

## University of Crete HEP Seminars 2009/2010

Fri Oct 2, 2009

### 5pm - 6pm Felix Mirabel (CEA/Saclay) on "Black Holes and Cosmology"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This is a spontaneously announced talk by Prof. Mirabel, due to his excellent Colloquium talk in the Oct 1 Colloquium.

Tue Oct 6, 2009

### 5pm - 6pm Bom-Soo Kim (Crete U./FORTH) on "Boundary structure of AdS/NRCFT"

**Where:** Physics Department, Seminar Room 1st Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: The boundary structure of the AdS/Non-Relativistic CFT correspondence is an interesting subject. We would like to propose new types of AdS metric which satisfy Galilean invariance and scale invariance. There are three classes. One class includes the metric proposed by D. T. Son, Balasubramanian and McGreevy. In another class, the boundary of the AdS metric is Non-Relativistic Galilean invariant.

Fri Oct 9, 2009

5pm - 6pm

### René Meyer (Crete U.) on "Flavoured Holographic Duals of 3D Chern-Simons-Matter Theories"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: Aharony, Bergman, Jafferis, and Maldacena have proposed that the low-energy description of multiple M2-branes at a  $C^4/Z_k$  singularity is a  $(2+1)$ -dimensional  $N=6$  supersymmetric  $U(N_c) \times U(N_c)$  Chern-Simons matter theory, the ABJM theory. In the large- $N_c$  limit, its holographic dual is supergravity in  $AdS_4 \times S^7/Z_k$ . We study various ways to add fields that transform in the fundamental representation of the gauge groups, i.e. flavor fields, to the ABJM theory. We work in a probe limit and perform analyses in both the supergravity and field theory descriptions. In the supergravity description we find a large class of supersymmetric embeddings of probe flavor branes. In the field theory description, we present a general method to determine the couplings of the flavor fields to the fields of the ABJM theory. We then study four examples in detail: codimension-zero  $N=3$  supersymmetric flavor, described in supergravity by Kaluza-Klein monopoles or D6-branes; codimension-one  $N=(0,6)$  supersymmetric chiral flavor, described by D8-branes; codimension-one  $N=(3,3)$  supersymmetric non-chiral flavor, described by M5/D4-branes; codimension-two  $N=4$  supersymmetric flavor, described by M2/D2-branes. Finally we discuss special physical equivalences between brane embeddings in M-theory, and their interpretation in the field theory description.

Tue Oct 13, 2009

### 5pm - 6pm Bert Schellekens (Amsterdam) on "RCFT string model building"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I will discuss the construction of standard model-like spectra in both heterotic strings and orientifolds using rational conformal field theory (RCFT), especially tensor products of  $N=2$  minimal models ("Gepner models"). In both cases large numbers of spectra with (an extension of)  $SU(3) \times SU(2) \times U(1)$  can be found with three families of massless matter. I will compare various features of the spectra obtained in the two approaches, such as non-chiral matter, the family distribution and fractional charges.

## University of Crete HEP Seminars 2009/2010

Fri Oct 16, 2009

### 5pm - 6pm Hongbao Zhang on "S-Matrix without local quantum field theory"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This talk will provide a brief review of the ongoing S matrix program. In particular, I will show how the BCFW recursion relation arises. If time permits, the twistor formalism will be also presented.

Tue Oct 20, 2009

### 5pm - 6pm Pascal Anastasopoulos (Rome) on "Mass Hierarchies in Orientifolds"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: We analyze the problem of the hierarchy of masses and mixings in orientifold realizations of the Standard Model. We find bottom-up brane configurations that can generate such hierarchies.

Fri Oct 23, 2009

### 2pm - 3pm

#### Christos Panagopoulos (Crete U. and FORTH) on "Interesting questions in High-Tc"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:** ABSTRACT: TBA

### 4pm - 5pm

#### Kyriakos Papadodimas (Amsterdam U.) on "Topological Anti-Topological Fusion in 4D SCFTs"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I will present some new exact results for general four-dimensional  $N=2$  superconformal field theories. I will show how to derive differential equations governing the coupling constant dependence of their chiral ring. These equations are the four-dimensional analogue of the  $\text{tt}^*$  equations in two-dimensions, discovered by the method of "topological anti-topological fusion" by Cecotti and Vafa. They imply that the Zamolodchikov metric on the moduli space and the operator mixing of chiral primaries are quasi-topological quantities and constrained by holomorphy.

