XIX AVOGADRO MEETING on Strings, Supergravity and Gauge Theories

Report dei Contributi

https://agenda.infn.it/e/37447

ID contributo: **18** Tipo: **Gong Show talk**

Freund-Rubin compactifications of non-supersymmetric strings

mercoledì 20 dicembre 2023 14:30 (10 minuti)

I will discuss Freund-Rubin compactifications of tachyon-free superstring theories that have no spacetime supersymmetry in their ten-dimensional formulation. A common feature of these models is the presence of scalar potentials in the low-energy physics, known as tadpole potentials, which correspond to vacuum energies in quantum field theories.
These tadpole potentials can play crucial roles in flux compactifications, and one can engineer Freund-Rubin vacua by balancing tree-level fluxes with one-loop vacuum energies. I will comment on the stability of these solutions and their connections with charged branes.

Autore principale: RAUCCI, Salvatore (Istituto Nazionale di Fisica Nucleare)

Relatore: RAUCCI, Salvatore (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Gong Show

ID contributo: **19** Tipo: **Gong Show talk**

Free energy on the sphere for non-abelian gauge theories

mercoledì 20 dicembre 2023 14:40 (10 minuti)

We compute the Sd partition function of the fixed point of non-abelian gauge theories in continuous d, using the ϵ-expansion around d = 4. We obtain the result up to NLO, i.e. including two-loop vacuum diagrams. Depending on the sign of the one-loop beta function, there is a fixed point with real gauge coupling in d > 4 or d < 4. In the first case, we extrapolate to d = 5 to test a recently proposed construction of the UV fixed point of 5d SU(2) Yang-Mills via a susy-breaking deformation of the E1 SCFT. In the second case, we extrapolate to d = 3 to test whether QCD3 with gauge group SU(nc) and nf fundamental matter fields flows to a CFT or to a symmetry-breaking case.

Autori principali: DE CESARE, Fabiana (Istituto Nazionale di Fisica Nucleare); DI PIETRO, Lorenzo (Istituto Nazionale di Fisica Nucleare); SERONE, Marco (TS)

Relatore: DE CESARE, Fabiana (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Gong Show

ID contributo: **20** Tipo: **Gong Show talk + Poster**

Geometry of Cosmological Correlators

mercoledì 20 dicembre 2023 14:50 (10 minuti)

We study correlators of a class of scalar toy models in cosmological background. These can be computed from the so-called wavefunction of the universe which in turn is given by the canonical form of the cosmological polytope. We find that a simple geometrical operation on the cosmological polytope gives a geometry whose canonical form gives the correlator. We initiate the study of its boundary structure and triangulations identifying new set of soft limits and positivity bounds.

Autore principale: DIAN, Gabriele (DESY Hamburg)

Relatore: DIAN, Gabriele (DESY Hamburg)

Classifica Sessioni: Gong Show

ID contributo: **21** Tipo: **Gong Show talk + Poster**

Spinning partial waves for scattering amplitudes in any dimension

mercoledì 20 dicembre 2023 15:00 (10 minuti)

Partial wave decomposition is one of the main tool within the S-matrix bootstrap. However, a comprehensive understanding of partial waves beyond four dimensions is currently lacking. We present a method to compute all partial waves for 2-to-2 scattering of spinning particles in arbitrary dimension.

Autore principale: RUSSO, Francesco (University of Pisa)

Coautore: VICHI, Alessandro (University of Pisa); BURIC, Ilija (University of Pisa)

Relatore: RUSSO, Francesco (University of Pisa)

Classifica Sessioni: Gong Show

ID contributo: **22** Tipo: **Gong Show talk + Poster**

Remodeling Equivariant GLSMs

mercoledì 20 dicembre 2023 15:10 (10 minuti)

Topological Recursion (TR) is the mathematical framework that governs the genus expansion of matrix integrals. In physics, TR has a wide range of applications: it computes correlation functions in matrix models, amplitudes in topological string theory, partition functions of JT (super)gravity and more. In this talk I will introduce the theory of Eynard-Orantin TR and outline the novel application to equivariant Gauged Linear Sigma Models and the physics of A-branes. Based on upcoming work.

