbital Resonance Model for High-Frequency QPOs <i>Slaný, Petr; Stuchlík, Zdeněk</i>	934
Multi-Resonance Models of QPOs and Black Holes Admitting Strong Resonant Phenomena <i>Stuchlík, Zdeněk; Kotrlová, Andrea; Török, Gabriel; Adámek, Karel</i>	937

Estimating Black Hole Masses out to $Z = 3$ <i>Sulentic, Jack W.; Marziani, Paola</i>	940
Can Stellar Mass Black Holes be Quark Stars? <i>Harko, Tiberiu; Cheng, K.S.; Kovács, Zoltán</i>	943
• Extreme Properties of Neutron Stars Observations and Theory <i>Chairperson: Mendez, Mariano</i>	
Axial W-Modes of Neutron Stars with Exotic Matter <i>Bandyopadhyay, Debades; Chatterjee, Debarati</i>	949
Quasiperiodic Oscillations in Braneworld Neutron Star Spacetimes <i>Kotrlová, Andrea; Stuchlík, Zdeněk; Török, Gabriel</i>	952
Trapping of Neutrinos in Extremely Compact Stars and the Influence of Brane Tension on This Process <i>Stuchlík, Zdeněk; Hladík, Jan; Urbanec, Martin</i>	955
Absorption Features in the Spectra of X-Ray Bursting Neutron Stars <i>Suleimanov, Valery F.; Rauch, Thomas; Werner, Klaus</i>	958
Equations of State and Compact Stars <i>Urbanec, Martin; Stuchlík, Zdeněk; Běták, Emil</i>	961
kHz QPOs and Their Relations to Spin Frequencies of Neutron Stars <i>Zhang, Chengmin; Wang, Jin; Yin, Hongxing; Zhao, Yongheng; Taani, Ali</i> .	964
• Observations from High Energy Astrophysics Satellites <i>Chairperson: Pian, Elena</i>	
Sequencing the Variability Classes of GRS 1915+105 <i>Pal, Partha Sarathi; Chakrabarti, Sandip K.; Nandi, Anuj</i>	969
• Astrophysical Black Holes from Quasars to Nano-Quasars <i>Chairperson: Chakrabarti, Sandip</i>	
Measuring Black Hole Masses in Active Galactic Nuclei <i>Wandel, Amri</i>	975
Two Temperature Accretion Flows around Rotating Black Holes and Determining the Kerr Parameter of Sources <i>Mukhopadhyay, Banibrata</i>	979
Accretion of Multi-Species Plasma onto Black Holes <i>Chattopadhyay, Indranil</i>	982
Monte-Carlo Simulations of Comptonization Process in a Two Com- ponent Accretion Flow around a Black Hole in Presence of an Outflow <i>Ghosh, Himadri; Garain, Sudip K.; Giri, Kinsuk; Chakrabarti, Sandip K.</i> .	985
On the Non-Thermal Emission of the Stellar Mass Black Holes <i>Paredes, Josep M.</i>	990

Hyper Velocity Stars and the Restricted Parabolic 3-Body Problem <i>Kobayashi, Shiho; Sari, Re'em; Rossi, Elena M.</i>	993
Multi-Frequency Radio Photometry of the Microquasars with the RATAN-600 Radio Telescope <i>Trushkin, Sergei A.; Nizhelskij, Nikolaj A.; Bursov, Nikolaj N.</i>	996
• Galactic Gamma-Ray Sources: Steady versus Transient Sources <i>Chairperson: Tavani, Marco</i>	
Fermi-LAT Results on Galactic Plane Gamma-Ray Transient Sources <i>Chaty, Sylvain</i>	1001
Variable Galactic Sources Detected with HESS <i>Skilton, Joanna L.; Hinton, Jim A.; Kerschhaggl, Matthias; Brucker, Julia; for the H.E.S.S. Collaboration</i>	1008
• Strong Fields and Particle Physics in Astrophysics <i>Chairperson: Kleinert, Hagen</i>	
On the Geometry and Energetics of the “Dyadotorus” <i>Cherubini, Christian; Geralico, Andrea; Rueda, H., Jorge A.; Ruffini, Remo</i>	1013
Circular Motion in Reissner–Nordström Spacetime <i>Pugliese, Daniela; Quevedo, Hernando; Ruffini, Remo</i>	1017
Precise Determination of Neutrino Mass Difference <i>Kleinert, Hagen</i>	1022
Killing Tensors and Conserved Quantities of a Relativistic Particle in External Fields <i>Igata, Takahisa; Koike, Tatsuhiko; Ishihara, Hideki</i>	1026
Toward an Invariant Definition of Repulsive Gravity <i>Luongo, Orlando; Quevedo, Hernando</i>	1029
Gravitational Hydrodynamics versus Observations of Voids, Jeans Clusters and MACHO Dark Matter <i>Nieuwenhuizen, Theo M.; Gibson, Carl H.; Schild, Rudolph E.</i>	1032
From Compressed Atoms to Compressed Massive Nuclear Density Cores <i>Rotondo, Michael; Rueda, Jorge A.; Ruffini, Remo; Xue, She-sheng</i>	1036
A New Family of Neutron Star Models: Global Neutrality versus Local Neutrality <i>Rueda, Jorge A.; Rotondo, Michael; Ruffini, Remo; Xue, She-sheng</i>	1039
Electrostatic Configurations Crossover Neutron Star Core <i>Rueda, Jorge A.; Ruffini, Remo; Xue, She-sheng</i>	1042

• **Black Holes in Higher Dimensions (Black Rings and Black Strings)**

Chairperson: Kunz, Jutta

New Static Black Holes with Nonspherical Horizon Topology <i>Kleihaus, Burkhard; Kunz, Jutta; Radu, Eugen;</i>	1047
Analytic Solution of the Geodesic Equations in Higher Dimensional Spherically Symmetric Space-Times <i>Hackmann, Eva; Kagramanova, Valeria; Kunz, Jutta; Lämmerzahl, Claus</i>	1050
Forming Nonsingular Black Holes from Dust Collapse <i>Maier, Rodrigo; Soares, Ivano D.</i>	1054
Gravitational Collapse to Higher-Dimensional Topological Black Holes <i>Mena, Filipe C.; Natário, Jose; Tod, Paul</i>	1057
Properties of the Black Dirings <i>Mishima, Takashi; Iguchi, Hideo</i>	1060
Dilatonic Black Holes in Heterotic String Theory <i>Moura, Filipe</i>	1063
Effective Potential Approach to the Motion of Massive Test Particles in Kaluza–Klein Gravity <i>Pugliese, Daniela; Lacquaniti, Valentino; Montani, Giovanni</i>	1066
Micro Black Holes Planck Phase and Generalized Uncertainty Principles <i>Scardigli, Fabio</i>	1069
Orbital Resonance Models of QPOs in Braneworld Kerr Black Holes <i>Stuchlík, Zdeněk; Kotrlová, Andrea</i>	1072
Existence of Horizons in Robinson–Trautman Spacetimes of Arbitrary Dimension <i>Svítek, Otakar</i>	1075
Phases of Ads Higher Dimensional Black Strings <i>Delsate, TERENCE</i>	1078
Closed Conformal Killing–Yano Tensor and Uniqueness of Generalized Kerr–NUT–de Sitter Spacetime <i>Houri, Tsuyoshi</i>	1081
Sequences of Dipole Black Rings and Kaluza–Klein Bubbles <i>Yazadjiev, Stoytcho S.; Nedkova, Petya G.</i>	1084
• Black Holes and Magneto-Hydrodynamics <i>Chairperson: Bisnovatyi-Kogan, Gennady</i>	
2-D MHD Configurations for Accretion Disks around Magnetized Stars <i>Benini, Riccardo; Montani, Giovanni</i>	1089

