

# The UGR node

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**HIGGSTOOLS** Kick-Off-meeting

London, April 3th 2014

# People involved I

## Senior

- 1 Roberto Pittau
- 2 Juan Fuster (IFIC-Valencia and ATLAS)
- 3 Francisco del Águila
- 4 Juan Antonio Aguilar-Saavedra (UGR and ATLAS)
- 5 Fernando Cornet
- 6 Sven Heinemeyer (IFCA-CSIC-UC-Santander)
- 7 José Ignacio Illana
- 8 Manuel Perez-Victoria
- 9 José Santiago

# People involved II

## PhD Students

- 1 Mikael Chala (Santiago)
- 2 Alice Maria Donati (Pittau)
- 3 Francisco Javier Martínez Lizana (Perez-Victoria)
- 4 Benjamin John Page (Pittau)

# Expertise (for Higgstools) I

## 1 Pittau

- Automation beyond 1-loop; Collider phenomenology; Perturbative QCD; EW physics; New algorithms and tools; Alternative Renormalization/Regularization approaches; Precision physics.

## 2 Fuster

- Experimental physics; Precise measurement of the top-quark mass using ATLAS (also at a linear collider above threshold); Higgs coupling to top (LHC+Linear Collider); Linear Collider detector and physics; Detector R&D for pixel detectors (DEPFET technology).

# Expertise (for Higgstools) II

## 3 Del Águila

- The LHC performance has allowed to established the Standard Model (SM) to a high degree of precision in all its predictions, and in particular it has led to the Higgs boson discovery. On the other hand neutrino masses are the only but miniscule beyond the SM physics observed up to now and then maybe the only window to NP. In this context we aim to study the possible SM extensions with enlarged scalar sectors which may be observable at the LHC and eventually explain the observed neutrino spectrum.

## 4 Aguilar-Saavedra

- Collider phenomenology of SM extensions, with special attention to the top quark and new quarks heavier than the top; New heavy leptons and signals of the seesaw mechanism at the LHC.

# Expertise (for Higgstools) III

## 5 Cornet

- Currently studying the phenomenology of Two Higgs Doublet Models; In particular, analyzing the constraints in the parameter space of this model set by current experimental data from LHC and look for their implications at future colliders.

## 6 Heinemeyer

- Leader of the LHCHSWG; Keeper of FeynHiggs (the standard tool for MSSM Higgs mass and coupling calculations); High precision calculations for SUSY Higgs physics at the LHC and ILC.

## 7 Illana

- Automatic calculations of FCNC observables (B physics, rare Higgs decays) in the context of Non Minimal Flavor Violation in Supersymmetry at one loop level; Production and propagation of heavy quarks in cosmic ray showers.

# Expertise (for Higgstools) VI

## 8 Perez-Victoria

- Construction and analysis of **composite-Higgs models and their extra-dimensional duals**. Electroweak constraints and the **LHC phenomenology** of general new physics scenarios using model-independent or simplified approaches.

## 9 Santiago

- Model building and BSM phenomenology; Effective description of **beyond the SM phenomenology at the LHC** and linear collider; **Implications of a non-standard Higgs sector**.

# Collaborations with other nodes

- 1 UDUR (Glover, Krauss) [[Automation at 2-loop](#), [Sherpa](#)]
- 2 DESY Hamburg [[after PhD](#), [M. Chala is going there](#)]
- 3 ETH (Dissertori, Pozzorini) [ [\$ttH\$](#) , [2-loop](#)]
- 4 FOM (Bentvelsen, Laenen, [Maltoni](#)) [ [\$ttH\$](#) ]
- 5 MPI ([Hollik](#), [Hahn](#), Heinrich) [[NLO Automation](#)]
- 6 NCSR-D (Papadopoulos) [[Automation at 2-loop](#)]
- 7 CERN ([Mangano](#)) [[Pheno and automatic 1- and 2- loop tools](#)]

- [Blue](#) means [potential](#) collaborations
- [Red](#) means [active](#) collaborations



# Links with activities outside the network I

- 1 **LHCtheory (ERC-2011-ADG-20110209):** *Theoretical predictions and analyses of LHC physics: advancing the precision frontier*  
M. Mangano (IP) and S. Frixione (CERN), M. Maltoni (UCL), R. Pittau (UGR)
- 2 **LHC@NLO (FPA2011-22398):** *LHC Phenomenology at 1-Loop*  
R. Pittau (IP), S. Frixione (CERN), M. Maltoni (UCL), F. Piccinini (INFN), M. Moretti (U. of Ferrara), A. Donati (UGR), B. Page (UGR)
- 3 **P10-FQM-6552:** *Precise calculations in Particle Physics*  
Francisco del Águila (IP), the UGR people.
- 4 **CONSOLIDER-CPAN (CSD2007-00042):** *National Center of Particle Physics, Astroparticle and Nuclear Physics*  
Antonio Pich (IP)

## Links with activities outside the network II

- ④ **HXSWG:** *LHC Higgs Cross Section Working Group*  
S. Heinemeyer
  
- ⑤ **IDPASC:** *International Doctorate Network in Particle Physics, Astrophysics and Cosmology*  
UGR, U. of Valencia, CERN, ...
  
- ⑥ **Linear Collider:** *R&D and Physics*  
J. Fuster, S. Heinemeyer, F. Cornet ...
  
- ⑦ Bilateral agreements with: *UC-Riverside and U. de Coimbra*