Autore principale: SCAZZUSO, Davide (HU Berlin)

Relatore: SCAZZUSO, Davide (HU Berlin)

Classifica Sessioni: Gong Show

ID contributo: **23** Tipo: **Gong Show talk**

The gravitational nature of generalized TTbar deformations

mercoledì 20 dicembre 2023 15:20 (10 minuti)

TTbar deformations provide remarkable insights into the topology and geometry of the space of field theories, as well as allowing exact calculations of physical quantities related to lower-dimensional deformed field theories. Noteworthy connections with theories of gravity have been shown to hold in two-dimensional spacetime. We discuss the extension of such correspondences to higher dimensional spacetimes, through the introduction of non-trivial, higher-derivative theories of gravity.

Autore principale: MORONE, Tommaso (Università di Torino)

Relatore: MORONE, Tommaso (Università di Torino)

Classifica Sessioni: Gong Show

ID contributo: **24** Tipo: **Gong Show talk + Poster**

AdS2 vacua from SL(2,R) T-Duality

mercoledì 20 dicembre 2023 15:30 (10 minuti)

The AdS_2/CFT_1 correspondence plays a key role in the microscopical description of extremal black holes, AdS_2 being part of the geometry that appears in their near horizon limit in any dimension. Another useful application of the AdS_2/CFT_1 correspondence is to the holographic description of superconformal line defects in higher dimensional CFTs. Geometrically, a sign that an AdS_2 solution may be describing a superconformal line defect is that it flows asymptotically locally to a higher dimensional AdS background, dual far from the defects to the higher dimensional CFT in which they are embedded.
I will present general results on the construction of AdS_2 solutions to Type II supergravity via U(1) and SL(2) T-dualities, paying special attention to the conditions for preservation of supersymmetry. I then exploit these to construct new classes of small $calN = 4$ solutions in Type II supergravity. I also applied this procedure to two solutions in Type IIA Supergravity with $\mathbb{CP}^3$ along the internal space. These preserve $calN = (5, 0)$ or $calN = (6, 0)$ supersymmetry and realise the superconformal algebras $osp(5|2)$ and $osp(6|2)$. This results in four new classes of AdS_2 solutions, realising these superconformal algebras, hinting that a more general class $AdS_2 \times \mathbb{CP}^3 \times \Sigma$ may exist.

Autore principale: Sig. CONTI, Andrea (University of Oviedo)

Coautore: Prof. MACPHERSON, Niall (University of Oviedo); Prof. LOZANO, Yolanda (University of Oviedo)

Relatore: Sig. CONTI, Andrea (University of Oviedo)

Classifica Sessioni: Gong Show

ID contributo: **25** Tipo: **Poster**

Matrix models from black hole geometries

Supersymmetric and magnetically charged black holes in AdS4 are known to be holographically dual to 3d SCFTs compactified on a Riemann surface.
In the last decade, many observables have been computed on both sides and a remarkable matching has been achieved.
In field theory, the partition function is computed via localization, and it reduces to a matrix model whose eigenvalues, at large N, become continuously distributed according to a function called eigenvalue density.
In this work we provide a gravitational interpretation of this eigenvalue density from the near-horizon geometry of the black holes, and illustrate it on various examples.

Autori principali: LUSCHER, Alice (University of Oxford); BOIDO, Andrea (University of Oxford); Prof. SPARKS, James (University of Oxford)

Relatore: LUSCHER, Alice (University of Oxford)

Classifica Sessioni: Poster session

ID contributo: **26** Tipo: **Gong Show talk + Poster**

Non-unitary multicriticality in two dimensions

mercoledì 20 dicembre 2023 15:50 (10 minuti)

