MEXILAZOS 2014

PROGRAMA

HORA	Jueves13	Viernes14
9-10:30	Curso: Robert Oeckl	
10:30-11:00	COFFE BREAK	
11:00-12:00	Plenaria: Alberto Escalante	Plenaria: Daniel Colosi
12:00-13:00	Plenaria: Alberto Molgado	Plenaria: Hugo Morales
13:00-13:30	COFFE BREAK	
13:30-14:30	Charlas	
14:30-16:30	COMIDA	
16:30-17:20	Charlas	Charlas
17:20-17:30		
17:30-18:00	COFFE BREAK	
18:00-18:20	Charlas	Discusión
18:20-19:00	Discusión	

CHARLAS CORTAS

	Jueves	Viernes
13:30-13:50	Jasel Berra	Guillermo Chacón Acosta
13:50-14:10	Bogar Díaz	Ángel Alejandro García Chung
14:10-14:30	Diego Ulloa	Max Dohse
	COMIDA	
16:30-16:50	Ricardo Rosas Rodríguez	Juan Manuel Garcia-Islas
16:50-17:10	Juan Daniel Reyes	Saeed Rastgoo
17:10-17:30	Iraís Rubalcava García	Mona Arjang
17:30-18:00	COFFE BREAK	
18:00-18:20	Jose Eduardo Rosales Quintero	

MINICURSO

“Fundamentos cuánticos para la gravitación cuántica”
Robert Oeckl (CCM-UNAM)

PLENARIAS

"Elementos básicos de la mecánica cuántica polimérica”
Hugo Morales Técotl (UAM-I)

Resumen. A partir de su propuesta como modelo de cuantización por lazos en sistemas mecánicos como el oscilador armónico, la mecánica cuántica polimérica se ha seguido explorando en otros sistemas sencillos incluyendo una partícula libre o en una caja o una partícula relativista. Asimismo su aplicación a cada uno de los modos de un campo lleva a un propagador que sugiere un comportamiento distintivo a muy altas energías. Después de revisar algunos de estos elementos de la mecánica cuántica polimérica, en esta plática comentaremos sobre sus posibles alcances y limitaciones.

"Aplicaciones de la formulación de fronteras generales de la teoría cuántica”
Daniele Colosi (ENES-UNAM-Morelia)

“Estructuras de Poisson covariantes y modelos cosmológicos”
Alberto Molgado (FC-UASLP)

“El Formalismo de Faddeev Jackiw, aplicado a Relatividad general”
Alberto Escalante (IFUAP)

CHARLAS CORTAS

JUEVES 13

Some aspects of multisymplectic field theory
Jasel Berra (FC-UASLP)

We review some features of the multisymplectic formalism, which is a covariant generalization of Hamilton's formulation of mechanics, through the de Donder-Weyl theory. Then we expound that the associated Poisson structure is given by the Peierls-DeWitt bracket of classical field theory. Finally, we present a couple of examples and give some insights toward its generalization by means of the Lepage theories.

Lagrangian approach to the physical degree of freedom count
Bogar Díaz (FCFM-BUAP) (Trabajo en colaboración con Daniel Higuita y Merced Montesinos.)

In this work we present a Lagrangian method that allows the physical degree of freedom count for any Lagrangian system without having to perform neither Dirac nor covariant canonical analyses. The essence of our method is to establish a map between the relevant Lagrangian parameters of the current approach and the Hamiltonian parameters that enter in the formula for the counting of the physical degrees of freedom as is given in Dirac's method. Once the map is obtained, the usual Hamiltonian formula for the counting can be expressed in terms of Lagrangian parameters only and therefore we can remain in the Lagrangian side without having to go to the Hamiltonian one. Using the map it is also possible to count the number of first and second-class constraints within the Lagrangian formalism only. For the sake of completeness, the geometric structure underlying the current approach--developed for systems with a finite number of degrees of freedom--is uncovered with the help of the covariant canonical formalism.

Conteo de grados de libertad físicos de la partícula libre relativista, comparación entre el enfoque Hamiltoniano y Lagrangiano.
Diego Ulloa (UDLAP)

Se tomó una acción que describe la dinámica de la partícula libre relativista y se hizo el análisis para la obtención de sus grados de libertad mediante el método Hamiltoniano (Dirac) y el nuevo enfoque Lagrangiano para el conteo de grados de libertad propuesto por Diaz B., Higuita D. y Montesinos M. a fin de comparar ambos métodos. Por completes para el enfoque Hamiltoniano, no solo se obtuvieron los parámetros necesarios para llevar a cabo el conteo, si no que se desarrollo toda la teoría hasta encontrar el Hamiltoniano extendido y su principio de acción. Como contribución adicional se investigo lo que sucedía (respecto del conteo) para sistemas con dependencia explicita del tiempo.

