Posters

Abreu, Everton (evertonabreu@ufrrj.br)
Universidade Federal Rural do Rio de Janeiro - Departamento de Física

Tuesday, Oct. 23

Open string with a background B-field as the first order mechanics, noncommutativity and soldering formalism

To study noncommutativity properties of the open string with constant B-field we construct a mechanical action which reproduces classical dynamics of the string sector under consideration. It allows one to apply the Dirac quantization procedure for constrained systems in a direct and unambiguous way. The mechanical action turns out to be the first order system without taking the strong field limit$\to\infty$. In particular, it is true for zero mode of the string coordinate which means that the noncommutativity is intrinsic property of this mechanical system. We describe the arbitrariness in the relation existent between the mechanical and the string variables and show that noncommutativity of the string variables on the boundary can be removed. It is in correspondence with the result of Seiberg and Witten on relation among noncommutative and ordinary Yang-Mills theories. The recently developed soldering formalism helps us to establish a connection between the original open string action and the Polyakov action.

AlMosallami, Azzam (az_almosallami@yahoo.com)
the Science Center for Studies and Research

Wednesday, Oct. 24

Quantum and Relativity Unified in concepts, principles and laws: The New Relativity Theory

In our work (the new relativity theory), we will unify between the relativity theory and the quantum theory (Copenhagen school) in concepts, principles and laws, wherein this new theory is agreed with the concepts, principles and laws of the quantum theory (Copenhagen school), and changes the concepts, principles and laws of quantum from abstractive, undiscriptive and unimaginative to be descriptive, and imaginative. And as we said previously, the quantum theory was applied on the micro world, while the macro world controlled by the classical physics laws, but in our work we believed that the laws that control the micro and the macro world are the same, and because of that we formulated this new theory to unify the micro and the macro in one theory with the same concepts, principle and laws.

Cécere, Mariana Andrea (marialda27@yahoo.com.ar)
Facultad de Matemática, Astronomía y Física - Relatividad General

Monday, Oct. 22

Dynamics of infinite cylindrical shells of counter-rotating particles

Recently there has been a growing interest in the literature to study the gravitational dynamics of infinite cylindrical shells of counter-rotating particles. Although infinite cylinders are not astrophysical entities, it is possible to learn a great deal about the basic qualitative features of generation of gravitational waves and the behavior of the matter conforming such shells in the limits of very small radius. We describe the analytical model using kinetic theory for the matter and the junction conditions through the shell to obtain its equation of motion. The nature of the static solutions are analyzed, both for a single shell as well as for two concentric shells. In this second case, for a time dependent external shell, we integrate numerically the equation of motion for several values of the constants of the system. Also, a brief description in terms of the Komar mass is given to account for the gravitational wave energy emitted by the system.

Costa, Alex (rios_alex@ig.com.br)
UFES, Física

Monday, Oct. 22

Uma Revisao da Gravitao Bidimensional do Ponto de Vista da Gravitaçâo Quantica de Loops

We make an introductory study of the formalism of Loop Quantum Gravity. A brief review of the canonical formulation of General Relativity is performed, in order to motivate the introduction of the loop formalism. We show how it can be adapted to bidimensional gravity, more specifically to the Jackiw-Teitelboim model, for which we make a complete analisys of the canonical formulation using the first order formalism. We finally comment on how the quantization procedure could be implemented in this model.

Neste trabalho apresentamos uma anlise do modelo de Jackiw-Teitelboim para a teoria da gravitao bidimensional, sendo o campo gravitacional acoplado a um campo escalar na presena da constante cosmológica. Onde introduzimos a teoria BF, que como foi será visto apresenta invariância de gauge, e mostramos a equivalência com a açao de Jackiw-Teitelboim. Logo, a ao para a gravitao bidimensional pode ser obtida da açao BF.

Fontana, Rodrigo Dal Bosco (rodrigof@fma.if.usp.br)
IF-USP, FMA

Monday, Oct. 22

Magnetic Black Hole Cross-Section: A study of absortion for the Ernst Metric

In this work we study the absorption cross-section for magnetic black holes like the Ernst metric. As the thermodynamic properties of the spacetime are the same as the Schwarzschild one, we demonstrate that at least in first order in magnetic field, the absorption cross section for m=0 remains unchanged.

