Simulations samples: experience, status and needs

- First experience
- Status & Needs
-

Andreas Jung (Fermilab)

Snowmass EF top group meeting

Experience

- Nice documentation & scripts provided by Sergei Chekanov:

  https://atlaswww.hep.anl.gov/asc/wikidoc/doku.php?id=snowmass2013:montecarlo

Fast simulation Monte Carlo for Snowmass2013

Below are ttbar and background MC samples generated for pp collisions at 14 TeV

1. **Delphes2.03 for PYTHIA8 and HERWIG++ for high-pT ttbar and high-pT QCD jets (without pileup)**
2. **Delphes3.0 for PYTHIA8. ttbar without pileup**
3. **Delphes3.04 for HERWIG++. Low pT ttbar with 140 overplayed pileup events**
4. **Delphes3.04 for HERWIG++. High pT ttbar with 140 overplayed pileup events**

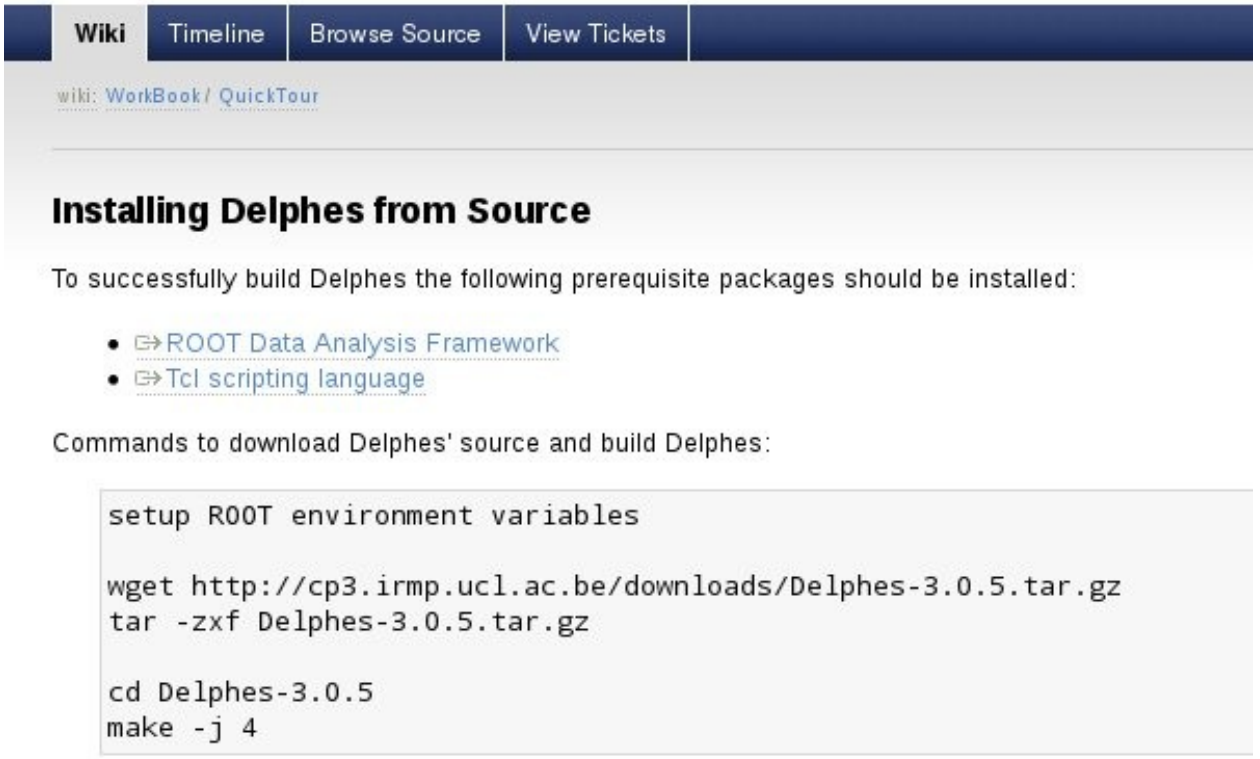
Help

- **How to download** link shows an automatic way of copying the ROOT files from this server
- **How to analyze** link explains how to analyze Delphes3 ROOT format

