

LAPP to-do list and tools for Higgs boson analysis



Laboratoire d'Annecy-le-Vieux
de Physique des Particules



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Common to both analyses (1)

- ◆ N_{signal} extraction from S+B fit
 - include systematics in the datacard?

- ◆ Systematic uncertainties on C_H factors
 - so far, inclusive only (main analysis)
 - m_H dependent uncertainties (especially very high mass) ?
 - $p_T^{\gamma\gamma}$ dependent uncertainties?
 - photon identification, energy scale, and isolation
 - mass resolution



Common to both analyses (2)

◆ Background modelling

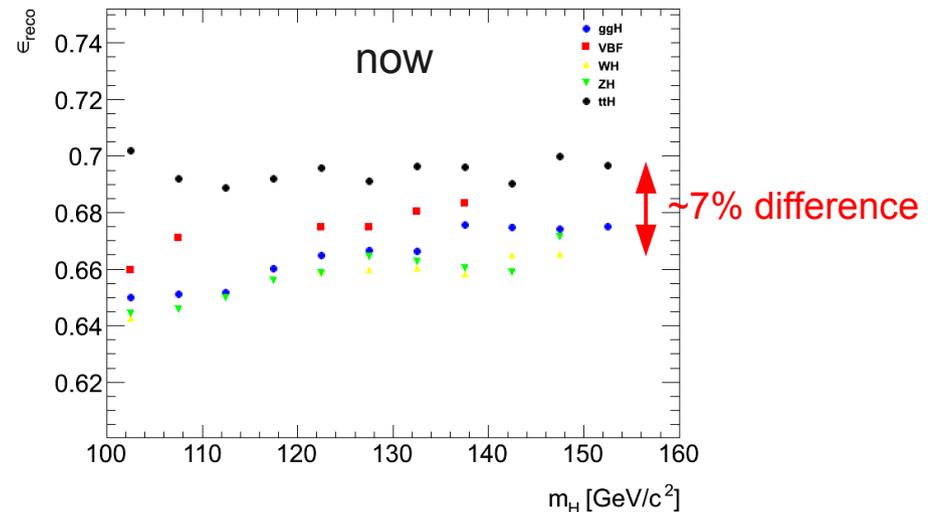
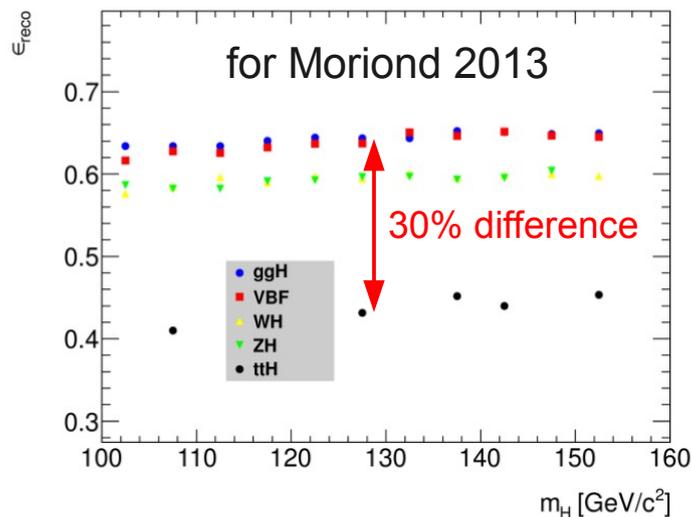
- Sherpa + Pythia samples ($\gamma\gamma + \gamma j + jj$) from Wisconsin
- produce own samples (Diphox?) for high masses?
- interim solution: data-driven à la CMS?

Marco ?

◆ C_H factors independent from process

- almost done
- associated systematics? (isolation)

Jessica





Limit on fiducial cross-section

◆ Signal parametrisation

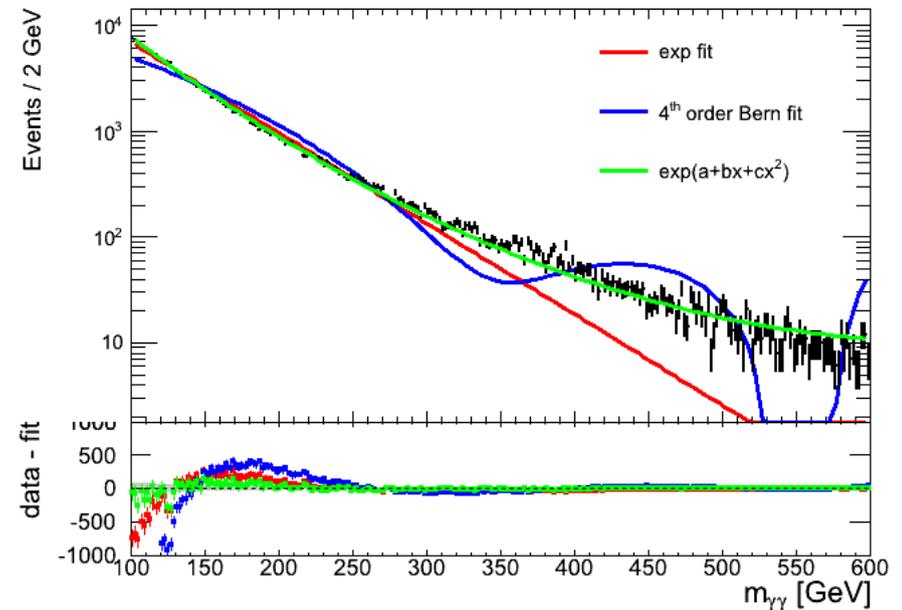
- with mass dependence
- wait for MC production? Produce unofficial graviton samples?