Franco, Daniel (dhtfranco@yahoo.com.br)
Universidade Federal de Viçosa

Wednesday, Oct. 24

A Uniqueness Theorem and Its Application to Field-Theoretical Models with a Fundamental Length

It is shown that if a distribution *V* of exponential growth has support in a proper convex cone and its Fourier transform is carried by a closed cone different from whole space, then *V=0*. The application of this result to a *quasi-local* quantum field theory (where the fields are localizable only in regions greater than a certain scale of nonlocality) is contemplated. In particular, we show that a number of physically important predictions of *local* quantum field theory also hold in a quantum field theory with a fundamental length, as indicated from string theory.

Girotti, Horacio (hgirotti@terra.com.br)
Instituto de Fisica - Universidade Federal de Rio Grande do Sul

Wednesday, Oct. 24

On noncommutative quantum mechanics

This paper is dedicated to present model independent results for non-commutative quantum mechanics.
Within the operator framework we first determine sufficient conditions to be fulfilled by the potential in order to secure the convergence of the Born series and, then, show that for this kind of potentials the theory is unitary. Afterwards, we focus on the functional quantization of non-commutative systems. The compatibility between the operator and the functional approaches for this kind of models is established. We also study the phase space path integral description of the dynamics of noncommutative systems when this integral is defined through the time slicing procedure. As known, this definition brings into play a new real parameter related with the arbitrariness of the point on the slice to be chosen for defining the path integral. Uniqueness of the functional formulation demands that the dependence on the just mentioned parameter should disappear when performing the limit of letting to zero the size of the time slice. This turns out to

be the case but the proof is considerably more involved that in the commutative case. We exhibit in detail the interplay between the slice arbitrariness and the non-commutativity.

(*) Gleiser, Reinaldo (gleiser@fis.uncor.edu)
Universidad Nacional de Córdoba - Facultad de Matemática, Astronomía y Física

Monday, Oct. 22

On the dynamics of thin shells of counter rotating particles

In this work we study the dynamics of self gravitating spherically symmetric thin shells of counter rotating particles, considering separately the cases where the radius is either constant or evolving in time.

In both cases we consider the possible velocity distributions for the particles, and provide an analysis of the stability of the single particle orbits. This analysis leads to the conclusion that under given conditions, that are given explicitly, an evolving shell may split into one or more separate shells. The subsequent evolution of the system is also considered.

Gómez, Humberto (humgomzu@ift.unesp.br)
IFT (Unesp)

Monday, Oct. 22

Pure spinors and anomalies

The basic idea of the work is to study the pure spinor action and present in a clear way that the anomalies only depend of the geometry of the pure spinor space.

Leoni Olivera, Matias (leoni@df.uba.ar)
Universidad de Buenos Aires, Department of Physics

Tuesday, Oct. 23

A TWISTED FZZ-LIKE DUAL FOR THE 2D BLACK HOLE

We discuss a twisted version of the Fateev-Zamolodchikov-Zamolodchikov duality conjecture. The new duality is shown to hold at the level of N-point correlation functions on the sphere topology, and connects tree-level string amplitudes in the euclidean version of the 2D black hole to correlation functions in a non-linear model in flat space but in presence of a tachyon wall potential and a linear dilaton.

To show this version of the correspondence we make use of the connection between correlation functions in the Wess-Zumino-Witten theory and correlation functions in the Liouville theory.

Reference: ArXiv:0706.0036, to appear in Rep. On Math. Phys. (2007)

Linares, Román (lirr@xanum.uam.mx)
Universidad Autónoma Metropoliatana Iztapalapa – Department of Physics