I will present recent developments in the understanding of non-unitary multicriticality in two-dimensions based on JHEP 02 (2023) 046, JHEP 09 (2023) 052 and work in progress.
We study the non-unitary, PT symmetric deformations of the two-dimensional Tricritical Ising Model obtained by coupling its two spin Z2 odd operators to imaginary magnetic fields. We establish the presence of two universality classes of infrared fixed points on the critical surface, separating PT symmetric and PT spontaneously broken phases. The first class corresponds to the familiar Yang-Lee edge singularity, while the second class to its tricritical version. We argue that these two universality classes are controlled by the conformal non-unitary minimal models (2, 5) and (2, 7) respectively, which is supported by considerations based on PT symmetry and the corresponding extension of Zamolodchikov's c-theorem, and also verified numerically using the truncated conformal space approach. Our results are in agreement with a previous numerical study of the lattice version of the Tricritical Ising Model. We also conjecture the classes of universality corresponding to higher non-unitary multicritical points obtained by perturbing the conformal unitary models with imaginary coupling magnetic fields. If correct, it implies the existence of a tower of RG flows among the minimal models (2,2n+3) analogous to the Zamolodchikov's flows among unitary minimal models. Even if they cannot be discussed by using (conformal) perturbation theory and are not integrable flows, we tested the existence of the flows among the minimal models (2,2n+3) numerically, by using truncated conformal space approach in JHEP 09 (2023) 052. We established the existence of the aforementioned flows for critical, tricritical and tetracritical version of the Lee-Yang, making stronger the conjecture on the non-unitary multicritical theory. In the last paper we also observed for the first time some non-critical breaking of PT symmetry. We argue that this exists because of an absence of an order parameter for such a symmetry breaking.

Autore principale: MISCIOSCIA, Alessio (Desy (Hamburg))

Relatore: MISCIOSCIA, Alessio (Desy (Hamburg))

Classifica Sessioni: Gong Show

ID contributo: **27** Tipo: **non specificato**

The Cosmological Bootstrap - Part 1

mercoledì 20 dicembre 2023 09:30 (1 ora)

Relatore: CABASS, Giovanni (Ruđer Bošković Institute)

Classifica Sessioni: The Cosmological Bootstrap

ID contributo: **28** Tipo: **non specificato**

The Cosmological Bootstrap - Part 2

mercoledì 20 dicembre 2023 11:00 (1 ora)

Relatore: DUASO PUEYO, Carlos (University of Cambridge)

Classifica Sessioni: The Cosmological Bootstrap

ID contributo: **29** Tipo: **non specificato**

Von Neumann Algebras and Quantum Gravity - Part 1

venerdì 22 dicembre 2023 15:00 (1 ora)

Relatore: DEJENE BAHIRU, Eyoab (SISSA)

Classifica Sessioni: Von Neumann Algebras and Quantum Gravity

ID contributo: **30** Tipo: **non specificato**

Von Neumann Algebras and Quantum Gravity - Part 2

venerdì 22 dicembre 2023 16:30 (1 ora)

Relatore: VARDIAN, Niloofar (SISSA)

Classifica Sessioni: Von Neumann Algebras and Quantum Gravity

ID contributo: **31** Tipo: **non specificato**

Axions from String Theory - Part 1

giovedì 21 dicembre 2023 09:30 (1 ora)

Relatore: REVELLO, Filippo (Utrecht University)

Classifica Sessioni: Axions from String Theory

ID contributo: **32** Tipo: **non specificato**

Axions from String Theory - Part 2

giovedì 21 dicembre 2023 11:00 (1 ora)

Relatore: RIGHI, Nicole (King's College London)

Classifica Sessioni: Axions from String Theory

ID contributo: **33** Tipo: **non specificato**

Non-perturbative Techniques for Superconformal Theories - Part 1

venerdì 22 dicembre 2023 09:30 (1 ora)

Relatore: GALVAGNO, Francesco (ETH Zuerich)

Classifica Sessioni: Non-perturbative Techniques for Superconformal Theories

ID contributo: **34** Tipo: **non specificato**

Non-perturbative Techniques for Superconformal Theories - Part 2

venerdì 22 dicembre 2023 11:00 (1 ora)