xxxiv

Accretion Disks Around Black Holes with Advection and Optical Depth Transition <i>Klepnev, Alexandr S.; Bisnovatyi-Kogan, Gennady S.</i>	1092
Unique Black Hole Source SS433: Monte-Carlo Modelling <i>Krivoshcheyev, Yu. M.; Bisnovatyi-Kogan, Gennady S.; Cherepashchuk, Anatoly M.; Postnov, Konstantin A.</i>	1095
MHD Models of Central Engines of Gamma Ray Bursts: Angular Momentum Influence <i>Barkov, Maxim V.</i>	1098
Propagation of Magnetars through the Interstellar Medium <i>Toropina, Olga D.; Romanova, M.M.; Lovelace, R.V.E.</i>	1111
Force-Free Magnetic Fields on an Extreme Reissner–Nordström Space-time and the Meissner Effect <i>Takamori, Yousuke; Nakao, Ken-ichi; Ishihara, Hideki; Kimura, Masashi; Yoo, Chul-Moon</i>	1114
Gravitational Lensing in Plasma <i>Tsupko, Oleg Yu.; Bisnovatyi-Kogan, Gennady S.</i>	1117
• Black Hole Thermodynamics <i>Chairperson: Khriplovich, Iosif</i>	
Hawking Radiation in the Presence of an Invariant Planck-Scale Cutoff <i>Agulló, Iván; Navarro-Salas, José; Olmo, Gonzalo J.; Parker, Leonard</i>	1123
Exact Differential and Quantum Corrections of Entropy for Axially Symmetric Black Holes <i>Akbar, Muhammad; Saifullah, Khalid</i>	1126
Information Geometry and Critical Phenomena in Black Hole Physics <i>Áman, Jan E.; Bengtsson, Ingemar; Pidokrajt, Narit</i>	1129
Entropic Origin of Hawking Radiation <i>Dasgupta, Arundhati</i>	1132
Asymptotically Anti de Sitter Spacetimes in Three Dimensions <i>Bombelli, Luca; Mohd, Arif</i>	1135
Entanglement and Corrections to Bekenstein–Hawking Entropy <i>Das, Saurya; Shankaranarayanan, S.; Sur, Sourav</i>	1138
Horizon Thermodynamics in FRW Space-Times <i>Di Criscienzo, Roberto; Hayward, Sean A.; Nadalini, Mario; Vanzo, Luciano; Zerbini, Sergio</i>	1142
Black Hole Entropy Discretization in Loop Quantum Gravity <i>Diaz-Polo, Jacobo; Borja, Enrique F.; Corichi, Alejandro</i>	1145

Quantum Back-reaction on Black Hole Spacetime with Negative Cosmological Constant <i>Kashiyama, Kazumi; Tanahashi, Norihiro; Flachi, Antonino; Tanaka, Takahiro</i>	1148
Wormhole Dynamics <i>Hayward, Sean A.</i>	1151
Do Evaporating 4D Black Holes Form Photospheres and/or Chromospheres? <i>MacGibbon, Jane H.; Carr, Bernard J.; Page, Don N.</i>	1154
Lorentzian Wormholes: Evaporating a Time Machine! <i>Martín-Moruno, Prado; González-Díaz, Pedro F.</i>	1157
Thermodynamics of Taub-NUT/Bolt-AdS Black Holes in Einstein- Gauss-Bonnet Gravity in Counterterm Method <i>Monshizadeh, Mahshid; Khodam-Mohammadi, Abdolhosein</i>	1160
Equilibrium Thermodynamics and $f(R)$ Gravity <i>Akbar, Muhammad; Salahuddin</i>	1163
Invariance of the Tunneling Method for Dynamical Black Holes <i>Di Criscienzo, Roberto; Nadalini, Mario; Vanzo, Luciano; Zerbini, Sergio; Hayward, Sean A.</i>	1166
Hawking Radiation from Black Holes of Constant Negative Curvature via Gravitational Anomalies <i>Skamagoulis, Petros</i>	1169
• Black Holes and the Information Puzzle <i>Chairperson: Veneziano, Gabriele</i>	
Non-BPS Black Holes and Self-Interacting Fundamental Strings <i>Chialva, Diego Valerio</i>	1175
S-Matrix and Quantum Tunneling in Gravitational Collapse <i>Ciafaloni, M.; Colferai, Dimitri</i>	1178
Formation and Evaporation of Regular Black Holes <i>Hayward, Sean A.</i>	1181
Possible Quantum Extension Beyond a Black-hole Singularity <i>Levanony, Dana; Ori, Amos</i>	1184
• Analog Gravity <i>Chairperson: Schuetzhold, Ralf</i>	
Accreting Astrophysical Black Holes are Natural Examples of Classical Analogue Model <i>Das, Tapas Kumar</i>	1189

xxxvi

Simulation of Cosmological Horizons by Ultracold Atoms in Optical Lattices and Multi-Josephson-Junction Loops <i>Dumin, Yurii V.</i>	1192
Gravity and Crystalline Defects <i>Kleinert, Hagen</i>	1195
Rotating Acoustic Black Holes and Superradiance in a Nonlinear Optical Cavity <i>Marino, Francesco; Ciszak, Marzena; Ortolan, Antonello</i>	1198
The Far-Infrared Region of the SM Vacuum as a Possible Gravity Analogue <i>Consoli, Maurizio</i>	1201
Fundamental Quantum Effects from a Quantum-Optics Perspective <i>Schützhold, Ralf</i>	1204
On the Simulation of Expanding Space-Times in Trapped Bose-Einstein Condensates <i>Uhlmann, Michael</i>	1214
• Inflation	
<i>Chairperson: Jérôme Martin</i>	
Inflation, Quantum Field Renormalization, and CMB Anisotropies <i>Agulló, Iván; Navarro-Salas, José; Olmo, Gonzalo J.; Parker, Leonard</i> . . .	1221
Regularization of Ultraviolet Divergences and Production of Child Universes <i>Ansoldi, Stefano; Guendelman, Eduardo I.; Shilon, Idan</i>	1224
Tribrid Inflation in Supergravity <i>Antusch, Stefan; Dutta, Koushik; Kostka, Philipp M.</i>	1228
Lorentz Boost and Non-Gaussianity in Multi-Field DBI-Inflation <i>Mizuno, Shuntaro; Arroja, Frederico; Koyama, Kazuya; Tanaka, Takahiro</i> .	1231
Combined Local and Equilateral Non-Gaussianities from Multifield Dirac-Born-Infeld Inflation <i>Renaux-Petel, Sebastien</i>	1234
Dark Spinor Driven Inflation <i>Shankaranarayanan, S.</i>	1237
Just Enough Inflation <i>Schwarz, Dominik J.; Ramirez, Erandy</i>	1241
The Higgs Field as an Inflaton <i>Steinwachs, Christian F.; Barvinsky, Andrei O.; Kamenshchik, Alexander Y.; Kiefer, Claus; Starobinsky, Alexei A.</i>	1244

Inflation and Reheating in Induced Gravity <i>Tronconi, Alessandro</i>	1247
• Dark Energy and Universe Acceleration	
<i>Chairperson: Starobinsky, Alexei</i>	
Dark Energy Beyond the Standard Cosmological Model <i>Kamenshchik, Alexander</i>	1253
How to Obtain Dark Energy at Low Energy (Late Time) <i>De La Macorra, Axel; Briscece, Fabio</i>	1259
On the Possible Concordance of a Symmetric Dirac-Milne Universe <i>Benoit-Lévy, Aurélien; Chardin, Gabriel</i>	1262
An Accelerating Universe in a 5D Non-Compact and Non-Ricci-Flat Kaluza–Klein Cosmology <i>Darabi, Farhad</i>	1265
A Non-Minimal Quintessence Model of Dark Energy <i>Das, Sudipta; Gupta, Gवेशna; Sen, Anjan A.</i>	1268
Relativistic Stars in $f(R)$ Gravity <i>Babichev, Eugeny; Langlois, David</i>	1271
The Growth of Matter Perturbations in $f(R)$ Models <i>Gannouji, Radouane; Moraes, Bruno; Polarski, David</i>	1274
Entangle Accelerating Universe <i>González-Díaz, Pedro F.; Robles-Pérez, Salvador</i>	1277
An Approach to Testing Dark Energy by Observations <i>Gu, Je-an; Chen, Chien-Wen; Chen, Pisin</i>	1280
Dark Energy Accretion Onto Black Holes <i>Guariento, Daniel C.; Horvath, Jorge E.</i>	1283
The Solution of the Cosmological Constant Problem by Discrete Space-time At Electroweak Scale <i>Mok, Ho Ming</i>	1286
Constraints on Dark Energy from the Abundance of Galaxy Clusters: Effects of Redshift Uncertainties and Mass Threshold <i>Lima, Mariana Penna; Makler, Martín</i>	1289
Infrared Cut-off for the Holographic Density and Scalar Fields Reconstruction <i>Granda, Luis N.; Oliveros, Alexander</i>	1292
Some Alternative Unified Views for Dark Energy and Dark Matter <i>Mathews, G.J.; Zhao, X.; Ichiki, K.; Kajino, T.; Lan, N.Q.</i>	1296