Tuesday, Oct. 23

4D Casimir force for a scalar field in brane worlds

Fundamental particles in the Standard Model, namely Higgs, gauge, leptons and quarks turn out to be massive and hence low energy tests of physical theories including the Casimir force should be amenable to include such a possibility. In this work we determine the 4D Casimir force for a massive (massless) scalar field fulfilling Dirichlet boundary conditions on parallel plates in the single brane Randall-Sundrum scenario (RSII) and its extended version including n_R compact extra dimensions (RSIIn). In the massive case for RSII the continuum mode spectrum contains a quasi-localized mode whereas for RSIIn there is an additional discrete sector due to presence of the compact dimensions. Here the quasi-localized mode corresponds to $n=0$. The resulting Casimir force can be more easily expressed in two regimes: a resonant one for which modes close to the quasi-localized value dominate and a light mode regime including those well below the scalar field mass scale. In the former regime the standard 4D result is regained, up to numerical factors, and for RSIIn the compact modes enhance the mass effect thus making the force to drop abruptly. In the latter regime no accordance with the standard case occurs. On the other hand for the massless case the continuum mode spectrum splits from a massless mode that is genuinely localized and which yields, for both RSII and RSIIn with $n=0$, again the 4D standard force, up to numerical factors. The role of the compact modes once again leads to a steeper decrease of the force.

Lourenço, José André (quantumlourenco@gmail.com)
Universidade Federal do Espírito Santo – UFES, DFIS

Monday, Oct. 22

The Quantum Configuration Space of Loop Quantum Gravity in 1+1 dimensions

In this work we studied several aspects of the space known as Bohr compactification of the real line, characterizing it as the configuration space of Loop Quantum Gravity in 1+1 dimensions. In this approach, we can introduce the mathematical structure of the Loop Quantum Gravity, in a technically simple way.

Maia, Clovis (casmaia@gmail.com)
Universidade Estadual Paulista (UNESP) - Instituto de Fisica Teorica (IFT)

Wednesday, Oct. 24

Backreaction effects in gravitational analogues

Although there is not an established theory of quantum gravity, quantum field theory in curved spaces has unveiled numerous interesting effects such as Hawking radiation (and its implications to black hole thermodynamic laws) and the Unruh effect (disclosing the relative aspect of the concept of particles in QFT). Recent developments have shown further possibilities of experimental assessment of such phenomena by means of condensed matter systems which display analogous features. Numerous setups (e.g. Bose-Einstein condensates, He-3 supefluids and dieletric waveguides) have been proposed to realize such gravitational analogues in laboratory, each of them presenting radiation of quasi-particles with thermal spectrum related to an analogue horizon. It has been usual to derive such results with no consideration of backreaction effects that such systems may present. We will describe a general representative model of an analogue system including its backreaction to Hawking emission. We show that not only Hawking emission is still obtained, but also the evaporation process in the analogue systems displays intriguing similarities with real black hole evaporation.

Martinez, Santiago Andres (santiamar@gmail.com)
Grupo de Partículas y Campos, Instituto Balseiro - Centro Atómico Bariloche

Monday Oct. 22

Canonical quantization and radiative corrections in QG-related effective field theories

We study the canonical quatization of Effective field theories which include additional terms motivated quantum gravity. We calculate the propagators and study the radiative corrections generated by loop diagrams. Fine tunning problems that may arise in these scenarios are also investigated.

Minces, Pablo (minces@iafe.uba.ar)
IAFE

Wednesday, Oct. 24

Four Point Functions for Strings in AdS_3

We consider strings in AdS_3 space. We compute winding conserving four point functions for operators in arbitrary spectral flow sectors, to the leading order in the expansion of the correlator in powers of the corresponding cross ratio. We consider that there is at least one state in the spectral flow image of the highest weight discrete representation.

Miranda, Alex (astmiranda@gmail.com.br)
Universidade Federal de Santa Maria

Tuesday, Oct. 23

Black brane quasinormal modes and the AdS/CFT correspondence

In the present work, we study the electromagnetic and gravitational quasinormal modes of nonextreme black branes. According to the AdS/CFT correspondence, these black branes correspond to thermal states in the interacting, superconformal field theory living on the boundary of this space. Perturbing the background is equivalent to perturbing the thermal state, and the quasinormal frequencies are identified to the poles of retarded correlation functions in the

