

# **International Conference on New Frontiers in Physics**

**ICFP 2012**

**Sunday, June 10, 2012 - Saturday, June 16, 2012**

**Kolymbari, Crete, Greece**

## **Scientific Program**

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The conference series "New Frontiers in Physics" aims to promote interdisciplinarity and cross-fertilization of ideas between different disciplines addressing fundamental physics. While different fields each face a distinct set of field-specific challenges in the coming decade, a significant set of commonalities has emerged in the technical nature of some of these challenges, or are underlying the fundamental concepts involved. A Grand Unified Theory should in principle reveal this underlying relationship.

For instance, techniques from string theory have become relevant in recent years for improving perturbative techniques in high energy physics or identifying material properties of non-abelian plasmas that share essential features with the systems studied in heavy ion collisions. Fluctuation analyses of the cosmic microwave background involve techniques and concepts that are becoming increasingly relevant for the study of the quickly expanding little bangs in heavy ion collisions. Cosmological models are developed in close interplay with searches for new physics at the LHC. There is a multitude of examples illustrating that crosstalk between neighboring fields is relevant or even crucial for progress in either field.

The conference series "New Frontiers in Physics" aims at identifying interdisciplinary topics on which crosstalk between different disciplines of fundamental physics can contribute to further progress. The conference series aims at bringing together key scientists of different fields to discuss the state of the art and the nature of open questions in a language suitable for a physics educated interdisciplinary audience, and to discuss avenues for further progress.

**Main topics of the Conference****A High Energy Particle Physics:**

Searches for new particles and new phenomena at the LHC and other colliders (Higgs boson, SUSY, top quarks, extra dimensions, flavour physics, precision electroweak measurements and other), neutrino experiments, and related theoretical topics.

**B Heavy Ion Collisions and Critical Phenomena :**

Establishing the properties of QCD matter at extreme conditions and the QCD phase diagram with Heavy Ion Collisions and related theoretical topics. Branching out to neighboring disciplines,

including Superconductivity and Critical Phenomena, Neutron Stars, Quark Stars, Exotics.

**C Quantum Physics and Quantum Entanglement :**

Quantum Physics, Quantum Optics, Quantum Entanglement, Foundations of Quantum Mechanics, Entanglement and our Universe: Black Holes and Cosmology, Quantum Non-Locality.

**D Cosmology, Astrophysics, Gravity, Mathematical Physics :**

Cosmic Microwave Background, Dark Energy, Modified Gravity, direct and indirect searches for Dark Matter, Astroparticle Physics, Quantum Gravity, String Theory, Non Commutative Geometry, Holography, Black Holes.