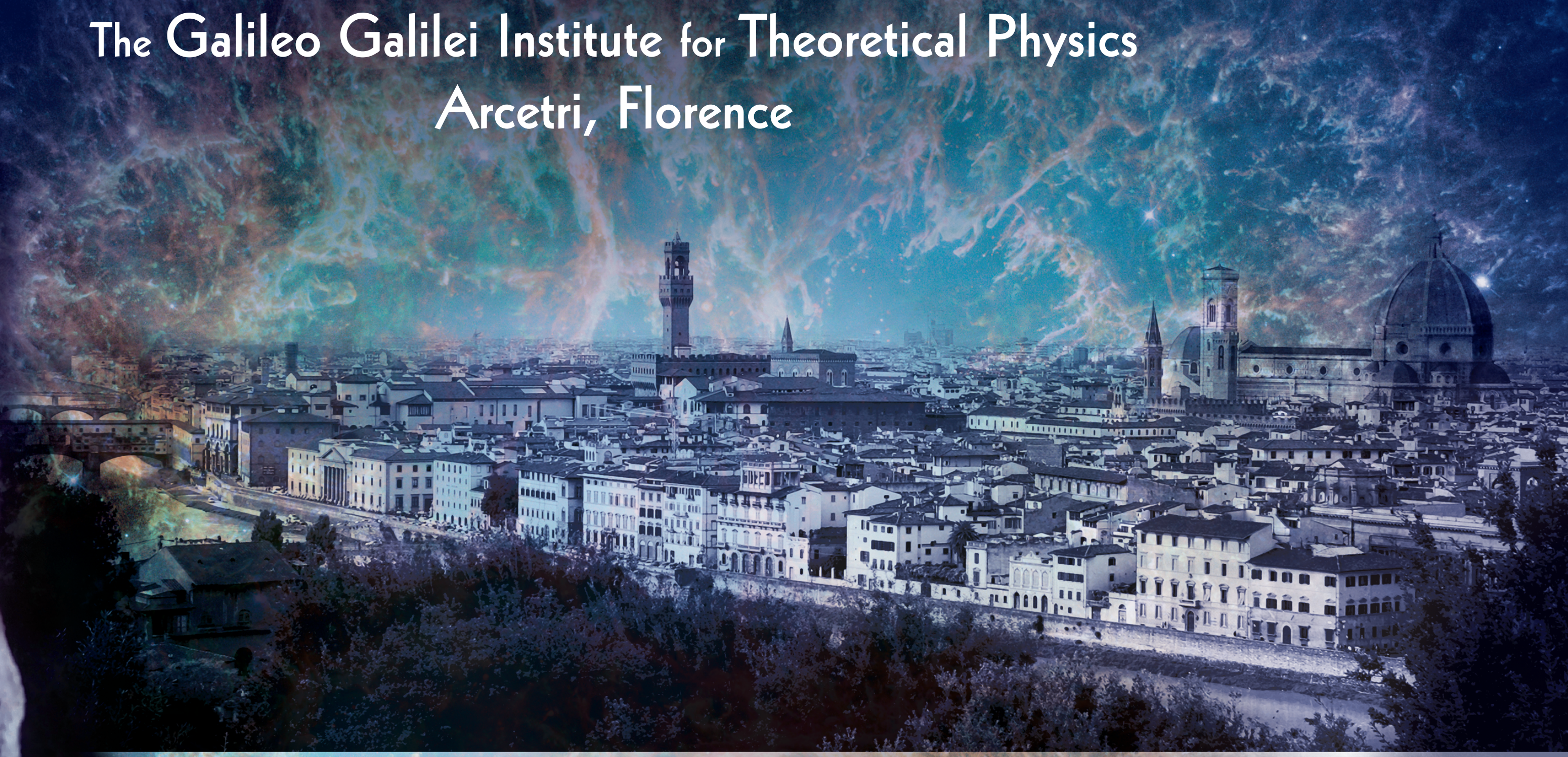The Galileo Galilei Institute for Theoretical Physics
Arcetri, Florence

Geometry of strings and fields

August 26, 2013 - October 18, 2013

Ever since the birth of string theory, interaction with geometry has been one of the primary driving forces that has led to progress in superstring theory. On one hand, string theory has generated many new geometrical concepts; and on the other hand new ideas from geometry have often found their first applications in string theory. These topics include vertex algebras, conformal field theory, mirror symmetry, topological field theory and string theory, exact solutions of supersymmetric gauge theory and noncommutative field theory. Recent exciting developments include the matrix model approach to $N=1$ gauge theory, open string mirror symmetry, the derived category approach to D-branes on Calabi-Yau manifolds, geometric transitions, proof of the $N=2$ Seiberg-Witten solution by instanton methods, wall crossing formulas, the relation between Langlands program and supersymmetric gauge theories, indications of integrable structures in super Yang-Mills theory and AdS string theory.

The program will be devoted to geometrical subjects motivated by string theory, and to recent developments in string theory and related physical fields which are of strong mathematical interest. On the mathematical side, the aim is to foster interaction between such areas of mathematics as derived categories, elliptic cohomology, geometric Langlands correspondence, quantum cohomology. On the more physical side, the aim is to foster new progress in the continuing drive towards understanding the foundations of string/M-theory, and in the wealth of new ideas involving D-branes, BPS states and various dualities which are of great importance to mathematical subjects such as algebraic geometry.

The main topics of the workshop include:

- Generalized complex geometry and supersymmetry
- Topological strings
- Extended topological field theories
- Vertex algebras
- Localization techniques in quantum field theory

Organizing Committee:
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