DESY Higgs Group Activities

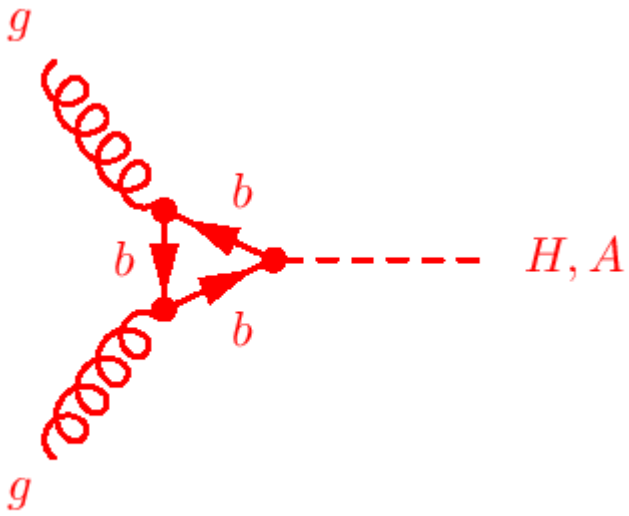
Alexei Raspereza

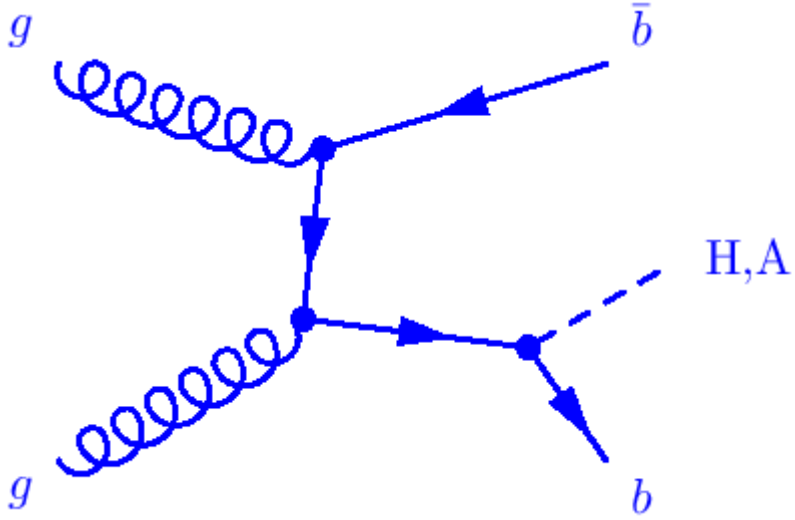
Higgs Group Meeting 23 Sep 2010

Research Group & Physics Goals

- Helmholtz Nachwuchsgruppe VH-NG 503
  - “Study of Electroweak Symmetry Breaking at LHC: Higgs Physics with CMS Detector”
- Main physics goals
  - SM and MSSM Higgs Physics
  - MSSM : gg →H(A), gg→H(A)bb
  - SM : gg →Htt
  - Masses, couplings, widths (?)
  - Interpretation within SM or MSSM, constraints on fundamental
- Technical work :
  - Tracking, vertexing, b-tagging