Constricción Hamiltoniana de Gravedad con Función Cosmológica: el caso ADM.
Ricardo Rosas Rodríguez (Instituto de Física y Matemáticas -UTM)

Hace poco propusimos una función cosmológica como un anzatz que resuelve la constricción Hamiltoniana de gravedad en el contexto de variables de Ashtekar. Este ansatz nos fue sugerido por las teorías de gravedad modificadas de Krasnov. El resultado es un modelo en el cual la dinámica se pierde, muy parecido al modelo de Husain-Kuchar. En esta plática trataremos el caso de un ansatz similar en el contexto de variables ADM, todo esto fue motivado por tratar de hallar una interpretación de la función cosmológica que resulta para el caso de variables de Ashtekar.

Holst action, surface terms, and Poincare charges in real Ashtekar variables
Juan Daniel Reyes (CCM-UNAM-Morelia)

We revisit the formulation in real Ashtekar variables of Poincare charges and generators for asymptotically flat space-times. We further discuss their connection to a well-defined variational principle starting from the Holst action.

Some remarks on energy in first order 2+1 gravity
Iraís Rubalcava García

We propose a three dimensional manifestly Lorentz invariant well posed Palatini action under asymptotically flat boundary conditions. We find the falloff conditions of the first order variables, we prove this action is well posed under this boundary conditions and then we find the energy through two different decompositions. Then we compare our results with the ones given by the second order metric formulation.

Supersymmetric extension for a CDJ-Action
Jose Eduardo Rosales Quintero (IFUG-UGTO)

VIERNES 14

Polymer quantum effects on compact stars models
Guillermo Chacón Acosta (UAM-C)

In this work we study a completely degenerated fermion gas at zero temperature within a semiclassical approximation for the Hamiltonian arising in polymer quantum mechanics. Polymer quantum systems are quantum mechanical models quantized in a similar way as in loop quantum gravity that allow the study of the discreteness of space and other features of the loop quantization in a simplified way. We obtain the polymer modified thermodynamical properties noticing that the corresponding Fermi energy is exactly the same as if one directly polymerizes the momentum p_F. We also obtain the corresponding expansion of thermodynamical variables for small values of the polymer length scale. With this results we study a simple model of a compact object where the gravitational collapse is supported by electron degeneracy pressure. We find polymer corrections to the mass of the star

Comentarios sobre la Teoría de Campos Polimérica: Reporte.
Ángel Alejandro García Chung (UAM-I)

En esta plática expondremos los aspectos principales de la Teoría Polimérica del campo escalar real dada por Viqar. Lo haremos desde la perspectiva del álgebra de Weyl y de la estructura compleja. Prestaremos especial atención a su relación con el grupo de Difeomorfismos.

Unique S-matrix for scalar QFT on AdS background from General Boundary Formulation
Max Dohse (CCM-UNAM, Morelia)(In collaboration with Robert OECKL, CM-UNAM, Morelia)

It is well known that for QFT on Anti de Sitter (AdS) spacetimes the standard S-matrix cannot be constructed because there are no asymptotically free states for large times. The General Boundary Formulation (GBF) is a reformulation of Quantum Theory which generalizes it, while

reproducing the standard results. The GBF allows us to consider states on the timelike boundary of AdS, which solves the problem of the S-matrix for QFT on AdS background. In this talk we sketch how to construct this S-matrix using a complex structure on the solution space of the classical theory. Our S-matrix becomes unique by requiring it to be invariant uder isometry actions, requiring its flat limit to reproduce the S-matrix on Minkowski background, and by letting our radial amplitudes coincide with the amplitudes of the usual states on equal-time surfaces.

Entropic force in Loop Quantum Gravity
Juan Manuel Garcia-Islas (IIMAS-UNAM)

We will present a mathematical method in loop quantum gravity which is able to reproduce an entropic force. It combines the quantum space network interacting with a particle, giving rise to a random motion in a graph. The random motion converges, in some special cases, to an increase of the entropy, producing in this way an entropic force.

Towards the resolution of the singularity of the CGHS black hole in loop quantum gravity
Saeed Rastgoo (UAM-I)

We show how to extend the method of singularity resolution of Gambini and Pullin for the spherically symmetric model to the famous CGHS model. We perform a canonical analysis, casting the theory in a suitable Hamiltonian form for quantization. Then we introduce the states and their Hilbert space and represent the phase space variables on this space. Finally we perform some analysis in the quantum theory and show that there are some very strong indications that the physical Hilbert space does not include any state containing a singularity. We also show that the observables that Gambini and Pullin found are also present here and they are actually generic to any 2D model with diffeomorphism invariance.

New Formalism for helicity amplitudes in Born-Infeld Theory
Mona Arjang (IFM-UMSNH)

Born-Infeld theory is a highly nonlinear quantum field theory which is of exceptional interest for field theory, since it displays a number of symmetries, both hidden and visible ones, and also for string and D-brane theory.
We present a new and highly efficient formalism for the calculation of helicity-decomposed amplitudes in Born-Infeld theory based on (off-shell) self-duality and (on-shell) helicity. We confirm the 6-point tree-level compu- tation of Boels et al and perform the first 8-point calculation in this theory. We propose to use this formalism in gravitational Born-Infeld theory.