Elisabeth



◆ Background parametrisation

- hard to find single function
- split analysis in $m_{\gamma\gamma}$ ranges?
- window fit around tested mass point?





Differential cross section

Luzana ?

◆ Signal modelling

- at 125 GeV only

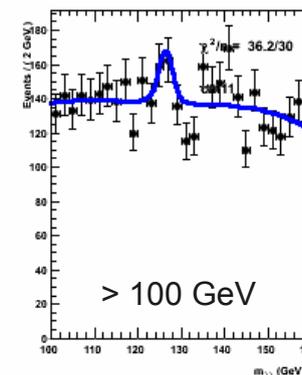
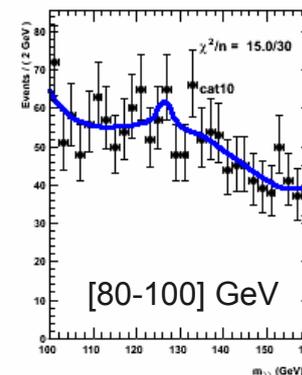
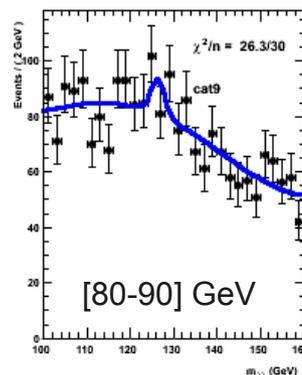
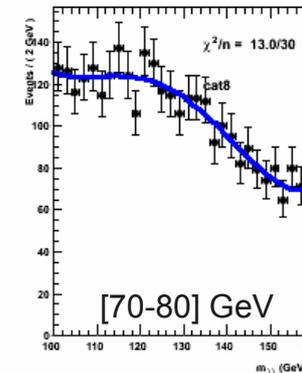
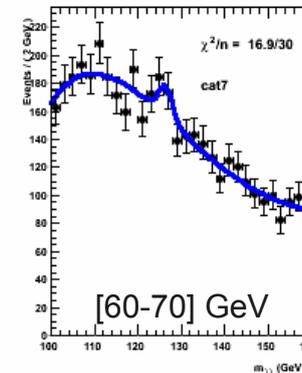
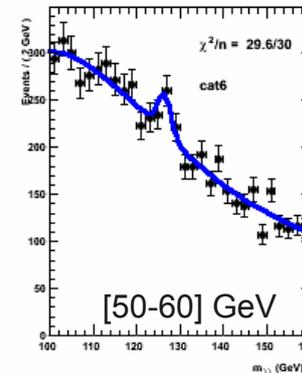
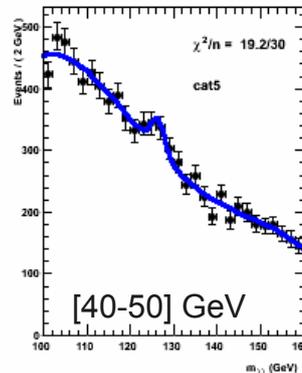
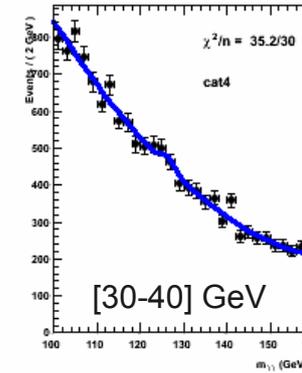
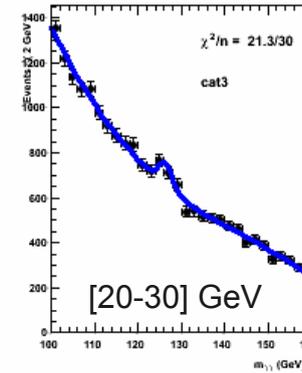
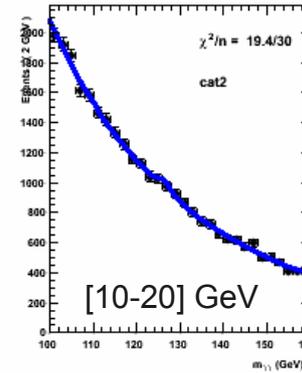
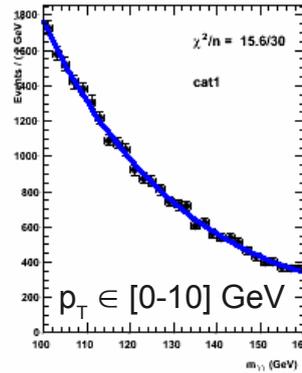
◆ Background modelling

- p_T^{YY} - m_{YY} correlation

◆ Migration between p_T bins

- use of HqT

◆ Unfolding?





Tools

- ◆ HGGReader: produce private ntuples from photon D3PDs on eos (ie on lxplus)
 - (should be) in agreement with official cut-flow
 - options to remove myy mass cut, isolation, etc
 - ~2-3h for all 2012 dataset + MC samples in batch mode

- ◆ Hfitter
 - to compute limits, p_0 , fit with categories, etc
 - many datacards available
 - based on RooFit

- ◆ Installation, use, examples here:
<https://twiki.cern.ch/twiki/bin/viewauth/AtlasProtected/Hfitter>



Home-made ntuples

- ◆ Fresh from the oven
- ◆ Data+MC ntuples with all selections applied:
`/afs/cern.ch/work/n/nberger/public/Tuples/Moriond2013`
- ◆ Data+MC ntuples with preselection only (trigger, quality cuts and photon pT, eta and loose ID)
`afs/cern.ch/work/n/nberger/public/Tuples/Moriond2013_Presel`
- ◆ MC ntuples with no selection applied:
`/afs/cern.ch/work/n/nberger/public/Tuples/Moriond2013_AllEvents`

Back-up slides