xxxviii

Model of Interacting Dark Energy in (4+1)-Dimensional Brane Cosmology <i>Jamil, Mubasher</i>	1299
Limits on the Parameters of the Equation of State for Interacting Dark Energy <i>Pavón, Diego; Izquierdo, Germán</i>	1302
Cosmological Constant from Decoherence? <i>Queisser, Friedemann S.; Kiefer, Claus; Starobinsky, Alexei A.</i>	1305
Accessing the Acceleration of the Universe with Sunyaev–Zeldovich and X-Ray Data from Galaxy Clusters <i>Holanda, R.F.L.; Limá, José A.S.; Cunha, J.V.</i>	1308
Accelerating Cosmology Driven by Gravitational Production of Dark Matter Particles: Constraints from SNE Ia and $H(z)$ Data <i>Santos, R.C.; Silva, F.E.; Lima, José A.S.</i>	1312
Rees–Sciama Effect in Accelerating Universe <i>Stuchlík, Zdeněk; Schee, Jan</i>	1316
Pseudo-Newtonian Modelling of Adiabatic Tori in Schwarzschild–de Sitter Spacetimes <i>Stuchlík, Zdeněk; Slaný, Petr; Kovář, Jiří</i>	1319
An Elastic Lagrangian for Space-Time <i>Tartaglia, Angelo; Radicella, Ninfa</i>	1322
On Evolution of the Interacting Cosmological Constant <i>Verma, Murlí Manohar</i>	1325
• Topology of the Universe <i>Chairperson: Demianski, Marek</i>	
Observable Circles-in-the-Sky in Flat Universes <i>Mota, Bruno; Rebouças, Marcelo J.; Tavakol, Reza</i>	1331
Cosmic Acceleration from Topological Considerations <i>García-Aspeitia, Miguel Ángel; Matos Chassin, Tonatiuh; Rodriguez Montoya, Ivan</i>	1334
Constraints on Dark Energy Equation of State Parameters from Cosmic Topology <i>Rebouças, Marcelo J.; Teixeira, Antonio F.F.</i>	1338
Wormhole-Centered Spacetimes in an n -Dimensional Expanding Universe <i>Riazi, Nematollah; Ebrahimi, Esmail</i>	1341
Which FLRW Comoving 3-Manifold is Preferred Observationally and Theoretically? <i>Roukema, Boudeewijn F.</i>	1344

• **Inhomogeneous Cosmologies Averaging and Back Reaction**

Chairperson: Coley, Alan

Ambiguities in Second-Order Cosmological Perturbations for Non-Canonical Scalar Fields <i>Appignani, Corrado; Casadio, Roberto; Shankaranarayanan, S.</i>	1349
Gravitational Instability in Presence of Bulk Viscosity: The Jeans Mass and the Quasi-Isotropic Solution <i>Carlevaro, Nakia; Montani, Giovanni</i>	1353
The Conjecture of Chaotic Cosmological Inhomogeneity <i>Hewitt, Conrad</i>	1356
Apparent Acceleration Due to Relativistic Cosmological Models More Complex Than FLRW as a Possible Alternative to Dark Energy <i>Ishak, Mustapha; Richardson, James; Garred, David; Whittington, Delilah; Nwankwo, Anthony; Sussman, Roberto</i>	1359
Spiky Mixmaster Dynamics <i>Lim, Woei Chet; Andersson, Lars; Garfinkle, David; Pretorius, Frans</i>	1362
Effects of Structure Formation on the Apparent Expansion Rate of the Universe: a Realistic Estimate Based Upon N-Body Simulations <i>Mathews, G. J.; Zhao, X.</i>	1364
Inhomogeneous Friedmann Cosmological Models <i>Cataldo, Mauricio; Del Campo, Sergio</i>	1367
Higher Order Curvature Gravity in Finsler Geometry <i>Mebarki, Noureddine; Boudjada, Mohamed Yahia</i>	1370
Indication from the Supernovae Ia Data of a Stationary Background Universe <i>Ostermann, Peter</i>	1373
A Direct Estimate of the Spatial Curvature of the Universe <i>Rosquist, Kjell; Samuelsson, Lars</i>	1376
Deformations of Spacetime Metrics and Backreaction <i>Stornaiolo, Cosimo</i>	1379
ADM Formulation of Cosmological Perturbation Theory <i>Strokov, Vladimir</i>	1382
Hubble Parameter in Bulk Viscous Cosmology <i>Tawfik, A.; Mansour, H.; Wahba, M.</i>	1385
A Weak Solution of Einstein Equations for Expanding Dust <i>Tegai, Sergey P.</i>	1388

• **Nonsingular Cosmology**

Chairperson: Novello, Mario

Multivalued Lagrangians and Non-Singular Cosmologies <i>Ansoldi, Stefano; Guendelman, Eduardo I.; Ishihara, Hideki</i>	1393
Avoiding the Big Bang Singularity with Palatini $f(R)$ Theories <i>Barragán, Carlos; Olmo, Gonzalo J.; Sanchis-Alepuz, Hèlios</i>	1396
On the Torsion Effect of a Relativistic Spin Fluid in Early Cosmology <i>Berredo-Peixoto, Guilherme de; Freitas, Emanuel A. de</i>	1399
How Quantum Is the Big Bang? <i>Bojowald, Martin</i>	1402
Gauge Invariant Cosmological Backreaction <i>Marozzi, Giovanni</i>	1405
Relativistic Deduction of a Stationary Tohu-va-Bohu Background Cosmology <i>Ostermann, Peter</i>	1408
Multifield Cosmological Perturbations at Third Order and the Ekpyrotic Trispectrum <i>Renaux-Petel, M. Sebastien</i>	1411
Cosmology Driven by One-Loop QED <i>Santos, Grasiela B.; Klippert, Renato</i>	1414
Bouncing Braneworld Cosmologies and Initial Conditions to Inflation <i>Maier, Rodrigo; Soares, Ivano Damião; Tonini, Eduardo V.</i>	1417
Non-Machian Singularity and Inconsistent Equivalence Principle <i>Verma, Murli Manohar</i>	1420
Primordial Power Spectrum from a Contracting Pre-Bounce Phase <i>Vitenti, Sandro Dias Pinto; Pinto-Neto, Nelson</i>	1424
• Quantum Cosmology and Quantum Effects in the Early Universe <i>Chairperson: Vargas Moniz, Paulo</i>	
Asymptotic Freedom in Inflationary Cosmology with a Non-Minimally Coupled Higgs Field <i>Kamenshchik, Alexander; Barvinsky, Andrei O.; Kiefer, Claus; Starobinsky, Alexei A.; Steinwachs, Christian F.</i>	1429
Smallest Relational Mechanics Model of Quantum Cosmology <i>Anderson, Edward</i>	1432
Quantum Suppression of Weak Universe Anisotropy <i>Belvedere, Riccardo; Battisti, Marco Valerio; Montani, Giovanni</i>	1435
Comparison of the Cosmological Singularity in the Polymer and in the GUP Frameworks <i>Battisti, Marco Valerio; Lecian, Orchidea Maria; Montani, Giovanni</i>	1438

Mixmaster Universe in the GUP Scheme <i>Battisti, Marco Valerio; Montani, Giovanni</i>	1441
Defrosting the Big Freeze Quantum Mechanically? <i>Bouhmadi-López, Mariam; Kiefer, Claus; Sandhöfer, Barbara; Vargas Moniz, Paulo</i>	1444
Gravitons Production in a New Type of GCG <i>Bouhmadi-López, Mariam; Frazão, Pedro; Henriques, Alfredo B.</i>	1447
Scalar Perturbations in Scalar Field Quantum Cosmology <i>Falciano, F.T.; Pinto-Neto, Nelson</i>	1450
The False Vacuum Bubble, the True Vacuum Bubble, and the Instanton Solution in Curved Space <i>Lee, Bum-Hoon; Lee, Chul H.; Lee, Wonwoo; Oh, Changheon</i>	1453
Observational Constraints on a Power Spectrum from Super-Inflation in Loop Quantum Cosmology <i>Shimano, Masahiro; Harada, Tomohiro</i>	1456
Entanglement in Inflationary Universe <i>Ohsumi, Yuji; Nambu, Yasusada</i>	1459
The Formulation of General Relativity in Extended Phase Space as a Way to Its Quantization <i>Shestakova, Tatyana P.</i>	1462
Bianchi Type-I Cosmological String Model in the Presence of a Magnetic Field: Classical and Quantum Loop Approaches <i>Visinescu, Anca; Visinescu, Mihai</i>	1465
• Tests of Local Lorentz Invariance <i>Chairperson: Lämmerzahl, Claus</i>	
Lorentz Symmetry Violation in Neutrinos in Curved Spacetime and Its Consequences <i>Mukhopadhyay, Banibrata</i>	1471
A Torsion Balance Search for Temporal Variations in the Newtonian Constant <i>Carbone, Ludovico; Panjwani, Hasnain; Speake, Clive C.; Quinn, Terry J.; Collins, Christopher J.</i>	1474
Testing Local Lorentz Invariance with High-Accuracy Astrometric Observations <i>Klioner, Sergei A.; Zschocke, Sven; Soffel, Michael H.; Butkevich, Alexey G.</i>	1478
A New Type of Atom Interferometry for Testing Fundamental Physics <i>Lorek, Dennis; Lämmerzahl, Claus; Wicht, Andreas</i>	1481

