gg->ZZ: Short Documentation

- C. Zecher, T. Matsuura and J. J. van der Bij, Z. Phys. C 64 (1994) 219[arXiv:hep-ph/9404295]

Throughout this paper we do not restrict the intermediate state Z bosons to the narrow width approximation but allow for arbitrary invariant masses. We compare the strength of this process with the known leading order results for $q\bar{q} \to ZZ \to 4\ell^{\pm}$ and for $gg \to H \to ZZ \to 4\ell^{\pm}$. At LHC energies ($\sqrt{s} = 14$ TeV) the contribution from the gluon fusion background is around 20 % of the contribution from quark-antiquark annihilation. These

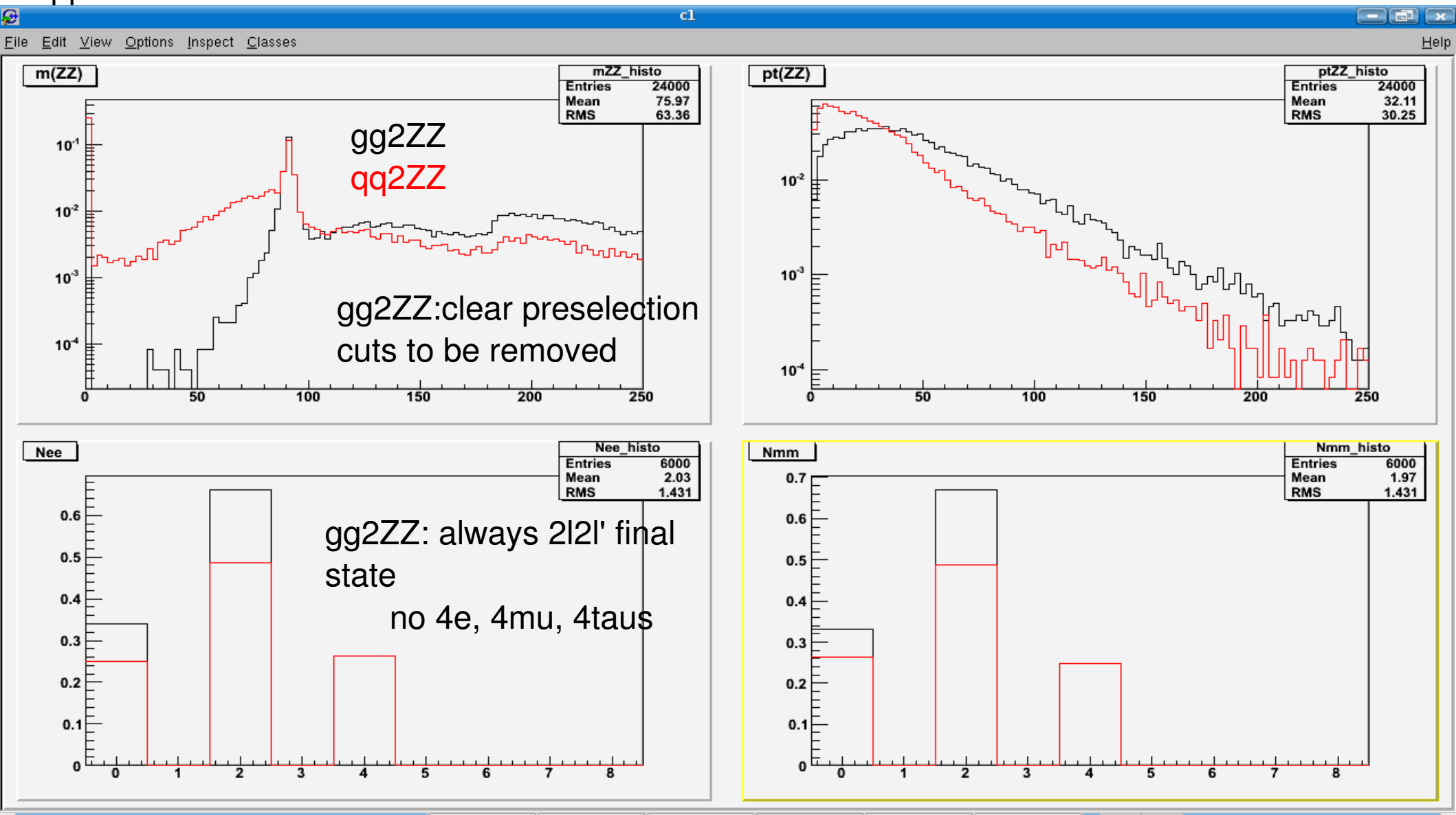
- gg2ZZ (author Nikolas Kauer)
  - http://hepsource.sourceforge.net/GG2ZZ/
    - full code (to be installed, compiled, run -> configurable)
    - set of 10k unweighted events (see next slide)
  - How to install and run
    - Twiki from Fabian Stoeckli (CMS)
      - https://twiki.cern.ch/twiki/bin/view/CMS/HowToGG2WW

