

The project (ESR21)

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HIGGSTOOLS Kick-Off-meeting
London, April 3th 2014

What (R. Pittau and J. Fuster)

Accurate studies of Higgs Physics and EWSB phenomena using top-antitop-higgs final states (WP3)

The main studies to be performed will be to make realistic simulations of both Higgs signals and backgrounds using the Next-to-Leading order calculations in QCD and EW theory including parton shower and hadronisation effects.

The methods will imply the use of the new generation of NLO Montecarlo tools built up on the automation philosophy. Then look for sensitive observables and compare with other approaches. These predictions will be directly confronted with the LHC data in connection with the activities of the ATLAS Experimental group in Valencia. The work will also be extended to a feasibility study comparing the physics reach of the HL-LHC phase with respect to the next Linear Collider (ILC and CLIC).

Secondments: CERN, FOM & Private Partners

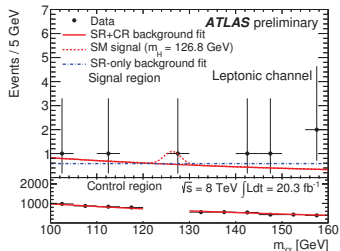
Why

- The production process of a H boson in association with a top pair is a classic mechanism for Higgs production at the LHC, where the large ttH Yukawa coupling and the presence of top quarks can be exploited to extract the signal from its QCD multi-jet background.

... The Higgs generates the mass and the top eats it up ...

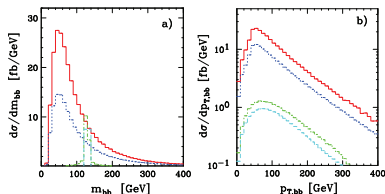
- Experimental searches of ttH ($H \rightarrow \gamma\gamma$) already started

(ATLAS-CONF-2013-080)

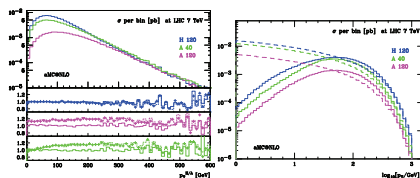


Fit in the network

- Key persons and experts of Higgs Physics and automated NLO codes are in **HIGGSTOOLS**



(ttH vs $ttbb$ by HELAC-NLO)



(ttH vs ttA by aMC@NLO)

- Envisaged collaboration with ATLAS, NCSR-D, FOM, ETH