Vacuum Structure and Ether-Drift Experiments <i>Consoli, Maurizio</i>	1484
• Variation of Fundamental Constants <i>Chairperson: Flambaum, Victor</i>	
Recent Variations of Fundamental Parameters and Their Implications for Gravitation <i>Dent, Thomas</i>	1489
A New Limit on the Light Speed Isotropy from the GRAAL Experiment at ESRF <i>Gurzadyan, Vahe G. et al.</i>	1495
Ammonia as a Tracer of Fundamental Constants <i>Henkel, C.; Menten, K.M.; Murphy, M.T.; Flambaum, Victor V.;</i> <i>Leushakov, S.A.; Lapinov, A.V.; Molaro, P.; Braatz, J.A.</i>	1500
Generalized Second Law Limits on the Variation of Fundamental Constants <i>MacGibbon, Jane H.</i>	1503
• Space Tests <i>Chairperson: Reynaud, Serge</i>	
Thermal Radiation and the Pioneer Anomaly <i>Rievers, Benny; Lämmerzahl, Claus</i>	1509
Astrodynamical Space Test of Relativity Using Optical Devices I (ASTROD I) <i>Selig, Hanns</i>	1512
Charged Particle Interferometry in Plebański–Demiański Black Hole Space-Times <i>Kagramanova, Valeria; Kunz, Jutta; Lämmerzahl, Claus</i>	1515
On Optical-Mechanical Analogy in General Relativity <i>Abdildin, Meirkhan M.; Abishev, Medeu E.; Beissen, Nurzada A.;</i> <i>Taukenova, Aliya S.</i>	1518
Ultra-Sensitive Electrostatic Accelerometers and Future Fundamental Physics Missions <i>Touboul, Pierre; Christophe, Bruno; Rodrigues, M.; Marque,</i> <i>Jean-Pierre; Foulon, Bernard</i>	1521
• Astrometric Tests <i>Chairperson: Klioner, Sergei</i>	
Global Astrometric Sphere Reconstruction in Gaia: Challenges and First Results of the Verification Unit <i>Abbas, Umami; Vecchiato, Alberto; Bucciarelli, Beatrice; Lattanzi,</i> <i>Mario G.; Morbidelli, Roberto</i>	1529

Curvature(s) of a Light Wavefront in a Weak Gravitational Field <i>Pascual-Sanchez, J.-Fernando; San Miguel, Angel; Vicente, Francisco</i> . . .	1532
Propagation Direction of Light in Parametrized Post-Post-Newtonian Approximation <i>Teyssandier, Pierre</i>	1535
• Short Range Gravity Tests / Equivalence Principle Tests <i>Chairperson: Long, Joshua / Touboul, Pierre</i>	
Progress on a New Experimental Test of the Gravitational Inverse- Square Law <i>Bonicalzi, Ricco M.; Boynton, Paul E.; Moore, Michael W.; Newman, Riley D.; Berg, Eric C.</i>	1541
Development of Models for High Precision Simulation of the Space Mission Microscope <i>Bremer, Stefanie; List, Meike; Selig, Hanns; Lämmerzahl, Claus</i>	1545
The Motion of Vibrating Systems in General Relativity <i>Delva, Pacôme; Bergamin, Luzi; Hees, Aurélien</i>	1548
Development Status of the Payload for the Microscope Mission <i>Foulon, Bernard; Touboul, P.; Rodrigues, M.; Lebat, V.; Chhun, R.</i>	1552
• Compact Binaries and Strong-Field Tests of Gravity <i>Chairperson: Kramer, Michael</i>	
Geometry of the Young Relativistic Binary Pulsar J1906+0746 from Geodetic Precession Observation <i>Desvignes, Gregory; Kramer, Michael; Cognard, Ismaël; Lyne, Andrew; Stappers, Ben W.; Theureau, Gilles</i>	1557
The Deceptively Boring PSR J1738+0333 <i>Freire, Paulo; Wex, Norbert</i>	1560
Precision Timing of PSR J1012+5307 and Strong-Field GR Tests <i>Lazaridis, Kosmas; et al</i>	1563
Interconnection of Electrical Earth Fields and Astrophysical Processes <i>Grunskaya, Lubov V.; Isakevich, Valeriy V.</i>	1566
PSR J1141–6545: A Powerful Laboratory of GR and Tensor-Scalar Theories of Gravity <i>Verbiest, J.P.W.; Bhat, N.D.R.; Bailes, M.</i>	1571
Generic Gravity Tests with the Double Pulsar <i>Wex, Norbert; Kramer, Michael</i>	1574
Constraining Alternative Theories of Gravity by Gravitational Waves from Precessing Compact Binaries <i>Yagi, Kento; Tanaka, Takahiro</i>	1577

xliv

PART C
PARALLEL SESSIONS

• **GRBs**

Chairperson: Soderberg, Alicia

Gamma-Ray Bursts in 18 Months of <i>Fermi</i> Observations <i>Cohen-Tanugi, Johann</i>	1585
Sensitivity of the <i>Fermi</i> Detectors to Gamma-Ray Bursts from Evaporating Primordial Black Holes (PBHs) <i>Ukwatta, T.N.; MacGibbon, Jane H.; Parke, W.C.; Dhuga, K.S.; Rhodes, S.; Eskandarian, A.; Gehrels, N.; Maximon, L.; Morris, D.C.</i>	1588

• **GRB Observations versus Theory in the Swift Era**

Chairperson: Frontera, Filippo

Long High Redshift GRB and XRT/Swift Lightcurves <i>Arkhangelskaja, Irene V.</i>	1593
GRB 050904: The Study of a High Redshift GRB within the Fireshell Model <i>Patricelli, Barbara</i>	1597
The X-Ray Flares of GRB 060607A within the Fireshell Model <i>Bernardini, Maria Grazia; Bianco, Carlo Luciano; Caito, Letizia; Izzo, Luca; Patricelli, Barbara; Ruffini, Remo</i>	1600
GRB Prompt Emission Polarization Measurements Using Integral/IBIS <i>Götz, Diego; Laurent, Philippe; Lebrun, François; Daigne, Frederic; Bošnjak, Zeljka</i>	1604
Arguments for a Modified Lag <i>Hafizi, Mimoza; Boçi, Sonila; Mochkovitch, Robert</i>	1607
GRB 090423 in the Fireshell Scenario: A Canonical GRB at Redshift 8.2 <i>Izzo, Luca; Bernardini, Maria Grazia; Bianco, Carlo Luciano; Caito, Letizia; Patricelli, Barbara; Ruffini, Remo</i>	1610
GRB Jets and Their Interaction with the Progenitor Star <i>Lazzati, Davide; Morsony, Brian; Begelman, Mitchell</i>	1613
Properties of the GRB Early Afterglow and their Interpretation <i>O'Brien, Paul; Evans, Phil A.</i>	1616
GRB 090423 as the New Beacon at the Frontier of the Universe <i>Salvaterra, Ruben</i>	1619
The State and Properties of the Interstellar Medium in GRB Host Galaxies <i>Thöne, Christina C.; Fynbo, Johan P.U.; Christensen, Lise</i>	1622

- **Models for GRBs**

Chairperson: Piran, Tsvi

A New Spectral Energy Distribution of Photons in the Fireshell Model of GRBs

Patricelli, Barbara; Bernardini, Maria Grazia; Bianco, Carlo Luciano; Caito, Letizia; Izzo, Luca; Ruffini, Remo; Vereshchagin, Gregory V. 1627