holographically dual finite temperature field theory. The numerical results for electromagnetic perturbations show an infinity number of purely damped modes in addition to the hydrodynamical mode, which is characterized by a diffusive behavior in the long distance, low-frequency limit. The dispersion relations corresponding to these modes saturate after a finite wavenumber value. In relation to ordinary modes, whose frequencies present a nonvanishing real part, the group velocity diverges as the wavenumber tends to zero.
In the zero temperature limit, the poles of the field theory correlators show the expected behavior: the real parts of the frequencies go as the ultrarelativistic dispersion relation, while the imaginary parts tend to zero.
In relation to the gravitational perturbations, our study follows the Kodama-Ishibachi-Seto perturbation method, which is based on a partially covariant, but totally gauge invariant formalism. The metric variations are naturally separated in three orthogonal sectors: tensor, vector, and scalar. An important difference between our formulation and the preceding ones is related to the choice of the fundamental functions that govern each sector of perturbations. We adopt the Son-Starinets prescription, which allows one to compute Minkowski-space correlators of the stress-energy tensor from AdS/CFT correspondence.
Thus we select the master variables such that incoming-wave boundary condition at the horizon and Dirichlet condition at the spacetime boundary lead to the poles of the corresponding time-real Green functions at the dual conformal field theory. Particularly, the long-distance, low-frequency limit of the Fourier transformed wave equations yields the expected hydrodynamic behaviour: shear modes in the vector branch and sound waves in the scalar branch.

Morales Bautista, Luis Ivan (mblivan@gmail.com)
Universidade Federal do Espirito Santo (UFES)

Wednesday, Oct. 24

Hamiltonian Formalism of Jackiw-Teitelboim's Model in Temporal Gauge

In view of the difficulties which appear in the theory of General Relativity in the real world, studies of simpler models then allow us to understand its features. If, on one side, the gravitation in two dimensions does not describe the real world, it allows us to simplify the difficulties encountered in 4-dimensional spacetime.
We will study the 2-dimensional gravitation, basing us on the model of Jackiw-Teitelboim, which is formulated as a topological theory of BF type. Due to difficulties found with the Poincare group ISO(1,1), we will introduce the (anti)-de Sitter group (A)dS, SO(2,1). We will do a parcial gauge fixing analogous to the one done in 4-dimensions in the formalism of Loop Quantization. We will study the gauge invariant quantities, namely the Dirac observables of this theory, and we will finish giving a brief introduction to the transition to the quantum theory.

Nardi, Rafael (rnardi@cbpf.br)
Department of Fields and Particles, Centro Brasileiro de Pesquisas Físicas - RJ/Brazil

Monday, Oct. 22

On Torsion Condensation and A Possible Origin for Lorentz-symmetry Violation

Based on a model with fermions coupled to gravity with torsion, we pursue an investigation of the possibility that torsion condensation takes place, which is triggered by the fermions, and a discussion on its immediate consequence to justify Lorentz-symmetry violation is presented.

Osorio Mayor, Cristhian Said (crisosma@ift.unesp.br)
Instituto de Fisica Teórica IFT – UNESP

Tuesday, Oct. 23

Lorentz Transformations in Homogeneous Spaces

The properties of Lorentz transformations in a de Sitter spacetime are studied. It is shown that, in addition to leaving invariant the velocity of light, they are found to leave invariant also the length scale related to the curvature of the de Sitter spacetime. They yield, therefore, a new kind of doubly special relativity, which may have important implications for quantum gravity.

(*) Ramirez, Marcos (marcosar2000@gmail.com)
Universidad Nacional de Córdoba - Facultad de Matemática, Astronomía y Física

Monday, Oct. 22

On the dynamics of thin shells of counter rotating particles

In this work we study the dynamics of self gravitating spherically symmetric thin shells of counter rotating particles, considering separately the cases where the radius is either constant or evolving in time.
In both cases we consider the possible velocity distributions for the particles, and provide an analysis of the stability of the single particle orbits. This analysis leads to the conclusion that under given conditions, that are given explicitly, an evolving shell may split into one or more separate shells. The subsequent evolution of the system is also considered.

Ramirez Barreto, Elmer (elmer@if.ufrj.br)
Departamento de fisica teorica, Universidade federal do Rio de Janeiro - Brazil

Tuesday, Oct. 23

Abelian Higgs in AdS

We study solitons solutions in Abelian Higgs model living in AdS space-time. We explore different dimensionalities and different coordinate charts for the AdS space.