Relatore: FARDELLI, Giulia (Boston University)

Classifica Sessioni: Non-perturbative Techniques for Superconformal Theories

ID contributo: **37** Tipo: **non specificato**

The Cosmological Bootstrap - Discussion session

mercoledì 20 dicembre 2023 12:00 (1 ora)

Classifica Sessioni: The Cosmological Bootstrap

ID contributo: **38** Tipo: **non specificato**

TBD

mercoledì 20 dicembre 2023 16:10 (10 minuti)

Relatore: BASON, Davide (University of Torino)

Classifica Sessioni: Gong Show

ID contributo: **39** Tipo: **non specificato**

Non-perturbative Techniques for Superconformal Theories - Discussion session

venerdì 22 dicembre 2023 12:00 (1 ora)

Classifica Sessioni: Non-perturbative Techniques for Superconformal Theories

ID contributo: **41** Tipo: **non specificato**

Axions from String Theory - Discussion session

giovedì 21 dicembre 2023 12:00 (1 ora)

Classifica Sessioni: Axions from String Theory

ID contributo: **42** Tipo: **non specificato**

Von Neumann Algebras and Quantum Gravity - Discussion session

venerdì 22 dicembre 2023 17:30 (1 ora)

Classifica Sessioni: Von Neumann Algebras and Quantum Gravity

ID contributo: **44** Tipo: **Gong Show talk + Poster**

Analytical bootstrap for the O(3) magnetic impurity

mercoledì 20 dicembre 2023 15:40 (10 minuti)

Extended operators such as defects are of fundamental importance in conformal field theories, with applications both to high energy theory and to condensed matter systems at criticality. Recently, analytic bootstrap techniques have been successfully applied to investigate these objects.

In this talk, we will focus on the O(3) magnetic impurity, which at the fixed point is described by a defect conformal field theory. Firstly, we will use symmetries and renormalization group techniques to study the light defect spectrum of this model the 4-ε expansion, which turns out to be quite rich. Once the defect spectrum is known, analytic bootstrap techniques are applied to bulk two-point functions to extract an infinite amount of new dCFT data.

Autore principale: DE SABBATA, Elia (Istituto Nazionale di Fisica Nucleare)

Relatore: DE SABBATA, Elia (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Gong Show

ID contributo: **45** Tipo: **Gong Show talk + Poster**

Broken (super) conformal Ward identities at finite temperature

mercoledì 20 dicembre 2023 16:00 (10 minuti)

I will present recent developments in the understanding of conformal field theories at finite temperature, based on hep-th/2306.12417.
When a (super) conformal field theory is placed on a non-trivial manifold, the (super) conformal symmetry is broken. However, it is still possible to derive broken Ward identities for these broken symmetries, which provide additional constraints on the theory. I will discuss how to derive and apply the broken Ward identities associated with the (super) conformal group on the thermal manifold $\mathcal{M}_\beta = S^1_\beta \times \mathbb{R}^{d-1}$, and I will show how the novel constraints not only systematically reproduce known results, including an implicit formulation of the generalized Cardy formula, but also elegantly relate the thermal energy spectrum with the conformal spectrum.

Autore principale: MARCHETTO, Enrico

Coautore: MISCIOSCIA, Alessio (DESY); POMONI, Elli (DESY and Hamburg University)

Relatore: MARCHETTO, Enrico

Classifica Sessioni: Gong Show

ID contributo: **46** Tipo: **Gong Show talk + Poster**

Remarks on BPS Wilson loops in non-conformal N=2 gauge theories and localization

mercoledì 20 dicembre 2023 16:40 (10 minuti)

We consider 1/2 BPS supersymmetric circular Wilson loops in four-dimensional N = 2 SU(N) SYM theories with massless matter in a generic representation of the gauge group and a non-vanishing β-function (arxiv:2311.17692). Following Pestun's approach, we can employ localization to map these observables, evaluated on the four-sphere S^4, into a matrix model, provided that the one-loop determinants are consistently regularized. After constructing the regularized matrix model for these set-ups, I will demonstrate that the predictions for the Wilson loop at order g^4 perfectly match the perturbative renormalization based on the evaluation of Feynman diagrams both on the sphere and, remarkably, in flat space, even if conformal symmetry is broken at the quantum level. Moreover, I will revisit the difference theory approach, showing that when β-function is non-vanishing this method does not account for the presence of "evanescent"terms which are activated by the renormalization procedure and contribute to the renormalized observable at order g^6.