The Spectrum of Gamma-Ray Burst: A Clue

Fan, Yizhong 1631

- **Sources of Gravitational Waves**

Chairperson: Melatos, Andrew

Unraveling Binary Evolution from Gravitational-Wave Signals and Source Statistics

Mandel, Ilya; Kalogera, Vicky; O'Shaughnessy, Richard 1637

High Frequency Gravitational Waves Generation in Laser Plasma Interaction

Ribeyre, Xavier; Tikhonchuk, Vladimir 1640

Towards Tests of Alternative Theories of Gravity with LISA

Sopuerta, Carlos F.; Yunes, Nicolás 1643

- **Operating GW Detectors**

Chairperson: Giazotto, Adalberto

The Schenberg Spherical Antenna: Status Report

Aguilar, Odylio D.; et al. 1649

A Thermal Compensation System for the Gravitational Wave Detector Virgo

Accadia, T.; et al. 1652

Progresses in the Realization of a Monolithic Suspension System in Virgo

Vocca, Helios; for the Virgo Collaboration 1657

- **Space and Third Generation GW Detectors**

Chairperson: Ruediger, Albrecht

First Cryogenic Test of a Mirror Suspension for the 3rd Generation G.W. Interferometer

Basti, Fabio; Frasconi, Franco; Majorana, Ettore; Moscatelli, Veronica; Naticchioni, Luca; Perciballi, Maurizio; Puppo, Paola; Rapagnani, Piero; Ricci, Fulvio 1665

Gravity Gradient Noise

Cella, Giancarlo 1670

The Einstein Telescope ET

Lück, Harald 1673

xlvii

Detecting Coalescences of Intermediate-Mass Black Holes in Globular Clusters with the Einstein Telescope <i>Mandel, Ilya; Gair, Jonathan R.; Miller, M. Coleman</i>	1676
Laguerre–Gauss Beams for Future Gravitational Wave Detectors <i>Fulda, Paul; Chelkowski, Simon; Hild, Stefan; Freise, Andreas</i>	1679
Compact Binary Coalescence and the Science Case for Einstein Telescope <i>Van Den Broeck, Chris</i>	1682
• GW Data Analysis <i>Chairperson: Ricci, Fulvio</i>	
Searches for Inspiral Gravitational Waves Associated with Short Gamma-Ray Bursts in LIGO’s Fifth and Virgo’s First Science Run <i>Dietz, Alexander; for the LIGO Scientific Collaboration and the Virgo Collaboration</i>	1689
Noise Analysis in Virgo: On-Line and Offline Tools for Noise Characterization <i>Cuoco, Elena; for the Virgo Collaboration</i>	1692
LIGO and Virgo Gravitational Wave Data Analysis <i>Guidi, Gianluca M.; for the LIGO Scientific Collaboration and the Virgo Collaboration</i>	1700
Optimal Unification for Components of GW-Detector Net <i>Gusev, Andrei V.; Rudenko, Valentin N.</i>	1712
The Effect of the Tides on the LIGO Interferometers <i>Melissinos, Adrian; for the LIGO Scientific Collaboration</i>	1718
• Advanced GW Detectors <i>Chairperson: Blair, David G.</i>	
Progress on the Monolithic Suspension for Advanced LIGO <i>Hammond, Giles D.; for the LIGO Scientific Collaboration</i>	1723
The Upgrade of GEO 600 <i>Lück, Harald; for the LIGO Scientific Collaboration</i>	1726
A Squeezed Light Source for the Gravitational Wave Detector GEO600 <i>Khalaidovski, Alexander; Vahlbruch, Henning; Lastzka, N.; Gräf, C.; Danzmann, Karsten; Schnabel, Roman</i>	1729
A Thermal Noise Model for a Branched System of Mechanical Harmonic Oscillators: Some Issues for the Test Masses Suspensions <i>Puppo, Paola</i>	1732
Scattered Light Control in Advanced LIGO <i>Smith, Michael R.</i>	1735

Plans for the Upgrade of the Gravitational Wave Detector Virgo: Advanced Virgo <i>Accadia, T.; et al.</i>	1738
• Recent Advances in the History of General Relativity <i>Chairperson: Eisenstaedt, Jean</i>	
General Relativity, Differential Geometry, and Unitary Theories in the Work of Mira Fernandes <i>Lemos, José P.S.</i>	1745
Nonlinearities in the Universe <i>Nurgaliev, Ildus</i>	1748
• Integrability and Solution Generating Methods for Einstein's Field Equations in Four and Higher Dimensions <i>Chairperson: Alekseev, Georgy</i>	
New Soliton Generating Transformations in the Bosonic Sector of Heterotic String Effective Theory <i>Alekseev, George A.</i>	1753
Non-Existence of Stationary Two-Black-Hole Configurations <i>Hennig, Jörg; Neugebauer, Gernot</i>	1756
On de Sitter-like Space-Times <i>Lübbe, Christian</i>	1759
Applications of the Ortho-Complex-Null (OCN) Formalism to Perfect Fluids <i>Wylleman, Lode</i>	1762
A Plane Wave Solution with a Source Admitting a Null Homothety <i>Ziad, Muhammad</i>	1765
• Chaos in Rotating Systems <i>Chairperson: Dauxois, Thierry</i>	
The Last Ten Years of the Mixmaster Model <i>Benini, Riccardo; Montani, Giovanni</i>	1771
Quasi Stationary States in Long Range Systems <i>Fanelli, Duccio</i>	1782
Geodesic Chaos around Black Holes with Discs <i>Suková, Petra; Semerák, Oldřich</i>	1785
Regular and Chaotic Regimes in Scalar Field Cosmology <i>Toporensky, Alexey</i>	1788
• Cosmological Singularities and Asymptotics <i>Chairperson: Cotsakis, Spiros</i>	

xlviii

The Formal Construction of Sudden Cosmological Singularities <i>Barrow, John; Cotsakis, Spiros; Tsokaros, Antonios</i>	1793
Approaching Quantum Singularities <i>Bojowald, Martin</i>	1796
Analytic Study of Odd Parity Perturbations of the Self-Similar LTB Spacetime <i>Duffy, Emily M.; Nolan, Brian C.</i>	1799
Conformal Formulation of Cosmological Futures <i>Höhn, Philipp A.; Scott, Susan M.</i>	1802
Late Time Behaviour of Closed Isotropic Models in Second Order Gravity Theory <i>Miritzis, John</i>	1805
Dynamics of Solutions of $f(R)$ Theory <i>MacNay, Lucy</i>	1808
Non-Singular Coordinates for the Usual Rotating BTZ Black Hole <i>Riaz, Syed M. Jawwad; Siddiqui, Azad A.</i>	1811
• Theoretical Issues in GR	
<i>Chairperson: Brill, Dieter</i>	
Electromagnetic Fields of Slowly Rotating Magnetized Stars in Braneworld <i>Morozova, Viktoriya; Ahmedov, Bobomurat</i>	1817
Gaussian Coordinate Systems for the Kerr and Schwarzschild Metrics <i>Bittencourt, Eduardo; Novello, Mário</i>	1820
Asymptotic Symmetries of Spacelike Stretched AdS Gravity <i>Blagojević, Milutin; Cvetković, Branislav</i>	1823
Dark Spinors <i>Boehmer, Christian B.; Burnett, James</i>	1826
The Beginnings of Black-Hole Horizons <i>Brill, Dieter R.</i>	1829
Analogy Between General Relativity and Electromagnetism Based on Tidal Tensors <i>Costa, L. Filipe O.; Herdeiro, Carlos A.R.</i>	1832
Stability Analysis of Scalar-Tensor Born–Infeld Black Hole Solutions <i>Doneva, Daniela D.; Yazadjiev, Stoytcho S.; Todorov, Michail D.; Stefanov, Ivan Zh.</i>	1835
Energy Loss Rate of Oscillatons <i>Fodor, Gyula; Forgács, Péter; Mezei, Márk</i>	1838