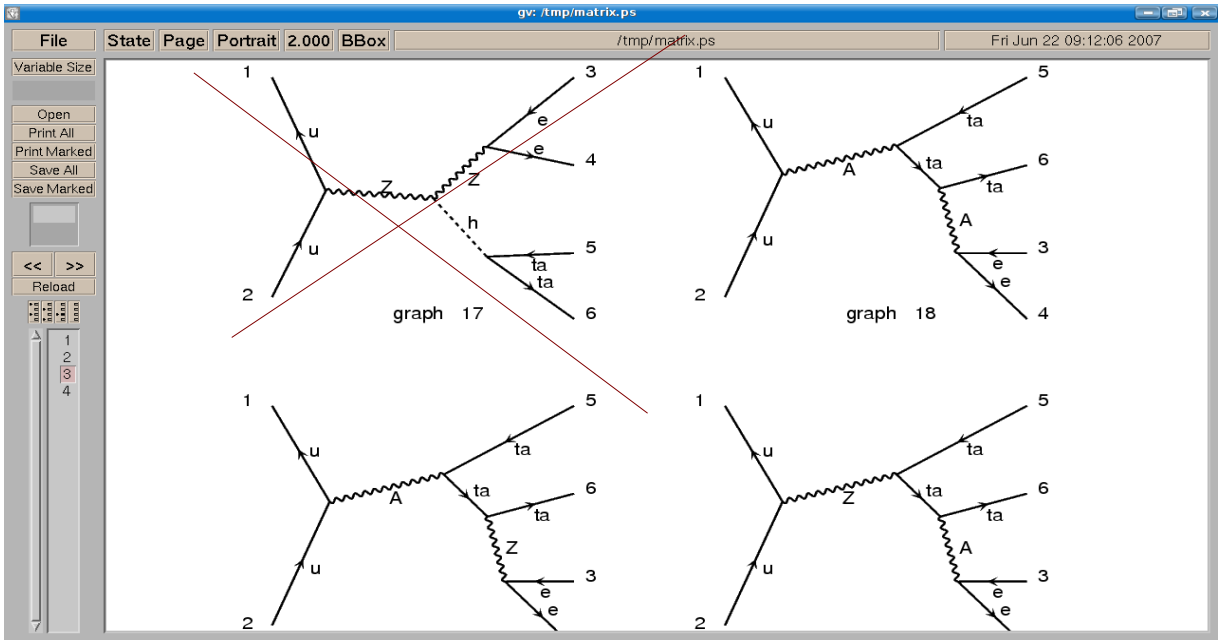
gg->ZZ analysis status

- Last days work
  - Fabian (already involved in gg2WW study) did a first test on all the machinery -> OK!
  - DG:
    - installed and build all libraries
    - propagated the 10k unweighted events (provided by NK) through the CMS framework
      - fragmantation/Hadronization/parton showering (PYTHIA)
      - generated a reference sample of 10k qq->ZZ->4l (eemumu) with MadGraph
        - thanks to Michel Herquet for instructions/feedback
        - preselection kinematic cuts: pt(lep)>5GeV, abs(eta(lep))<2.7
      - first comparison of distribution
        - m(ZZ), pt(ZZ), Number of ee, mumu, tautau pairs

naïve comparison

xsec (pb)
gg2ZZ(2l2l') 0.0235
qq2ZZ->4l: .13037E+00



To Do List

- generate events gg2ZZ
  - reduce the kinematic preselection
  - 4l (4e, 2e2mu, 4mu) final state
- generate events qq2ZZ (MadGraph)
  - directly pp->4l
  - removing Higgs!