

Cabeo school 2015

Monday, 25 May 2015 - Friday, 29 May 2015

IUSS - Ferrara 1391

Scientific Programme

The 2015 Cabeo school will be devoted to "infinities", i.e. huge numbers or (inverse of) tiny numbers, that can be found in the context of quantum field theories of particle physics and cosmology.

Infinities are not all equivalent. A rough classification includes:

- 1) calculable infinities, associated to the renormalization procedure of quantum field theories;
- 2) unavoidable infinities, associated to some phenomenon where the perturbative approach is not applicable;
- 3) infinities of unknown origin, associated to some phenomenon due to new physics.

Often these kind of infinities coexist, as is the case for QCD. As the perturbative approach is generically applicable to Flavor physics and Neutrino physics they are an ideal arena to study new particles and their associated mass scales.

Unknown infinities are often considered unnatural, as is the case for the Standard Model hierarchy problem and of the Cosmological constant, and thus challenge theorists to develop extensions of the Standard Model in the direction of a unification with gravity. Being associated to the failure of a symmetry of a theory's classical action, anomalies belong instead to the first class.

Infinities are a fascinating subject and, most importantly, present and upcoming experiments in particle physics and cosmology might reveal much about their nature. The aim of this school is to provide the state-of-the-art of the research on the topics above.