

## Seminar:



Monday, May 8<sup>th</sup> 2023, 15:00 h

Aula B, DiFC, Via Archirafi 36

### **VERSO L'IGNOTO** PROSPETTIVE IN FISICA DELLE INTERAZIONI FONDAMENTALI

**08.05.23, ORE 15 - 17**  
**VIA ARCHIRAFI 36, AULA B**

***"The physics of the unknown:***

***future perspectives in theoretical physics"***

**Francesco Marino, Master's Student,  
Dipartimento di Fisica ed Astronomia, Alma Mater Studiorum - Università di Bologna**

### ***"Extra dimensions and the strangeness of string theory"***

String theory is nowadays the only consistent theory of quantum gravity. From supersymmetry to extra dimensions, its predictions are as attractive from a theoretical point of view as not viable phenomenologically. Even if experiments do not seem to prove this theory yet, its conceptual and mathematical framework is so stable to be of fundamental importance for modern theoretical physics (e.g. gauge/gravity duality).

In this talk, reviewing very rapidly the present situation in particle physics and cosmology, we'll justify the introduction of string theory both from a historical and from a conceptual point of view.

**Amedeo Maria Favitta, PhD Student, DiFC, Università di Palermo**

### ***"Exploring Axions: from Quantum Chromodynamics to Cosmology"***

Axions are hypothetical particles suggested by Roberto Peccei and Helen Quinn in 1977 to solve the Strong CP problem of Quantum Chromodynamics (QCD) and they are currently of main theoretical interest since they are also considered as ones of the most promising candidates for the Dark Matter. This is furtherly supported by recent works on the gravitational lensing of HS 0810+2554 that suggest a dark matter made up by axions. In this lecture, we will briefly introduce QCD axions and ALPs (Axion-Like Particles) and summarize the state of art of the research on the fields of axion detection and axion cosmology. In the end, we will briefly present the activities in this field performed by the recently formed research team of Palermo, in collaboration with INFN, the Norwegian University of Science and Technology and the University of Helsinki.