Tue Oct 27, 2009

### 5:15pm - 6:15pm Matthew Lippert (Crete U.) on "Phases of Holographic QCD"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: The Sakai-Sugimoto model captures many of the qualitative features large  $N$  QCD, including both confinement and chiral symmetry breaking. I will introduce the model and discuss its behavior at nonzero baryon density as well as in background electromagnetic fields.

# University of Crete HEP Seminars 2009/2010

Fri Oct 30, 2009

2pm - 3pm

## Christos Panagopoulos (Crete U. and FORTH) on "Interesting questions in High-Tc Part II"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This is the second part of the special seminar on High-Tc superconductors.

4pm - 5pm

## Jorge Casalderrey Solana (CERN) on "Stochastic String Motion Above and Below the World Sheet Horizon"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: We study the stochastic motion of a relativistic trailing string in black hole AdS<sub>5</sub>. The classical string solution develops a world-sheet horizon and we determine the associated Hawking radiation spectrum. The emitted radiation causes fluctuations on the string both above and below the world-sheet horizon. In contrast to standard black hole physics, the fluctuations below the horizon are causally connected with the boundary of AdS. We derive a bulk stochastic equation of motion for the dual string and use the AdS/CFT correspondence to determine the evolution a fast heavy quark in the strongly coupled  $N=4$  plasma. We find that the kinetic mass of the quark decreases by  $\Delta M = -\sqrt{\gamma \lambda} T/2$  while the correlation time of world sheet fluctuations increases by  $\sqrt{\gamma}$ .

Tue Nov 3, 2009

2pm - 3pm

## Ivar Martin (Los Alamos) on "Stripes in High Tc and Doped Antiferromagnets"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This will be an informal joint-seminar to discuss stripes in high-Tc with relation also to other doped antiferromagnets.

5:15pm - 6:15pm

## Thomas Sotiriou (Cambridge) on "Horava-Lifshitz gravity and projectability"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: Models of 3+1 dimensional quantum gravity based on anisotropic scaling at a  $z=3$  Lifshitz point, variants of the model initially proposed by Horava, have been attracted remarkable attention lately. The differences between these models will be explained and their shortcomings will be discussed. Emphasis will be given to the model with projectability and without detailed balance, which seems to be the least problematic at this stage, and its theoretical development and phenomenology will be presented.

# University of Crete HEP Seminars 2009/2010

Fri Nov 6, 2009

## 4pm - 5pm Niko Jokela (Technion) on "Decaying D-brane in the scope of electrostatics"

**Where:** Physics Department, 2nd Floor Seminar Room

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: The decay of an unstable D-brane is one of the cleanest examples of time-dependent backgrounds in closed string theories. Yet very little is known about its decay process. I will review the current understanding and focus on string scattering amplitudes in particular. I will also present a novel method by which one is able to study the high energy limit of a closed string pair production amplitude.

Tue Nov 10, 2009

## 5:15pm - 6:15pm Angel Paredes (Barcelona) on "D3-D7 Quark-Gluon Plasmas"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I will present the string dual to finite temperature  $SU(N_c)$   $N=4$  SYM coupled to massless fundamental matter introduced by  $N_f$  D7 branes, with Abelian flavor symmetry. The analytic solution includes the backreaction of the flavors up to second order in a parameter that weighs the internal flavor loops. I will study the thermodynamics of the system and its departure from conformality; and analyze the energy loss of partons moving through the plasma: the fundamental degrees of freedom enhance the jet quenching.

Fri Nov 13, 2009

## 4pm - 5pm

### Giorgio Torrieri (Frankfurt U.) on "Bulk viscosity in the QCD phase transition and its phenomenological effect"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: After an introduction to the phenomenology of heavy ion collisions, in particular the still unresolved "HBT puzzle" we discuss the role bulk viscosity has in heavy ion collision dynamics. We argue that bulk viscosity should peak around  $T_c$ , and explore the effect such a peak has on the evolution of the QCD fluid. (Based on <http://arxiv.org/abs/0805.0442> [arxiv.org])

Fri Nov 20, 2009

## 4pm - 5pm

### Gabriele Veneziano (CERN) on "Transplanckian string collisions: a review of past and recent progress"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: After a brief summary of twenty years of work on transplanckian-energy string collisions I will present a recent S-matrix approach to gravitational collapse which, in spite of its drastic simplifications, appears to capture the essential physics of the problem by its surprisingly good agreement with analytic and numerical results in General Relativity.

