

**New Frontiers in Theoretical Physics
XXXVI Convegno Nazionale di Fisica Teorica**

Wednesday 23 May 2018 – Saturday 26 May 2018

Palazzone della Scuola Normale Superiore, Cortona (Arezzo)

Plenary Sessions – Talk list



Name	Title	Abstract
CALABRESE, Pasquale SISSA Trieste	Entanglement and thermodynamics in non-equilibrium isolated quantum systems	Entanglement and entropy are key concepts standing at the foundations of quantum and statistical mechanics. In the last decade the study of the non-equilibrium dynamics of isolated quantum systems revealed that these two concepts are intricately intertwined. Although the unitary time evolution ensuing from a pure initial state maintains the system globally at zero entropy, at long time after the quench local properties are captured by an appropriate statistical ensemble with non-zero thermodynamic entropy, which can be interpreted as the entanglement accumulated during the dynamics. Therefore, understanding the post-quench entanglement evolution unveils how thermodynamics emerges in isolated quantum systems.
CIRELLI, Marco LPTHE CNRS Jussieu Paris	Still searching for Dark Matter	I will briefly overview the current Dark Matter theory panorama, and the phenomenology of the searches. I will put some emphasis on some emerging directions that depart from the beaten path.
DE CURTIS, Stefania INFN Firenze	Nambu-Goldstone Composite Higgs(es)	I'll review the implications of composite Higgs scenarios from a theoretical and phenomenological point of view. They represent a natural possibility for the Electroweak Symmetry Breaking induced by a strong dynamics giving rise to new composite particles. These are ideal targets for the LHC program because they can produce visible effects without conflict with direct bounds.
DEL DUCA, vittorio ETH Zurich - INFN LNF	Amplitudes (in the Standard Model and beyond)	
FERRONI, Fernando Università di Roma e INFN	Future challenges for INFN	
FERUGLIO, Ferruccio Dipartimento di Fisica e Astronomia - Padova	Lepton Flavour Universality in B decays	B decays mediated by both charged currents and neutral currents have provided hints of violation of lepton flavour universality. I shortly review the present experimental results and the global fits when new physics is invoked. I illustrate a plausible SM extension providing an explanation of the anomalies in terms of new physics at or above the TeV scale and described by an effective field theory. Finally, I discuss the main constraints to this general framework: the impact of electroweak radiative corrections on a consistent interpretation of the data and the constraints coming from collider physics.
FORINI, Valentina City U. London and Humboldt U. Berlin	Superstrings, lattice and AdS/CFT	I will discuss perturbative and non-perturbative approaches to the quantization of the superstring sigma-models relevant in AdS/CFT, reporting in particular on the use of lattice field theory methods in this context.

<p>GIUSTO, Stefano Università di Padova</p>	<p>Holographic correlators and the information paradox</p>	<p>Some signatures of information loss are imprinted in the correlators containing the heavy operators dual to the black hole microstates. By using the classical geometries dual to particular microstates, we will compute some of these correlators and show how information is preserved already in the large N limit.</p>
<p>LATTANZI, Massimiliano INFN Ferrara</p>	<p>Particle cosmology: from neutrinos to stringy inflation</p>	<p>Cosmological observations represent a powerful tool to constrain particle physics, often complementary to laboratory experiments. In my talk I will focus on two distinct examples of such an interplay between cosmology and particle physics, namely neutrino physics and inflation. After briefly reviewing the relevant cosmological datasets, in the first part of the talk I will show how observations of the cosmic microwave background (CMB) and of the distribution of large scale structures (LSS) in the Universe constrain the properties of the relic neutrinos, as well as of additional light relic particles in the Universe like sterile neutrinos, axions or majorons. In the second part of the talk, I will discuss how string-inspired model of inflation can explain the observed "low-ell anomaly" in the CMB power spectrum, i.e., the lack of large-scale correlations.</p>
<p>LISI, Eligio INFN, Bari</p>	<p>Neutrino Masses and Mixings: Status and Challenges</p>	<p>The status of neutrino masses and mixings within the standard three-neutrino framework is presented. The combination of current data coming from oscillation experiments provides interesting constraints on the known mass-mixing parameters, as well as intriguing hints on the unknown ones. Concerning the latter, particularly interesting indications are emerging in favor of nearly maximal leptonic CP violation and of normal (i.e., quark-like) mass spectrum ordering, while the octant of the largest mixing angle remains undetermined. The combination of oscillation and non-oscillation data (coming from neutrinoless double beta decay searches and from cosmological surveys) is shown to set bounds to the absolute neutrino mass scale in the sub-eV range. We also discuss some of the challenges posed by the completion of the standard three-neutrino framework and by the search for new physics beyond it.</p>
<p>MANGANO, Michelangelo CERN</p>	<p>LHC and beyond: future perspective for High Energy Physics</p>	
<p>MARTINELLI, Guido Università Roma La Sapienza</p>	<p>Flavor Physics for Non-Experts</p>	<p>Several aspects of flavour physics, including the recent experimental "anomalies" in leptonic decays, are critically reviewed and future developments discussed.</p>
<p>MORALES, Jose Francisco INFN, Roma Tor Vergata</p>	<p>Localization and non-perturbative dynamics of supersymmetric gauge theories</p>	<p>I review localization techniques and their applications to the study of supersymmetric gauge theories.</p>

<p>PENATI, Silvia Università di Milano-Bicocca</p>	<p>GenHET- The new EU Working Group on gender issues in Theoretical Physics</p>	<p>The new permanent EU Working Group on the gender issue in Theoretical Physics will be presented, with primary focus on its origin, motivations, its composition, aims, present and future activities. The talk will be followed by an open discussion to which everybody will be invited to participate.</p>
<p>PROVENZALE, Antonello CNR Institute of Geosciences and Earth Resources</p>	<p>Earth's climate as a complex system</p>	<p>Planetary climates are complex systems composed of many interacting components. In the case of Earth, the atmosphere, oceans, cryosphere, geosphere and biosphere interact nonlinearly on a multitude of spatial and temporal scales, generating feedback mechanisms that lead both to climate variability on all time scales, as well as to long-term stability of the climate system that has allowed life persistence in the last 3.5 billion years. In this lecture, I shall review some of the basic feedback mechanisms that control Earth climate, addressing the role of the biosphere and the physical and chemical characteristics that make our planet habitable. The role of anthropic influence on climate, mainly through emission of greenhouse gases and land-use changes, if finally discussed, together with possible climate change mitigation options such as carbon capture and sequestration.</p>
<p>RICCI, Fulvio Università Roma Sapienza e INFN. Roma 1</p>	<p>Gravitational Waves; where we are where we go</p>	<p>The observations of gravitational waves from the merger of binary black holes and from a binary neutron star coalescence followed by a set of astronomical measurements is the first striking example of investigating the universe by multi-messenger astronomy. In this talk we review these results and then we will focus on the middle and long term evolution of the gravitational wave detectors with emphasis to their perspectives for the advancement on physics and astronomy.</p>