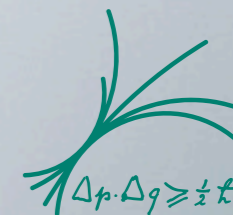




# ESR 8



Max-Planck-Institut für Physik  
(Werner-Heisenberg-Institut)

- **Host:** Max Planck Institute for Physics, Munich
- **Junior ESR** PhD position (Theory), 12 months funded by HiggsTools, 24 months funded by MPP
- **Period:** October 2014 - September 2017
- **Work packages:**

**WP2:** high-precision predictions for Higgs physics, including signal, background and their interference

**and WP3:** development of tools and their automation

- **Supervisor:** Gudrun Heinrich (MPP Munich)

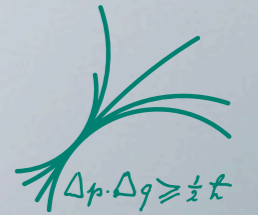
**Co-supervisor:** Frank Krauss (IPPP Durham)

The candidate will work on fully automated virtual matrix elements and multijet-merged samples at NLO QCD for all relevant (single and double) Higgs boson production & decay channels and their backgrounds. The inclusion of dominant electroweak corrections is also envisaged.





# WHY?



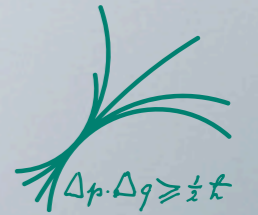
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- ◆ Higgs particle: scalar boson; if elementary, a **particle type never seen before** !
- ◆ second phase of LHC will allow to study properties of the Higgs boson in detail
- ◆ in particular data will allow a first glimpse at the Higgs self coupling
- ◆ form of Higgs potential is not probed yet at all !
- ◆ precision studies of Higgs couplings to vector bosons, fermions, itself, require precision calculations, taking into account higher order corrections to production and decay
- ◆ realistic comparison to data requires combination of matrix element level calculations with parton shower Monte Carlo programs





# WHAT?



Max-Planck-Institut für Physik  
(Werner-Heisenberg-Institut)

★ will build on existing tools able to handle complex multi-particle processes:

★ **GoSam:** virtual one-loop multi-leg amplitudes  
QCD, electroweak, beyond the Standard Model

<http://gosam.hepforge.org>

expertise mainly at MPP Munich

★ **Sherpa:** Monte Carlo program, NLO matching to parton shower, multi-jet merged samples, hadronisation

<http://sherpa.hepforge.org>

expertise mainly at IPPP Durham

★ aims to produce predictions of unprecedented precision, directly comparable to experiment

close collaboration with IPPP Durham, CERN, opportunity for secondments at private partners (tools development)