Tue Nov 24, 2009

## 5:15pm - 6:15pm Nick Tsamis (Crete U.) on "Gravity-Driven Cosmology"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: After an introduction to quantum gravitational effects in early cosmology, a simple phenomenological model is presented and its implications are detailed numerically as well as analytically.

# University of Crete HEP Seminars 2009/2010

Fri Nov 27, 2009

2pm - 3pm

## Daniel Elander (Swansea U.) on "A light scalar from walking solutions in gauge-string duality"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: Recently, a class of solutions to the Type IIB system of  $N_c$  D5-branes wrapped on  $S^2$  were found that exhibit walking behaviour, i.e. a suitably defined gauge coupling stays approximately constant over a large intermediate energy regime. These models provide interesting laboratories in which dynamical questions about the strongly coupled properties of walking theories can be addressed. One such question is whether the spontaneous breaking of scale invariance leads to the existence of a light scalar in the spectrum, the dilaton. In this talk, I will review results from an analytical and numerical study, which indicates the presence of such a light state, the mass of which is suppressed by the length of the walking region.

Tue Dec 1, 2009

5:15pm - 6:15pm Tassos Petkou (Crete U.) on "Stochastic Quantization vs AdS/CFT"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I present an example of the formal connection between Stochastic Quantization and AdS/CFT. The 4d action of a conformally coupled  $\phi^4$  model on AdS4 is shown to be related, both through Stochastic Quantization and AdS/CFT, to the 3d Euclidean action of a massless scalar with  $\phi^6$  interaction. The connection of our model 3d and 4d actions to the gravitational action in the corresponding dimensions, indicates a possible geometric origin of our results.

Fri Dec 4, 2009

2pm - 3pm Sergey Sibiryakov (CERN) on "A healthy extension of Horava gravity"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I review the recent proposal of Horava to construct the theory of quantum gravity by abandoning Lorentz invariance. I discuss the self-consistency problems appearing in the original formulation of the proposal and show that these problems are resolved in an extended version of the theory. The extension is natural: it amounts to considering the most general action which is renormalizable by power counting and compatible with the symmetries of the theory. At low energies the extended model reduces to a Lorentz-violating scalar-tensor gravity theory. I discuss some phenomenological aspects of the model and show that the deviations from general relativity can be made weak by an appropriate choice of parameters.

Mon Dec 7, 2009

1pm - 2pm

## Christos Panagopoulos (Crete U. and FORTH) on "Interesting questions in High-Tc" Part III

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This is the third part of the informal seminar on the experimental status and questions in High Tc.

## University of Crete HEP Seminars 2009/2010

Tue Dec 8, 2009

5:15pm - 6:15pm

### David Mateos (Barcelona U.) on "Universal String Predictions for Heavy Ion Collisions"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I will review a recently uncovered, fascinating connection between the physics of string theory black holes and the physics of the deconfined quark-gluon plasma created in relativistic heavy-ion collision experiments. I will then describe universal string predictions potentially observable in these experiments.

Thu Dec 10, 2009

1pm - 3pm

### Christos Panagopoulos (Crete U. and FORTH) on "Interesting questions in High-Tc" Part IV

**Where:** 3rd Floor Seminar Room, Physics Department

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This is the fourth part of the informal seminar on the experimental status and questions in High Tc.

Fri Dec 11, 2009

2pm - 3pm Peter Rakitzis (Crete U./FORTH) on "Atomic Parity Violation"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I review atomic parity violation experiments, future prospects, and also discuss possible parity violation experiments on Crete.

4pm - 6pm

### Christos Panagopoulos (Crete U. and FORTH) on "Interesting questions in High-Tc" Part V

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: This is the fifth part of the informal seminar on the experimental status and questions in High Tc.

Tue Dec 15, 2009

5:15pm - 6:15pm Daisuke Yamada (Crete U.) on "Phase Diagram of N=4 SYM on Sphere"

**Where:** Physics Department, Seminar Room 2nd Floor

**Creator:** University of Crete HEP Seminars 2009/2010

**Description:**

ABSTRACT: I discuss the phase structure of the N=4 theory defined on three-sphere at zero coupling. We find that Gauss' law of the compact space alone can "confine" the theory.