ESR14

Host: University of Zurich

Period: October 2014 - September 2017

Junior ESR (PhD position)

Supervisors: Massimiliano Grazzini (UZH) and Michael Spira (PSI)

"The candidate will work on the the improvement and refinement of theoretical predictions for Higgs boson production and decay, as well as the development of corresponding tools aiming at a reduction of the theoretical uncertainties"

Why:

Accurate theoretical predictions exist for Higgs boson production through gluon fusion and are implemented in various numerical programs

In particular, HNNLO, HqT and HRes are numerical codes that include NNLO QCD corrections for Higgs boson production, and in the case of HqT and HRes, the NNLL resummation of the logarithmically enhanced contributions at small transverse momenta

These codes are presently limited to a SM Higgs

However, it would be important to incorporate possible new physics effects in these numerical programs

In particular, the transverse momentum distribution of the Higgs boson can be used to disentangle new physics effects which may be not evident in inclusive rates

What:

We plan to include the possible new physics effects in our numerical programs by using an effective field theory approach

Generally speaking, the number of possible operators contributing in the Buchmuller-Wyler approach is very high

We plan to consider a limited number of operators suggested by the EW precision data

The improved tools will have an important impact in Higgs analyses

Secondments: Short visits to any of the partners, particularly CERN depending on the development of the project. Two months at DFTTO for training in code development and one month at ALU-FR for interfacing theory with experimentalists and a secondment in one of our private sector partners Maplesoft, Wolfram Research and Shell.