Complete Set of Analytic Solutions for the Geodesic Equation in Plebański–Demiański Space-Times <i>Hackmann, Eva; Kagramanova, Valeria; Kunz, Jutta; Lämmerzahl, Claus</i>	1841
Refined Trapped Surfaces <i>Hayward, Sean A.</i>	1847
New Ideas About Multiplication of Tensorial Distributions <i>Skákala, Jozef</i>	1849
The Weak Field Limit of $f(R)$ Gravity in Large Scale Structure <i>Saaidi, Khaled; Vajdi, A.; Aghmohammadi, A.</i>	1852
Off-Equatorial Motion of Charged Particles Near Compact Objects <i>Kovář, Jiri; Stuchlík, Zdeněk; Kopáček, Ondrej; Karas, Vladimír</i>	1855
Energy Contents of Plane Gravitational Waves in Teleparallel Gravity <i>Sharif, Muhammad; Taj, Sumaira</i>	1858
Two Fundamental Fields: Identification of Dark Energy and Dark Matter <i>Mychelkin, Eduard</i>	1861
Angular-Momentum of Kerr Solution in Teleparallel Theory Equivalent to General Relativity <i>Nashed, Gamal G. L.</i>	1865
Approximate Symmetries and the Energy in Spacetimes <i>Qadir, Asghar; Hussain, Ibrar</i>	1868
• Exact Solutions (Physical Aspects) <i>Chairperson: Scott, Susan</i>	
Cosmic Strings with Positive Λ <i>Bhattacharya, Sourav; Lahiri, Amitabha</i>	1877
On a Quevedo–Mashhoon Solution for a Massive, Rotating and Quadrupolar Body <i>Bini, Donato; Geralico, Andrea</i>	1880
The Quadrupole Moment of Slowly Rotating Stars <i>Bradley, Michael; Fodor, Gyula</i>	1883
Cosmological Singularities in FLRW Spacetimes <i>Fernández-Jambrina, Leonardo; Lazkoz, Ruth</i>	1887
On the Existence of New Conserved Quantities for the Spaces of Different Curvatures <i>Feroze, Tooba</i>	1890

Einstein–Rosen Waves and the Self-Similarity Hypothesis in Cylindrical Symmetry <i>Harada, Tomohiro; Nakao, Ken-ichi; Nolan, Brian C.</i>	1893
Light Cone Cut Solution in the 2+1 Null Surface Formulation <i>Harriott, Tina A.; Williams, Jeffrey G.</i>	1896
Gravitational Field of Gyratons Propagating on Backgrounds Formed by Direct-Product Spacetimes <i>Kadlecová, Hedvika</i>	1899
Physical Properties of the Double Kerr Solution <i>Herdeiro, Carlos A.R.; Rebelo, Carmen</i>	1902
Curvature and Weyl Collineations of Spacetimes <i>Kashif, Abdul Rehman; Saifullah, Khalid</i>	1905
Classical Limits of Boost-Rotation Symmetric Spacetimes <i>Kofroň, David; Bičák, Jiří</i>	1908
“Singularities” in Spacetimes with Diverging Higher-Order Curvature Invariants <i>Konkowski, Deborah A.; Helliwell, Thomas M.</i>	1911
Equilibrium Configurations of Perfect Fluid In Reissner–Nordström–(anti-)De Sitter Spacetimes <i>Kučáková, Hana; Stuchlík, Zdeněk; Slaný, Petr</i>	1914
Equatorial Circular Orbits in the Kerr–Newman–de Sitter Spacetimes <i>Petrásek, Martin; Slaný, Petr</i>	1917
On Conformally Flat and Type N Pure Radiation Metrics <i>Prikryl, Ondrej; Podolský, Jiri</i>	1920
Asymptotic Properties of the C-Metric <i>Sladek, Pavel</i>	1923
Equatorial Circular Orbits in Kerr–Anti-de Sitter Spacetimes <i>Víchová, Miroslava; Stuchlík, Zdeněk; Slaný, Petr</i>	1926
Structure of Cosmological Levi-Civita Solutions <i>Žofka, Martin</i>	1929
• Higher Dimensional Theories <i>Chairperson: Coley, Alan</i>	
Dual Formulation of the S -Expansion Procedure for Higher Order Lie Algebras <i>Caroca, Ricardo; Merino, Nelson; Salgado, Patricio</i>	1935
Geodesic Deviation on a Kaluza–Klein Background <i>Lacquaniti, Valentino; Montani, Giovanni; Vietri, Francesco</i>	1938

Spinor Calculus on 5-Dimensional Spacetimes <i>García-Parrado Gómez-Lobo, Alfonso; Martín-García, José María</i>	1941
Brans–Dicke DGP Brane Cosmology <i>Atazadeh, Khedmat; Sepangi, Hamid Reza</i>	1944
3+1+1 Dimensional Covariant Gravitational Dynamics on an Asymmetrically Embedded Brane: the Difference Equations <i>Keresztes, Zoltán; Gergely, László Árpád</i>	1948
Restated Dynamics for Particles and Fields in a 5-D Framework <i>Lacquaniti, Valentino; Montani, Giovanni</i>	1952
Newman–Penrose Formalism in Higher Dimensions <i>Ortaggio, Marcello; Pravda, Vojtěch; Pravdová, Alena</i>	1955
On Asymptotically Flat Algebraically Special Spacetimes in Higher Dimensions <i>Ortaggio, Marcello; Pravda, Vojtěch; Pravdová, Alena</i>	1958
General Kundt and Robinson–Trautman Spacetimes in Higher Dimensions <i>Podolský, Jiří; Žofka, Martin; Ortaggio, Marcello</i>	1961
Vacuum Thin Shell Solutions in Five Dimensional Lovelock Gravity <i>Garraffo, Cecilia; Giribet, G.; Gravanis, Elias; Willison, Steven</i>	1964
Dynamics of a Flat Multidimensional Anisotropic Universe in the Gauss–Bonnet Gravity <i>Toporensky, Alexey; Kirnos, Ilya; Pavluchenko, Sergeyey</i>	1967
Conformal Killing–Yano Tensors on Higher Dimensional Spacetimes Endowed with Special Structures <i>Visinescu, Mihai; Ianus, Stere; Visinescu, Anca; Vilcu, Gabriel-Eduard</i>	1970
• Higher Derivative Theories <i>Chairperson: Capozziello, Salvatore</i>	
Stability of the Einstein Static Universe in Modified Theories of Gravity <i>Böhmer, Christian G.; Hollenstein, Lukas; Lobo, Francisco S.N.; Seahra, Sanjeev S.</i>	1977
The Healthy DGP Branch in a State of Self-Acceleration <i>Bouhmadi-López, Mariam</i>	1980
Stability in Generalized Modified Gravity <i>Cognola, Guido; Sebastiani, Lorenzo; Zerbini, Sergio</i>	1983
Ostrogradski Approach for the Regge–Teitelboim Model <i>Cordero, Ruben; Molgado, Alberto; Rojas, Efrain</i>	1986

Is $f(R)$ Gravity Viable? The Cauchy Problem of Metric and Palatini $f(R)$ Theories <i>Faraoni, Valerio</i>	1989
Lemaître–Tolman–Bondi Solutions in $f(R)$ -gravity <i>Bohicchio, Ivana</i>	1992
Thermodynamics of Taub-NUT Black Hole in Gauss–Bonnet–Maxwell Gravity in New Method <i>Khodam-Mohammadi, Abdolhosein</i>	1995
Enriched Phenomenology in Extended Palatini Theories <i>Olmo, Gonzalo J.; Sanchis-Alepuz, Hèlios; Tripathi, Swapnil</i>	1998
Gravitational Zero Point Energy Induces Physical Observables <i>Garattini, Remo</i>	2001
Evolving Newton’s Constant in Higher Derivative Theories <i>Nesseris, Savvas</i>	2005
Hamiltonian Formulation of $f(\text{Riemann})$ Theories of Gravity <i>Sendouda, Yuuiti; Deruelle, Nathalie; Sasaki, Misao; Yamauchi, Daisuke</i>	2008
Central Charges in 2D Reduced Cosmological Massive Gravity <i>Son, Edwin J.; Kim, Wontae</i>	2011
Kerr–Gauss–Bonnet Black Holes in $N > 4$ Gravity Theories <i>Alexeyev, Stanislav</i>	2014
$f(R)$ Theories with Torsion <i>Stornaiolo, Cosimo</i>	2017
• Gravitational Fields with Sources <i>Chairperson: Lemos, José P.S.</i>	
Extended Bodies in General Relativity: Dixon’s Model and Its Applications <i>Bini, Donato; Geralico, Andrea</i>	2023
Conformally Related Material Metrics in General Relativistic Elasticity <i>Brito, Irene; Vaz, Estelita</i>	2026
On Self-Gravitating Elementary Solutions of Non-Linear Electrodynamics <i>Diaz-Alonso, Joaquín; Rubiera-García, Diego</i>	2029
Elasticity and Spherical Symmetry <i>Vaz, Estelita; Brito, Irene; Carot, Jaume</i>	2032
The Spherically Symmetric Body in Relativistic Elasticity <i>Frauenthiener, Jörg</i>	2035

