GSS 2.0: Gauge theories, supergravity and string theory

National coordinator

Anna Ceresole INFN section: Torino

Nodes

- Milano Bicocca
- Milano
- Padova
- Torino
- Pisa
- Lecce
- Genova

The over-arching theme

- The research project of GSS 2.0 is devoted to the investigation of some challenging problems in Supersymmetric Quantum Field Theories for the unified description of Gravity and Gauge interactions.

The main topics

- String Theory, M-Theory, Supergravity.
- Perturbative and non-perturbative properties of Gauge Theories.
- Topological field and string theories.
- Black Hole physics.
- Supersymmetry in Cosmology and Particle Physics.

GSS: Genova Node

The Genoa group

- Giuseppe Bandelloni (Retired since November 2016)
- Carlo Becchi (Emeritus)
- Camillo Imbimbo, 100%

The specific theme of the Genoa group

The Genova node has focused and developed an expertise on topological quantum field theories and string theories, higher-spin field theories, their non-perturbative dynamics and application to supersymmetric theories.

Results of 2018-19

- In collaboration with **Dario Rosa** of the Korean Institute for Advanced Studies of Seoul we have identified some hitherto unknown emergent topological structures sitting inside supergravity theory.
- We have used this, in an ongoing collaboration with **Valentina Pedemonte**, former student of the Laurea Magistrale of the Department of Physics of Genova, to give a complete description of the space of classical supersymmetric vacua of $N = 4$ $d = 2$ supergravity.

Ongoing and future projects for 2020

- We plan to extend our analysis to the more challenging and interesting case of $N = 2$ $d = 4$ supersymmetric gauge theories.
- We plan to exploit the topological structures of supergravity to elucidate the long standing and still not settled issue of supersymmetry quantum anomalies.

Publications 2018-19

- C. Imbimbo and D. Rosa, “The topological structure of supergravity: an application to supersymmetric localization,” JHEP **1805**, 112 (2018).
- V. Pedemonte, “ Supersymmetric localization and the topological structure of supergravity”, Master Thesis, Department of Physics University of Genova, November 2018, Supervisor: C. Imbimbo.
- C Imbimbo and V. Pedemonte, “The vacuum structure of $N = 4$ supergravity in 2 dimension”, forthcoming.