Autore principale: TESTA, Alessandro (Istituto Nazionale di Fisica Nucleare)

Relatore: TESTA, Alessandro (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Gong Show

ID contributo: **47** Tipo: **Poster**

Resonance contributions to nucleon spin structure in Holographic QCD

We study polarized inelastic electron-nucleon scattering at low momentum transfer in the Witten-Sakai-Sugimoto model of holographic QCD, focusing on resonance production contributions to the nucleon spin structure functions. Our analysis includes both spin $3/2$ and spin $1/2$ low-lying nucleon resonances with positive and negative parity. We determine, in turn, the helicity amplitudes for nucleon-resonance transitions and the resonance contributions to the neutron and proton generalized spin polarizabilities. Extrapolating the model parameters to realistic QCD data, our analysis, triggered by recent experimental results from Jefferson Lab, agrees with the observation that the $\Delta(1232)$ resonance gives the dominant contribution to the forward spin polarizabilities at low momentum transfer. The contribution is negative and tends to zero as the momentum transfer increases. As expected, the contribution of the $\Delta(1232)$ to the longitudinal-transverse polarizabilities is instead negligible. The latter, for both nucleons, turn out to be negative functions with zero asymptote. The holographic results, at least for the proton where enough data are available, are in qualitative agreement with the resonance contributions to the spin polarizabilities extracted from experimental data on the helicity amplitudes.

Autore principale: CASTELLANI, Federico (Istituto Nazionale di Fisica Nucleare)

Relatore: CASTELLANI, Federico (Istituto Nazionale di Fisica Nucleare)

Classifica Sessioni: Poster session

ID contributo: **48** Tipo: **Gong Show talk + Poster**

Is action complexity better for dS space in JT gravity?

Holographic complexity is supposed to capture the evolution of spacetime. In two-dimensional de Sitter (dS), volume complexity remains O(1) up to a critical time, after which it suddenly diverges. On the other hand, in (d>2)-dimensional dS, complexity becomes very large even before the critical time. In Jackiw-Teitelboim (JT) gravity, taking into account the dilaton, the same behavior is expected for complexity in two-dimensional dS. We show that this expectation is met by action complexity, which we explicitly compute by performing half reduction from three-dimensional dS. In addition, we propose an appropriate Weyl field-redefinition such that volume avoids the discontinuous jump in time evolution. Since action complexity directly takes into account the dilaton and does not suffer the Weyl-field redefinition ambiguity which affects volume complexity, we argue that action is better than volume for dS in JT gravity.

Autore principale: ZENONI, Nicolò (Department of Physics, Osaka University)

ID contributo: **49** Tipo: **Gong Show talk + Poster**

Gravitational Axiverse Spectroscopy: Seeing the Forest for the Axions

mercoledì 20 dicembre 2023 16:20 (10 minuti)

We consider inflationary models with multiple spectator axions that couple to dark Abelian gauge sectors. We demonstrate a distinctive phenomenon that make this class of models attractive – we show that separation of the gravitational wave peaks can occur, depending on the axion initial conditions and mass. This leads to a distinctive gravitational wave (GW) forest, whose observation would be a signal that multiple axions exist within the universe. Finally, we elaborate on possible ultraviolet origins of the spectator models utilizing string axions descending from p-form gauge field coupled to D-branes. String theory compactifications generically produce an 'axiverse', that is, many of these string axions. Their coupling to D-branes in turn generates CS couplings to dark gauge fields which can be enhanced via multiple brane wrappings and/or fluxes. If these string axions then undergo slow-roll during inflation, they produce GW signals with peaked frequency distribution which are potentially detectable. We discuss the non-trivial requirements for such U(1) gauge field coupled string axions to occur in type IIB string compactifications on Calabi-Yau orientifolds with fluxes, and provide a rudimentary classification of some options.