— *Sergei Chekanov 2013/03/06 20:47*

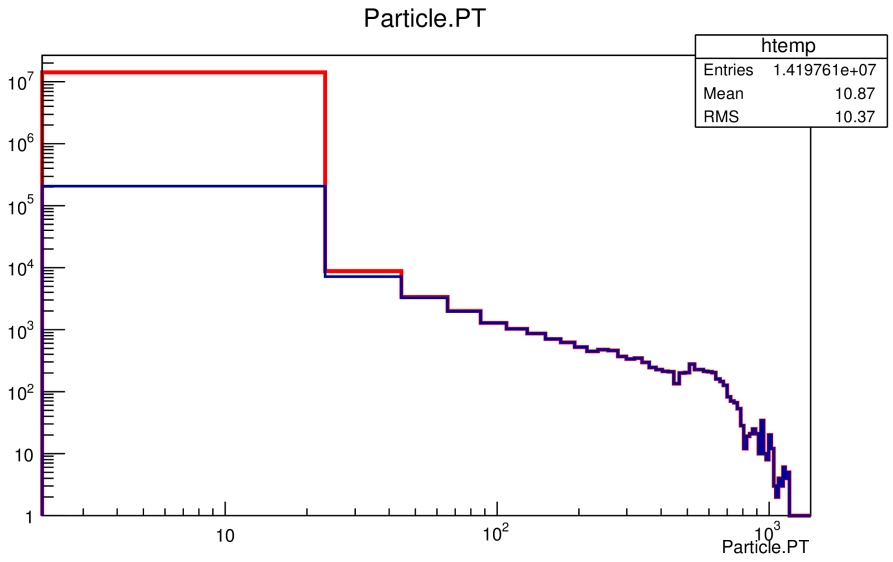
Experience

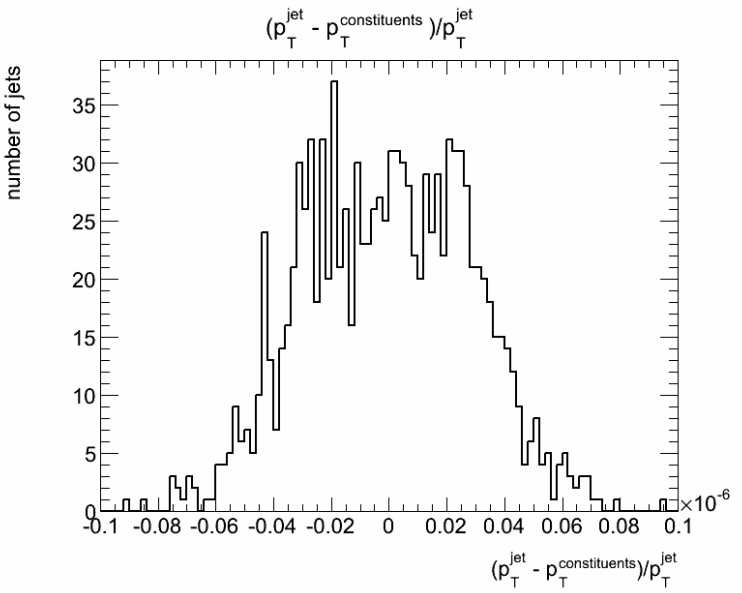
- Nice documentation & scripts provided by Sergei Chekanov:
  https://atlaswww.hep.anl.gov/asc/wikidoc/doku.php?id=snowmass2013:montecarlo
- Good source of information: Delphes workbook
  https://cp3.irmp.ucl.ac.be/projects/delphes/wiki/WorkBook/QuickTour

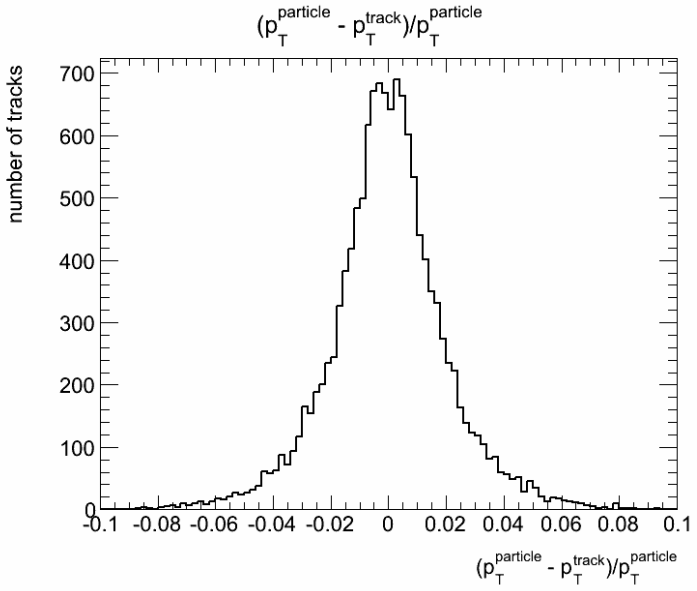


Experience

- Not yet fully fledged studies...nice examples with how-to access in Delphes folder
- Looking at 650 samples and 140 pile-up samples (btw: Jet.BTag always 0 ?!)

