Meeting PRIN ”String Theory as a bridge between Gauge Theories and Quantum Gravity”

Report of Contributions

https://agenda.infn.it/e/35383

Contribution ID: **1** Type: **not specified**

Constructing solutions to crossing relations

Thursday, 22 June 2023 14:30 (1 hour)

In this talk I will discuss how to write down generalized group-theoretic crossing equations for a unitary Euclidean CFT and how to construct an exact solution to it. I will also present its connection to the cosmological bootstrap program.

Presenter: BISSI, Agnese

Contribution ID: **2** Type: **not specified**

On the stability and deformability of topological stars

Thursday, 22 June 2023 16:00 (45 minutes)

Topological stars, or top star for brevity, are smooth horizonless static solutions of Einstein-Maxwell theory in 5-d, that reduce to spherically symmetric solutions of Einstein-Maxwell-Dilaton theory in 4-d. In the framework of the fuzzball program, they represent possible microstate geometries for non-supersymmetric black holes. The study of linear scalar perturbations of top stars allows to argue for their stability and deformability. With different techniques, including WKB approximation, numerical analysis and quantum Seiberg-Witten curves, one can identify three classes of quasi-normal modes: long-lived meta-stable, prompt ring-down and 'blind' modes. The corresponding frequencies have negative imaginary part, thus suggesting linear stability for top stars. Moreover the tidal Love and dissipation numbers, encoding the response to tidal deformations, can be determined. Similarly to black holes, both of them vanish in the static limit; however, contrary to black holes, the dynamical Love number is non-trivial and there are no dissipative effects at linear order.

Presenter: SUDANO, Giuseppe

Contribution ID: **3** Type: **not specified**

A Rutherford-like formula for scattering off Kerr-Newman BHs and subleading corrections

Thursday, 22 June 2023 16:45 (45 minutes)

Analytic methods for studying gravitational processes have received review interest due to their application to gravitational wave phenomenology. In this direction, one of the challenges is to develop a systematic apparatus to obtain the dynamics of spinning objects from the classical limit of quantum scattering amplitudes.
Exploring the Kerr-Schild gauge properties seems promising, and within this framework we study the scattering of a massive (charged) scalar off a Kerr-Newman black hole. In this gauge, the interactions between the probe and the target involve only tri-linear vertices, and we manage to write down the tree-level scattering amplitudes in analytic form, from which we can construct an expression for the eikonal phase which is exact in the spin of the black hole at arbitrary order in the Post-Minkowskian expansion. We compute the classical contribution to the cross-section and deflection angle at leading order for a Kerr black hole for arbitrary orientation of the spin. Finally, we test our method by reproducing the classical amplitude for a Schwarzschild black hole at second Post-Minkowskian order and outline how to extend the analysis to the Kerr-Newman case.

Presenter: GAMBINO, Claudio (Istituto Nazionale di Fisica Nucleare)

Contribution ID: **4** Type: **not specified**

Meeting organizzativo PRIN

Thursday, 22 June 2023 17:45 (30 minutes)

Presenter: BIANCHI, Massimo (Università di Roma Tor Vergata)

Contribution ID: **5** Type: **not specified**

The case for dS_2

Friday, 23 June 2023 09:30 (1 hour)

We discuss the Euclidean picture of semi classical gravity with positive cosmological constant, and the Gibbons-Hawking relation for the cosmological horizon entropy. We argue that many features remain non-trivial in two-dimensional toy models and discuss a variety of computational tools that can lead to exact expressions.

Presenter: ANNINOS, Dyonisos

Contribution ID: **6** Type: **not specified**

Analytic bootstrap for magnetic impurities

Friday, 23 June 2023 11:00 (45 minutes)

We will discuss two classes of line defects in the O(N) critical model at the Wilson-Fisher fixed point. These extended excitations are relevant for condensed matter systems, such as doped quantum antiferromagnets. After reviewing some state-of-the-art analytic bootstrap techniques, we will apply them to compute the correlator of two bulk excitations at first order in the epsilon expansion. From this result we are able to extract an infinite set of defect CFT data.

Presenter: BIANCHI, Lorenzo (Istituto Nazionale di Fisica Nucleare)