Autori principali: WESTPHAL, Alexander; DIMASTROGIOVANNI, Emanuela; Dr. LEEDOM, Jacob (DESY); PUTTI, Margherita (Hamburg University UHH - DESY); FASIELLO, Matteo (IFT)

Relatore: PUTTI, Margherita (Hamburg University UHH - DESY)

Classifica Sessioni: Gong Show

ID contributo: **50** Tipo: **Gong Show talk + Poster**

Higher-point lightcone bootstrap in the comb channel

mercoledì 20 dicembre 2023 16:30 (10 minuti)

It is a well-established fact that any conformal field theory with a gap in the twist spectrum must contain families of multi-twist operators, whose spectrum at large spin approaches that of generalized free theory. In this talk, we aim to discuss how the lightcone bootstrap can be applied to five- and six-point correlation functions in the comb channel to constrain the behavior of double- and triple-twist operators. Our analysis yields new expressions for large-spin OPE coefficients involving two double-twist operators, as well as the leading-order anomalous dimension matrix for triple-twist operators. The latter offers valuable insight into how the degeneracy of triple-twist primaries in the free-theory limit gets lifted by the inclusion of interactions.

Autore principale: QUINTAVALLE, Lorenzo (Laval University)

Coautore: Dr. KAVIRAJ, Apratim (IIT Kanpur); Dr. MANN, Jeremy (King's College London); Sig. HARRIS, Sebastian (DESY); Prof. SCHOMERUS, Volker (DESY)

Relatore: QUINTAVALLE, Lorenzo (Laval University)

Classifica Sessioni: Gong Show

ID contributo: **54** Tipo: **non specificato**

Generalized Global Symmetries in Quantum Field Theory - Discussion session

giovedì 21 dicembre 2023 17:30 (1 ora)

Classifica Sessioni: Generalized Global Symmetries in Quantum Field Theory

ID contributo: **55** Tipo: **non specificato**

Generalized Global Symmetries in Quantum Field Theory - Part 1

giovedì 21 dicembre 2023 15:00 (1 ora)

Relatore: Sig. MININNO, Alessandro (Instituto de Fisica Teorica UAM-CSIC)

Classifica Sessioni: Generalized Global Symmetries in Quantum Field Theory

ID contributo: **56** Tipo: **non specificato**

Generalized Global Symmetries in Quantum Field Theory - Part 2

giovedì 21 dicembre 2023 16:30 (1 ora)

Relatore: COPETTI, Christian (Oxford)

Classifica Sessioni: Generalized Global Symmetries in Quantum Field Theory

ID contributo: **57** Tipo: **Gong Show talk + Poster**

Is action complexity better for dS space in JT gravity?

mercoledì 20 dicembre 2023 16:50 (10 minuti)

Holographic complexity is supposed to capture the evolution of spacetime. In two-dimensional de Sitter (dS), volume complexity remains O(1) up to a critical time, after which it suddenly diverges. On the other hand, in (d>2)-dimensional dS, complexity becomes very large even before the critical time. In Jackiw-Teitelboim (JT) gravity, taking into account the dilaton, the same behavior is expected for complexity in two-dimensional dS. We show that this expectation is met by action complexity, which we explicitly compute by performing half reduction from three-dimensional dS. In addition, we propose an appropriate Weyl field-redefinition such that volume avoids the discontinuous jump in time evolution. Since action complexity directly takes into account the dilaton and does not suffer the Weyl-field redefinition ambiguity which affects volume complexity, we argue that action is better than volume for dS in JT gravity.

Relatore: ZENONI, Nicolò (Department of Physics, Osaka University)

Classifica Sessioni: Gong Show