Colloqui della Classe di Scienze

Anno Accademico 2015/2016

Sala Stemmi | Palazzo della Carovana
Scuola Normale Superiore
Piazza dei Cavalieri, 7 - PISA

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Charting the Space of Quantum Field Theories

Abstract

Quantum field theory is the universal language of theoretical physics, underlying the Standard Model of elementary particles, the physics of the early Universe and a host of condensed matter phenomena such as phase transitions and superconductors. A great achievement of 20th century physics was the understanding of *weakly coupled* quantum field theories, where interactions can be treated as small perturbations of otherwise freely moving particles. However, weakly coupled theories are just a tiny island in the ocean of possibilities, and fail to describe some of the most interesting physical phenomena.

In this colloquium I will describe the astonishing discovery that in many physical systems, there is a unique *quantum* field theory that satisfies the general constrains of symmetry and quantum mechanics. This strategy, known as the **bootstrap**, allows to make sharp predictions for physical observables even in strongly coupled theories. These ideas have wide implications across theoretical physics.

Elaborazione a cura del Servizio Comunicazione e Relazioni Esterne | SNS

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