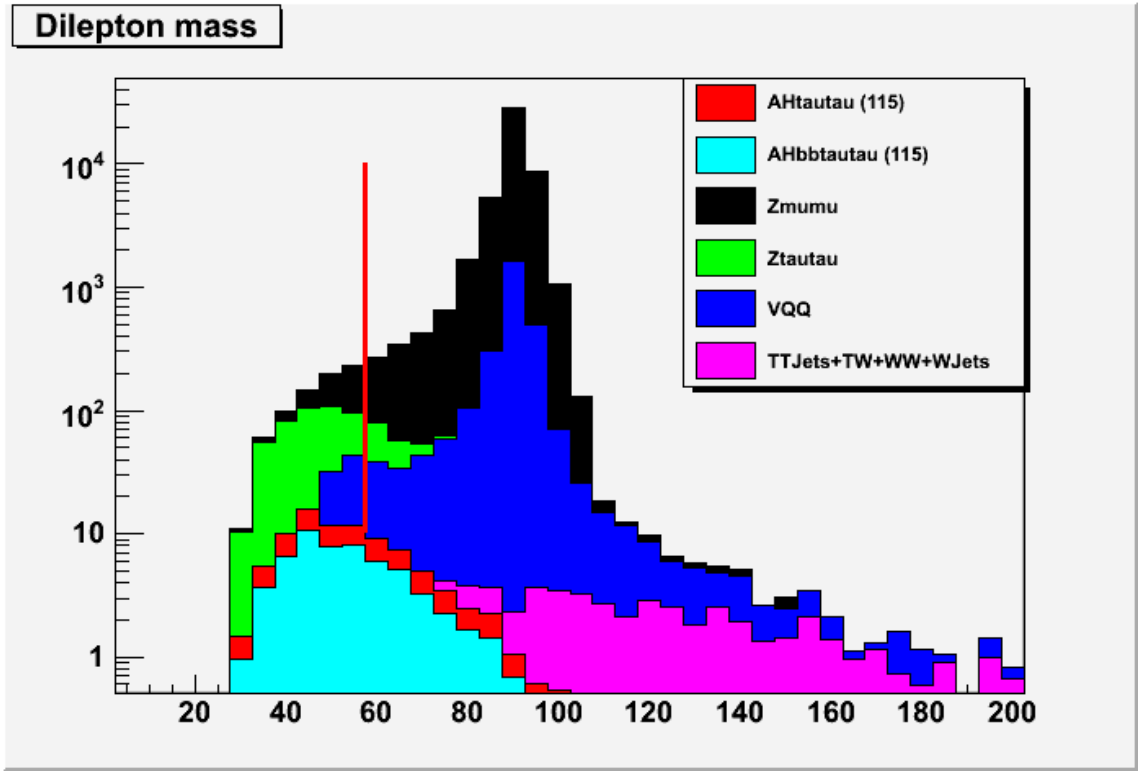
MSSM Higgs Analysis





- g(bbH) ~ tanβ, σ~ $\tan^2\beta$
- Possibility of early discovery (high tanβ scenario)
- Channels covered in CMS :
  - H → ττ → μ+τ-jet, e+τ-jet, e+μ
- We proposed novel analysis : H → ττ → μμ

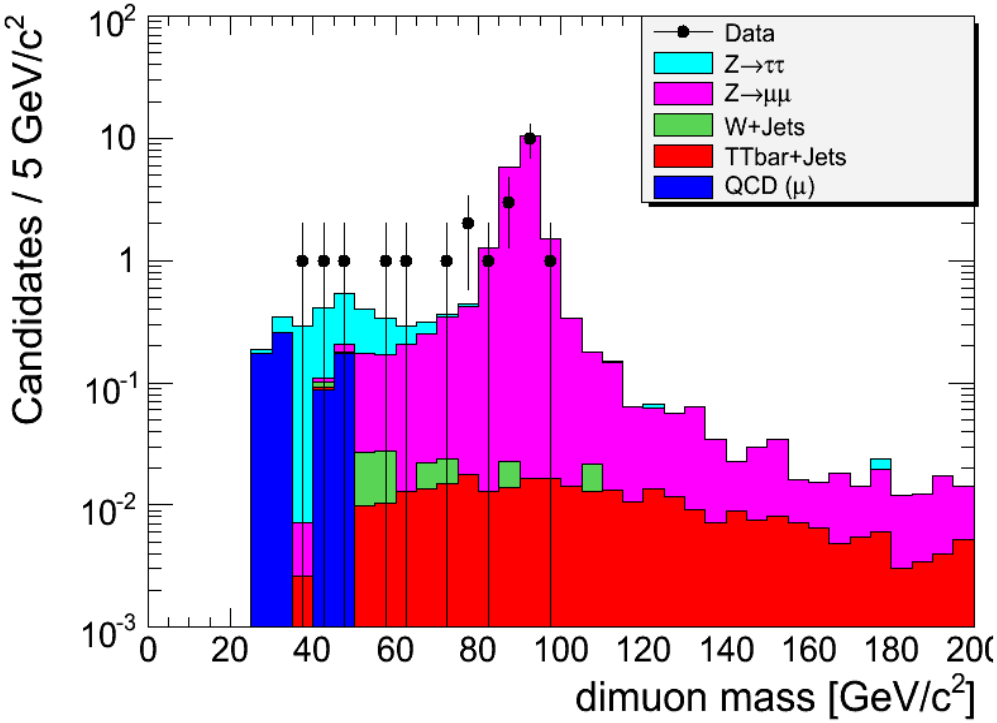
MSSM Higgs Analysis. Initial Results



- Significance > 3.4 for tanβ > 20 (7 TeV, 1 fb^{-1})
- Improvement of overall sensitivity of MSSM Higgs searches
- Needs intensive advertisement within Higgs PAG

Z Analysis. First step towards Higgs Searches

- MSSM Higgs Analysis commissioning with $Z \rightarrow \tau\tau$
- Analysis caused interest in Tau EWK group
- Chance to contribute to EWK Tau Paper
- Open issue
  - Data-driven methods of background evaluation
  - Data-driven method of signal efficiency evaluation



Interactions with PAG, POG

- Higgs and Electroweak PAG
  - Expressed interest to contribute to MSSM Higgs and Electroweak Tau papers with H(Z) $\rightarrow\tau\tau\rightarrow\mu\mu$
  - Reference H(Z) $\rightarrow\tau\tau\rightarrow e+\mu$ analysis (needed also for systematic checks)
- Top PAG
  - Current activity : B-tagging efficiency with top events
  - Plans : top production employing b-tagging -> basis for future
- Tracking
  - Current activity : validation of tracking performance
  - Plans : data-driven estimation of tracking (vertexing) efficiency
- B-Tagging
  - Current activity : study of fragmentation related systematic effects