Definition and Properties of Quasiblack Holes <i>Lemos, José P.S.; Zaslavskii, Oleg B.</i>	2038
Interacting Kerr-Newman Fields <i>Rosquist, Kjell; Samuelsson, Lars; Von Strauss, Mikael</i>	2041
MGAT7: Gravitational Fields with Sources <i>Lemos, José P.S.; Cardoso, Vitor</i>	2044
Relativistic Figures of Equilibrium: from Maclaurin Spheroids to Kerr Black Holes <i>Meinel, Reinhard</i>	2047
Static Spherically Symmetric Solutions in Extended Palatini Gravity. <i>Olmo, Gonzalo J.; Sanchis-Alepuz, Hèlios; Tripathi, Swapnil</i>	2050
Classical Spinning Particle Interactions in Black Hole Space-Time Backgrounds <i>Singh, Dinesh</i>	2053
Nambu-Goto Membrane with Repulsive Gravity <i>Belinski, Vladimir A.; Pizzi, Marco; Paolino, Armando</i>	2057
A Pure Geometric Primitive Model for a Main Sequence Star <i>Wanas, Mamdouh I.; Ammar, Samah A.</i>	2060
• Alternative Theories <i>Chairperson: Maeda, Kei-ichi</i>	
Black Objects in the Einstein–Gauss–Bonnet Theory with Cosmological Constant and the Boundary Counterterm Method <i>Brihaye, Yves; Radu, Eugen</i>	2065
Almost Periodic Localized States in a Dilaton Model <i>Fodor, Gyula; Forgács, Péter; Horváth, Zalán; Mezei, Márk</i>	2069
Super-Accelerated Expansion and Asymptotic Solutions in Scalar- Tensor Cosmology <i>Järv, Laur; Kuusk, Piret; Saal, Margus</i>	2072
Lorentz Violation and Gravity <i>Potting, Robertus</i>	2075
Violation of Causality in $f(R)$ Gravity <i>Rebouças, Marcelo J.; Santos, Janilo</i>	2078
Preferred Frame Parameters in the Tensor-Vector-Scalar Theory of Gravity <i>Sagi, Eva</i>	2081
Probing TeVeS with Gravitational Wave Asteroseismology <i>Sotani, Hajime</i>	2084

liv

Phases of 4D Scalar-Tensor Black Holes with Non-Linear Electrodynamics <i>Stefanov, Ivan Zh.; Yazadjiev, Stoytcho S.; Todorov, Michail D.</i>	2087
Spherically-Symmetric Gravitational Fields in Conformal Gravity and Their Sources <i>Verbin, Yosef; Brihaye, Yves</i>	2090
• Self-Gravitating Systems <i>Chairperson: Chavanis, Pierre-Henri</i>	
Testing MOND with Milky Way Globular Clusters <i>Baumgardt, Holger</i>	2095
Models of Partially Relaxed and Quasi-Relaxed Stellar Systems <i>Bertin, G.; Varri, A.L.; Amorisco, N.C.</i>	2098
Critical Dimension of the Self-Gravitating Radiation <i>Chavanis, Pierre-Henri</i>	2101
General Relativity without General Relativity: Self-Gravitating Systems and Effective Geometries <i>Bini, Donato; Cherubini, Christian; Filippi, Simonetta; Geralico, Andrea</i> . .	2104
Mass Ejection and Vlasov-Poisson Limit in the Collapse of a Cold Spherical Self-Gravitating Cloud <i>Joyce, Michael; Marcos, Bruno; Sylos Labini, Francesco</i>	2107
Relativistic Stellar Clusters with Anisotropic Momentum Distribution <i>Merafina, Marco; Bisnovatyi-Kogan, Gennady S.</i>	2110
Fractal Geometry of One-Dimensional Cosmological Models with Scale-Free Initial Conditions <i>Miller, Bruce N.; Rouet, Jean-Louis</i>	2113
Collapse and Evaporation of a Canonical Self-Gravitating Gas <i>Sire, Clément; Chavanis, Pierre-Henri</i>	2116
• Primordial Gravitational Waves and the CMB <i>Chairperson: Grishchuk, Leonid</i>	
The Birth Pangs of the Big Bang in the Light of BICEP <i>Keating, Brian G.</i>	2121
Observing the Cosmic Microwave Background from Space and from a Balloon <i>MacTavish, Carrie J.</i>	2124
Evidence for a Primordial Magnetic Field from the CMB Polarization and Power Spectra <i>Mathews, G.J.; Yamazaki, D.G.; Ichiki, K.; Kajino, T.</i>	2127
• CMB Experiments <i>Chairperson: Masi, Silvia</i>	

SAGACE: The Spectroscopic Active Galaxies and Clusters Explorer <i>De Bernardis, Paolo; for the SAGACE Team</i>	2133
Measuring CMB Polarization with QUIET: the Q/U Imaging Experiment <i>Newburgh, Laura</i>	2145
The QUIJOTE-CMB Experiment: Progress Report <i>Génova-Santos, Ricardo; et al.</i>	2156
The EBEX Cryostat and Supporting Electronics <i>Sagiv, Ilan; et al.</i>	2166
• The Planck Mission and the CMB <i>Chairperson: Bucher, Martin</i>	
Large Scale Flows: Implications for Inflation <i>Atrio-Barandela, Fernando; Kashlinsky, Alexander; Ebeling, Harald; Kocevski, Dale</i>	2179
Cosmic Microwave Background Lensing with the Planck Mission <i>Perotto, Laurence</i>	2182
Testing Large-Angle Deviation from Gaussianity in CMB Maps <i>Bernui, Armando; Rebouças, Marcelo J.; Teixeira, Antonio F.F.</i>	2185
• Observational Gravitational Lensing [Microlensing] <i>Chairperson: Jetzer, Philippe</i>	
Detection of Exoplanets in M31 with Pixel-Lensing: The Event PA-99-N2 Case <i>Ingrasso, Gabriele; De Paolis, Francesco; Calchi Novati, Sebastiano; Jetzer, Philippe; Nucita, Achille A.; Zakharov, Alexander F.</i>	2191
Microlensing Events from Galactic Globular Clusters <i>Jetzer, Philippe</i>	2196
Gravitational Lensing of S-Star Cluster by Sgr A* <i>Bozza, Valerio; Mancini, Luigi</i>	2200
Microlensing Results from EROS <i>Moniez, Marc; for the EROS Collaboration</i>	2203
M31 Pixel Lensing: Observations at the Loiano Telescope <i>Calchi Novati, Sebastiano</i>	2206
• Dark Matter and Large-Scale Structure Weak Lensing <i>Chairperson: Mellier, Yannick</i>	
Simulating Weak Lensing on CMB Maps <i>Basak, Soumen; Prunet, Simon; Benabed, Karim</i>	2213
Radial Density Statistics of the Galaxy Distribution and the Luminosity Function <i>Iribarrem, Alvaro S.; Ribeiro, Marcelo B.; Stoeger, William R.</i>	2216

Constraints on Neutrino Masses from CFHTLS Cosmic Shear <i>Tereno, Ismael; Schimd, Carlo</i>	2220
• Strings/Brane Motivated Gravity <i>Chairperson: Galtsov, Dmitry</i>	
Variable Tension Brane-Worlds <i>Gergely, László Árpád</i>	2225
Expanding Lie and Gauge Free Differential Algebras Through Abelian Semigroups <i>Izaurieta, Fernando; Rodríguez, Eduardo; Pérez, Alfredo; Salgado, Patricio</i> .	2228
The Dirac-ADM Quantization of the Brane-World Gravity <i>Maia, M.D.; Fernandes, M.C.B.</i>	2231
Field Localization on Brane Intersections in Anti-de Sitter Spacetime <i>Flachi, Antonino; Minamitsuji, Masato</i>	2234
Probing Further Ultrahyperbolic GR by Using Group Theory <i>Melas, Evangelos</i>	2237
Particle-Brane Interaction up to Second Order <i>Gal'tsov, Dmitry V.; Melkumova, Elena Yu.; Zhgunev, Zaur G.</i>	2240
Effects of Density Gradients on Braneworld Stars <i>Ovalle, Jorge</i>	2243
Orbifold Branes in String/ <i>M</i> -Theory and their Cosmological Applications <i>Wang, Anzhong</i>	2246
Evolutionary Effects in One-Bubble Open Inflation for String Landscape <i>Yamauchi, Daisuke; Linde, Andrei; Naruko, Atsushi; Sasaki, Misao; Tanaka, Takahiro</i>	2252
Black Hole Solutions in String Theory with Gauss–Bonnet Curvature Correction <i>Maeda, Kei-ichi; Sasagawa, Yukinori; Ohta, Nobuyoshi</i>	2255
• Loop Quantum Gravity, Quantum Geometry, Spin Foams <i>Chairperson: Lewandowski, Jerzy</i>	
LQG Propagator <i>Alesci, Emanuele</i>	2261
Towards Inhomogeneous Loop Quantum Cosmology: Triangulating Bianchi IX with Perturbations <i>Marcianò, Antonino</i>	2264
Flux-Area Operator and Black Hole Entropy <i>Barbero G., J. Fernando; Lewandowski, Jerzy; Villaseñor, Eduardo J.S.</i> . .	2267