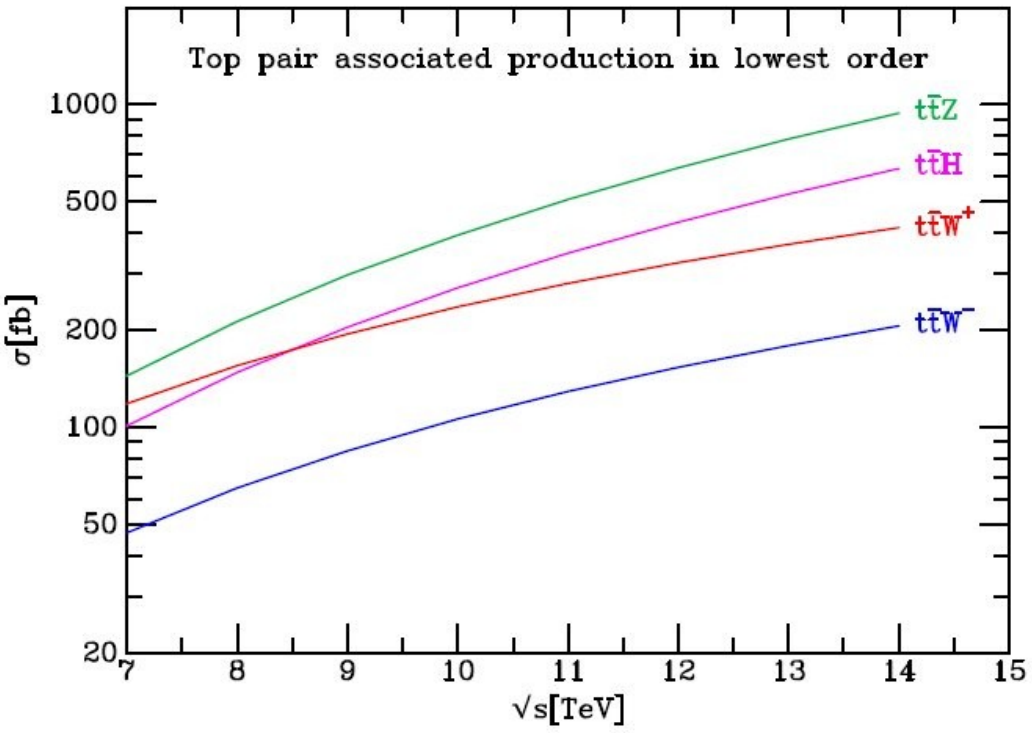


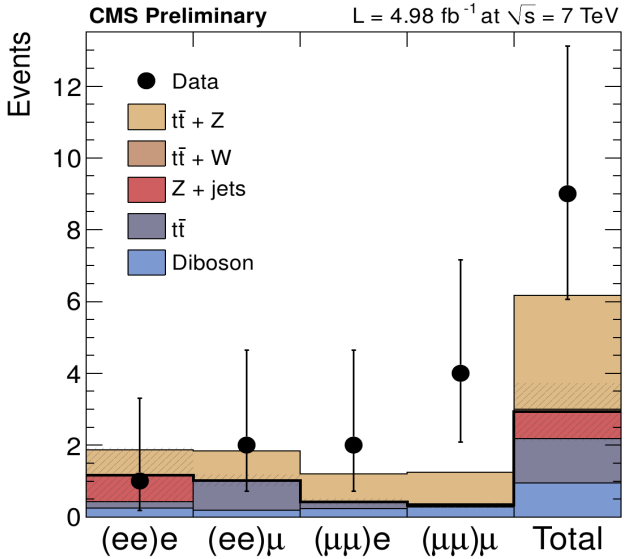




Needs ?

- **What about tt + X samples ?**
- Most up-to-date study is from A. Juste et al.: Phys. Rev. D71 (2005) 054013
  - LO cross section increases by ~ 2-5
  - 300 fb^{-1}: $t\bar{t}Z$ axial (vector) couplings, uncertainty of 45-85% (15-20%)





CMS PAS TOP-12-014

$$\sigma_{ttZ} = 0.30\ ^{+0.14}_{-0.11}\ (\text{stat})\ ^{+0.04}_{-0.02}\ (\text{syst})\ \text{pb}$$

$$\sigma_{ttW} = 0.28\ ^{+0.14}_{-0.12}\ (\text{stat})\ \pm 0.04\ (\text{syst})\ \text{pb}$$