



**Laboratório de Instrumentação e
Física Experimental de Partículas**

Seminar*

Thursday 18th May 2017

11:30 to 12:30

Implications of gauge symmetry for precision Higgs physics

By Leonardo Pedro (CFTP/University of Graz)

The Higgs mechanism was inspired by phenomena in solid state physics. By then it was already known that strictly speaking, there is no spontaneous breaking of a (local) gauge symmetry. This implies that in the Standard Model, the Higgs field is part of the structure of leptons and hadrons. The composition of the (physical, gauge-invariant) electrons and protons in terms of the gauge-dependent elementary fields is described by the parton distribution functions (PDFs), including the Higgs PDFs. The successful predictions of the Standard Model at the LHC use a mean-field approximation to estimate the Higgs PDFs. The artificial breaking of symmetries is a common feature of mean-field approximations in particle, nuclear and solid-state physics and this explains why the Higgs mechanism is related to spontaneous symmetry breaking. In nuclear and solid-state physics there are several methods to improve the mean-field approximations. In particle physics, such approximation to the Higgs PDFs can be improved using a combination of experimental data and lattice simulations.

We will discuss 5 physical processes at colliders which are sensible to the Higgs PDFs.

*** Place: LIP Seminar Room**

LIP (Laboratório de Instrumentação e Física Experimental de Partículas)

Av. Elias Garcia, 14, 1º

Coffee and cakes starting at 11h.