Generating Functions for Black Holes in Loop Quantum Gravity <i>Barbero G., J. Fernando; Villaseñor, Eduardo J.S.</i>	2270
Perturbed Loop Quantum Cosmology <i>Bojowald, Martin</i>	2273
On the Removal of Time-Gauge in Loop Quantum Gravity, with and without Matter <i>Cianfrani, Francesco; Montani, Giovanni</i>	2276
Asymptotics of Recent Spin Foam Models <i>Barrett, John W.; Dowdall, Richard J.; Fairbairn, Winston J.; Gomes, Henrique; Hellmann, Frank; Pereira, Roberto</i>	2279
The $SU(2)$ Invariant Presymplectic Structure of Spherical Isolated Horizons <i>Engle, Jonathan; Noui, Karim; Perez, Alejandro</i>	2282
Quantum de Sitter Universe in 4D Causal Dynamical Triangulations <i>Görllich, Andrzej</i>	2285
The Poincaré Gauge Theory of Gravity and the Immirzi Parameter <i>Kaźmierczak, Marcin</i>	2288
Big Bounce in Inhomogeneous Cosmologies <i>Mena Marugán, Guillermo A.; Brizuela, David; Pawłowski, Tomasz</i>	2291
Husain–Kuchar Model as a Constrained BF Theory <i>Montesinos, Merced; Velázquez, Mercedes</i>	2294
Concept of Evolution in Loop Quantum Cosmology: Vacuum Bianchi I <i>Pawłowski, Tomasz; Martín-Benito, Mercedes; Mena Marugán, Guillermo A.</i>	2297
Quantum Corrections in Quantum Spacetime <i>Puchta, Jacek Pawel</i>	2300
Groups of Flux-like Transformations in Loop Quantum Gravity <i>Velhinho, José M.</i>	2303
• Anti de Sitter/Conformal Field Theory <i>Chairperson: Skenderis, Kostas</i>	
AdS/CFT for the Early Stages of Heavy Ion Collisions <i>Beuf, Guillaume; Heller, Michal; Janik, Romuald A.; Peschanski, Robi</i>	2309
Dark Energy Stars and AdS/CFT <i>Chapline, George</i>	2312
Observational Signatures of Holographic Models of Inflation <i>McFadden, Paul; Skenderis, Kostas</i>	2315
A Semiclassical Approach to η/s Bound Through Holography <i>Pesci, Alessandro</i>	2324

lviii

• **Perturbative and Non-Perturbative Aspects of String Theory and Supergravity**

Chairperson: VanHove, Pierre

New Massive Gravity

Bergshoeff, Eric A.; Hohm, Olaf; Townsend, Paul K. 2329

Monodromy and Kawai–Lewellen–Tye Relations for Gravity Amplitudes

Bjerrum-Bohr, N. Emil J.; Vanhove, Pierre 2332

Characterizing Supersymmetric Solutions of Supergravity

Bellorin, Jorge 2338

R^4 Terms and $d = 4$ Supergravity

Moura, Filipe 2341

Non-Geometrical Compactifications with Few Moduli

Pradisi, Gianfranco 2344

Dynamics of Intersecting Brane Systems

Uzawa, Kunihito 2348

On The Ultraviolet Behaviour Of $\mathcal{N} = 8$ Supergravity Amplitudes

Vanhove, Pierre 2351

• **Quantum Fields**

Chairperson: Belinski, Vladimir

Charged Unruh Effect on Geon Spacetimes

Bruschi, David Edward; Louko, Jorma 2359

Uniqueness of the Quantization of a Scalar Field on S^1 with Time Dependent Mass: A Generalization of the Case of Gowdy Cosmologies

Cortez, Jerónimo; Mena Marugán, Guillermo A.; Velhinho, José M. 2362

Absorption of Scalar Waves by Static Black Holes and Analogues

Crispino, Luís C.B.; Oliveira, Ednilton S.; Dolan, Samuel R.; Matsas, George E.A. 2365

Semiclassical Warp-Drive Instability

Finazzi, Stefano; Liberati, Stefano; Barceló, Carlos 2369

The Quantum Interest Conjecture in (3+1)-Dimensional Minkowski Space

Abreu, Gabriel; Visser, Matt 2371

Time Boundary Terms and Dirac Constraints

Gallardo, Alejandro; Montesinos, Merced 2374

An Exact Result for the Behavior of Yang–Mills Green Functions in the Deep Infrared Region

Kondo, Kei-ichi 2377

Quantum Particle Behavior in Classically Singular Spacetimes <i>Konkowski, Deborah A.; Helliwell, Thomas M.</i>	2380
Quantum Black Holes as Planck Scale Gamow States <i>Leblanc, Yvan</i>	2383
Non-Invariance of Usual WKB Approximation for Hawking Radiation <i>Pizzi, Marco</i>	2386
Consistent Gravitational Anomalies for Chiral Scalars <i>Menotti, Pietro</i>	2389
Measuring Vacuum Fluctuation Suppression Effects <i>Ford, Lawrence H.; Roman, Thomas A.</i>	2392
Dewitt–Schwinger Renormalization of $\langle\phi^2\rangle$ in d Dimensions <i>Thompson, Robert T.; Lemos, José P.S.</i>	2395
Modelling the Neutrino in Terms of Cosserat Elasticity <i>Chervova, Olga; Vassiliev, Dmitri</i>	2398
Gravitational Anomalies in Curved Space with Non-Abelian Torsion <i>Yajima, Satoshi; Fukuda, Makoto; Oka, Tomonori; Yamashita, Shinji; Yamamoto, Takuo</i>	2401
• Quantum Gravity Phenomenology <i>Chairperson: Amelino-Camelia, Giovanni</i>	
The Generalized Uncertainty Principle and Quantum Gravity Phenomenology <i>Ali, Ahmed Farag; Das, Saurya; Vagenas, Elias C.</i>	2407
Quantum Gravitational Signatures in MAGIC Observations of a Very High Energy Source? <i>Ansoldi, Stefano; for the MAGIC Collaboration</i>	2410
A Brief Overview of Quantum Field Theory with Deformed Symmetries and Their Relation with Quantum Gravity <i>Marcianò, Antonino</i>	2414
Loop Quantum Gravity and the CMB: Toward Pre-Big Bounce Cosmology <i>Barrau, Aurelien</i>	2417
Metric Fluctuations and Decoherence <i>Göklü, Ertan; Lämmerzahl, Claus; Breuer, Heinz-Peter</i>	2420
Planck-Scale Induced Birefringence and CMB Polarization Data <i>Gubitosi, Giulia</i>	2423
Quantum Gravitational Corrections to the Propagator in Spacetimes with Constant Curvature <i>Kothawala, Dawood; Shankaranarayanan, S.; Sriramkumar, L.</i>	2426

lx

Sensitivity to Planck Scale Effects in Cold Atom Experiments	
<i>Mercati, Flavio</i>	2429
Doubly Special Relativity and Translation Invariance	
<i>Mignemi, Salvatore</i>	2432
Holographic Quantum Foam	
<i>Ng, Y. Jack</i>	2435
Breakdown of Lorentz Invariance for Spin-1/2 Particle Motion in Curved Space-Time with Applications to Muon Decay	
<i>Singh, Dinesh; Mobed, Nader</i>	2438
Renormalization of Newton's Constant and Particle Physics	
<i>Calmet, Xavier</i>	2442
List of Participants	2445
Author Index	2465