Rubalcava Garcia, Irais (est126@fcfm.buap.mx)
Facultad de Ciencias Físico Matemáticas, Universidad Autónoma de Puebla

Wednesday, Oct. 24

Static gravitomagnetic fields in the linearized Einstein theory

It is shown that from a source-free magnetostatic field in flat space-time one can obtain a solution of the linearized Einstein equations in such a way that the equations of motion for a charged particle in the magnetostatic field coincide with those of a particle with nonzero rest-mass in the corresponding gravitational field.

Sánchez, Rodrigo (sanchezr@cab.cnea.gov.ar)
Instituto Balseiro, Particulas y Campos

Monday, Oct. 22

A semiclassical approach to strong gravitational fields phenomenology

We consider a schema for quantum matter phenomenology in the presence of strong classical gravitational fields and analyze its consistency at small scales.

Santini, Eduardo Sergio (santini@cbpf.br)
CNEN and CBPF, ICRA-BR

Monday, Oct. 22

EPR correlations and wormholes

The Bohm-de Broglie interpretation is applied to the two-particle wave function of an Einstein-Podolsky-Rosen system, given by a two dimensional relativistic scalar field model. The quantum potential is viewed as modifying the Minkowski geometry. In this way an effective metric, which is analogous to a black hole metric in some limited region, is obtained in one case and a particular metric with singularities appears in other case. In such a way, we envisage the possibility, following Holland, of interpreting the EPR correlations as being originated by an effective wormhole geometry, through which the physical signals can propagate.

Sreenath, B.N. (bnsreenath@yahoo.co.in)

Wednesday, Oct. 24

New conceptual foundations for Quantum-Gravity and Quantum-Mechanics

Quantum-Gravity (QG) is limited to bodies, which have attained their ‘gravitational radius’ like Black holes (BH) and Quasars. QG has been explained and solved on entirely new concepts and

laws so as to bring within its scope not only unification of all physical interactions including gravitation in its 'distorted' form and electro-magnetism but also other cosmological problems which involve high energy existence like the BH dynamics, dark-energy, etc. This becomes obvious once we go through the BH Chart and the Interaction-Table (IT). In BH Chart and the IT, gravitational radius and the interaction-range are identified thus unifying the phenomena occurring in BH with those of the micro-world. The two laws of QG enunciated give rise to two fundamental constants in physics whose values are reciprocal to the values of 'C' and 'G'. The Quantum-Gravity field is identified with the "Exponentially Varying Accelerated (or Gravity) Field" so that in it both test masses of classical size and micro-particles of quantum size, describe the same 'Logarithmic Spiral Path'. Micro-particles can also describe 'Conical Spiral Path'. Thus QG field is an 'inward spinning field' which involves 'Torsion' and 'Curvature' varying. 'Spinors', which are used to describe the "Logarithmic Spiral Path" in BH, give rise to "Immirzi Parameter". From the concept of 'unitary change in acceleration', atomic transitions are explained and 'Heisenberg's Principle of Indeterminacy' is derived.

The approach in this article to solve the problem of Quantum-Gravity(QG) basically differs from that in loop QG and string QG.

Sturla, Mauricio (sturla@fisica.unlp.edu.ar)
Departamento de Fisica, Ciencias Exactas, UNLP

Tuesday, Oct. 23

Space-time filling branes in non critical (super) string theories

We consider solutions of (super) gravities associated to non critical (super) string theories in arbitrary space-time dimension $D=p+3$, that describe generically non extremal black p-branes charged under NSNS or RR gauge fields, embedded in some non critical vacuum. In the case of vacuum (uncharged) backgrounds, we solve completely the problem obtaining all the possible solutions, that consist of the $(p+1)$ dimensional Minkowski space times a linear dilaton times a S^1, and a three parameter family of solutions that include $(p+1)$ dimensional Minkowski space times the cigar, and its T-dual $(p+1)$ dimensional Minkowski space times the trumpet.

