GAST (Gauge and String Theories)

Bologna 28/29 Marzo 2013

Dip. di Fisica ed Astronomia, via Irnerio 46, aula Magna

Titoli e abstracts

Giovedi 28 (14:00-16:00) Chair: Davide Fioravanti

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Guido Macorini (NBI, Copenhagen)

Towards the dressing phase in the AdS_3/CFT_2 duality

I will review recent progresses in understanding the 1-loop correction to the dressing phase appearing in the Bethe Ansatz equations proposed for the spectrum of strings on $AdS_3 \times S^3 \times T^4$.

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Michele Cicoli (Bologna)

Axions and dark radiation from string compactifications

I shall present a general analysis of the role played by axion-like particles which emerge in the low energy limit of type IIB string compactifications, showing that one can obtain viable QCD axion candidates and additional light axions which can behave as dark radiation recently observed by PLANCK at 2 sigma level.

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Gabriele Martelloni (Firenze)

Wilson loops and the generalized quark-antiquark potential in ABJM theory

We construct a generalized cusped Wilson loop operator in N=6 Super Chern-Simons theories which is locally invariant under half of the supercharges. It depends on two parameters and interpolates smoothly between the 1/2 BPS line or circle and a pair of antiparallel lines, representing a natural generalization of the quark-antiquark potential in ABJ(M) theories. Moreover we construct two new families of BPS Wilson loops in ABJM theory which live respectively on three dimensional euclidean space-time and on the two dimensional sphere. Our results open the possibility to explore the connection between localization and all-loop Bethe Ansatz in ABJM theory and give a possible way to find an interpolating function between weak and strong coupling, essential to solve the TBA.

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Giovedi 28 (16:20-18:20) Chair: Luca Griguolo

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Ken Konishi (Pisa)

Confinement via strongly-coupled nonabelian monopoles

New types of confinement phase emerge as singular SCFT's appearing as infrared-fixed-points of N=2 supersymmetric QCD (SQCD) are perturbed by an N=1 adjoint mass term. Based on recent remarkable developments in the understanding of infrared-fixed-point SCFT of highest criticality by Gaiotto, Seiberg, Tachikawa, we discuss physics of some such systems with SU(N), USp(2N) and SO(N) gauge groups, which show features different from, and subtler than, a straightforward dual superconductivity picture of confinement a' la 't Hooft and Mandelstam. This might suggest a new confinement picture for the real-world QCD.

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Daniel Ricci Pacifici (Padova)

Deformed Seiberg-Witten curves for ADE quivers

We study N=2 ADE quiver gauge theories in presence of a non-trivial Omega background along a two dimensional plane. In particular we perform a saddle point analysis to the partition function and derive an epsilon-deformed version of Seiberg-Witten like equations. The result can be interpreted as a non-commutative version of the standard Seiberg-Witten curves associated to the quiver theories.

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Roberto Bonezzi (Bologna)

Worldline approach to higher spin fields and quantum gravity

In the present talk we will present recent progresses in a first quantized approach to higher spin fields that makes use of O(N) spinning particle models. In particular, by coupling the spinning particle to a curved background we are able to identify the first Seeley-DeWitt coefficients of the effective action of a class of higher spin fields on (A)dS backgrounds, in arbitrary even dimensions.

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Venerdi 29 (9:00-11:00) Chair: Alessandro Tanzini

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Filippo Passerini (CERN, Ginevra)

3d & 5d gauge theory partition functions as q-deformed CFT correlators

In this talk I will discuss few relations between gauge theory partition functions and CFT correlators. In particular, I will define a class of q-deformed CFT correlators where conformal blocks are controlled by a deformation of Virasoro symmetry and I will show how three-point functions can be derived exploiting the bootstrap approach. It results that q-deformed degenerate correlators can be mapped to 3d partition functions while non-degenerate q-deformed correlators are related to 5d partition functions. I will describe how these results are consistent with the interpretation of certain 3d gauge theories as codimension two defect theories inside 5d theories.

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Francesco Bigazzi (Pisa)

Charged D3-D7 plasmas

I will focus on D3-D7 systems whose low energy dynamics is described by finite temperature N=4 Super Yang-Mills (and more general quiver theories) in the presence of dynamical massless fundamental matter fields at finite baryon charge density. I will present the holographic dual charged black hole solutions which are perturbative in the flavor backreaction but exact in the charge density. I will then discuss thermodynamical and hydrodynamical properties of these solutions and comment on their validity regimes.

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Andrea Marini (Perugia)

Thermal DBI at weak and strong coupling

We propose a new way to describe the dynamics of Dp-branes probing finite temperature backgrounds at weak coupling ($g_s << 1$) using a thermally corrected version of the DBI action. The new thermal DBI action can be derived perturbatively for small temperature through a quantum computation and the leading correction in temperature is given by the one-loop effective action for the DBI. For the specific case of D3-branes we also compare the thermal DBI action at weak coupling with the corresponding one at strong coupling, which can be obtained using the blackfold approach. Remarkably we find that the famous 3/4 factor between strongly and weakly coupled regimes for the D3-brane without electric and magnetic fields actually extends to the full non-linear DBI regime.

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Venerdi 29 (11:20-13:20) Chair: Domenico Seminara

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Ugo Bruzzo (Trieste)

Instanton counting on ALE spaces and desingularization of moduli spaces of instantons

Moduli spaces of framed sheaves on the projective plane are desingularizations of the moduli spaces of framed instantons on R4. The instanton counting for instantons on R4 is indeed in practice performed on those moduli spaces. A natural question arises whether one can construct analogous desingularizations for instantons on other spaces, e.g., ALE spaces. It turns out that this construction is possible at the price of considering framed sheaves on root stacks.

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Alessandro Fabbri (Bologna)

The AdS_4 correspondence at low string energy: Y system formulation of the CP^3 non-linear sigma model coupled to one fermion

Starting from a recently proposed set of Asymptotics Bethe Ansatz equations governing the behavior of a particular integrable bidimensional non linear sigma model we derive a set of functional equations (Y system). After introducing the model and discussing its properties, we discuss the peculiar form of the Y system obtained and show how to use it to access UV physical quantities. The connection between our results and the Fendley conjecture is also analyzed to the extent of obtaining the NLSM as the limit of a family of perturbed conformal models.

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Francesco Ravanini (Bologna)

Entanglement entropy in integrable models

I briefly review the application of integrable methods, ranging from conformal field theory results to corner transfer matrix approach to the calculation of entanglement entropy in 2D integrable lattice or continuum field theories.

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