For NSNS charged solutions, we also solve in closed form the problem, obtaining several families of solutions, that include in particular the fundamental non critical string solution embedded in the cigar vacuum, recently found in hep-th/0604202, and a solution that we interpret as a fundamental non critical string embedded in the linear dilaton vacuum. In the case of RR charged Dp-branes solutions, an ansätz allows us to find a non conformal, constant curvature, asymptotically $AdS_{1,p+1}$ space, T-dual to $AdS_{1,p+2}$, together with a three-parameter family of solutions that includes the non conformal, AdS black hole like solution associated with the earlier space. The solutions obtained by T-duality are Einstein spaces with constant dilaton and include, in particular, the AdS black hole of hep-th/0403254. We speculate about the possible applications of some of them in the framework of the gauge-gravity correspondence.

Tamaki, Takashi (tamaki@gravity.phys.waseda.ac.jp)
Waseda University

Wednesday, Oct. 24

Properties of black holes in Lorentz-violating model

We constructed black hole solutions in Lorentz-violating model. As a model, we consider Einstein-Aether theory. We investigated their differences from Schwarzschild black hole. We also mention observational constraints about Einstein-Aether theory.

Tanaka, Tomo (tomo@gravity.phys.waseda.ac.jp)
Waseda University

Monday, Oct. 22

Considering boundary conditions for black hole entropy in loop quantum gravity

We argue for black hole entropy in loop quantum gravity (LQG) by taking into account the interpretation that there is no other side of the horizon. This gives new values for the Barbero-Immirzi parameter (γ=0.367... or 0.323...) which are fairly larger than those considered before (γ=0.261... or 0.237...). We also discuss its consequences for future experiments.

Vargas Paredes, Alfredo Andrés (alfredov@cbpf.br)
Department of Fields and Particles, Centro Brasileiro de Pesquisas Fisicas RJ – Brazil

Tuesday, Oct. 23

2-form Gauge Fields and Fermionic Excitations in the Presence of Magnetic Vortices and Monopoles

p-form gauge fields appear in different supergravity theories. We wish here to reassess some of its remarkable features in connection with the formation of topological defects such as magnetic vortices and monopoles. Going further and introducing supersymmetry, we focus on the fermionic excitations that make partnership with the 2-form gauge boson and we try to discuss their possible phenomenological implications for the dark matter constitution.

Ventosinos, Federico (fedevento@gmail.com)
FaM.A.F. – Departamento de Física

Wednesday, Oct. 24

Hamilton-Jacobi Formulation of the Geometry of Spacetime

In this work we show that the equations that determine the points of spacetime as well as the conformal metric do not come from a lagrangian formulation. We also show that it is possible to give a generalized Hamilton-Jacobi formulation of the problem.

Verma, Murli (sunilmmv@yahoo.com)
Lucknow University, Department of Physics

Wednesday, Oct. 24

On the unstable initial singularity with fluctuating scalar fields

The issue of initial singularity is settled by invoking a circular time axis with oscillations embedded on it, instead of a single arrow of time. On the sub-Planckian scale, the maximum energy gives an unstable equilibrium to the Universe. This coupled with the quantum fluctuations of the scalar fields at the maxima drives the Universe later into an accelerated phase, which is today observed as the dark energy dominated epoch.

This paper attempts to understand how the quantum fluctuations can be carried over from the pre-big bang phase to the post-big bang phase in addition to showing why the singularity itself is unstable. Probably these fluctuations cause a loss in the global conservation of energy in General Relativity and in a way, the loss of information about the pre-big bang history of the Universe.

Villegas, Fulgencio (fvillegass@hotmail.com)
Universidad Nacional Mayor de San Marcos

Wednesday, Oct. 24

Supersymetric quantization of Linearized Supergravity

We give a manifestly supersymetric quantization ascheme for linearized supergravity, motivated by the desire to develop a background field method for the full non-linear theory. Supersymmetric gauge fixing constraints are constructed and the corresponding ghost action is discussed. It is found that the faddev-Popov action itself possessses invariances, requiring secondary gauge fixing, wich in turn leads to secondary ghost fields, the latter having normal statistics. The gauge fixing constraints are used to construct gauge fixing terms in the action, with a total of four gauge fixing parametrers. The superpropagators are found and may be greatly simplified by certain choices of these parameters.