

Simulations samples: experience, status and needs



- First experience
- Status & Needs
-

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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 overlaid pileup events
4. [Delphes3.04](#) for HERWIG++. High pT ttbar with 140 overlaid 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

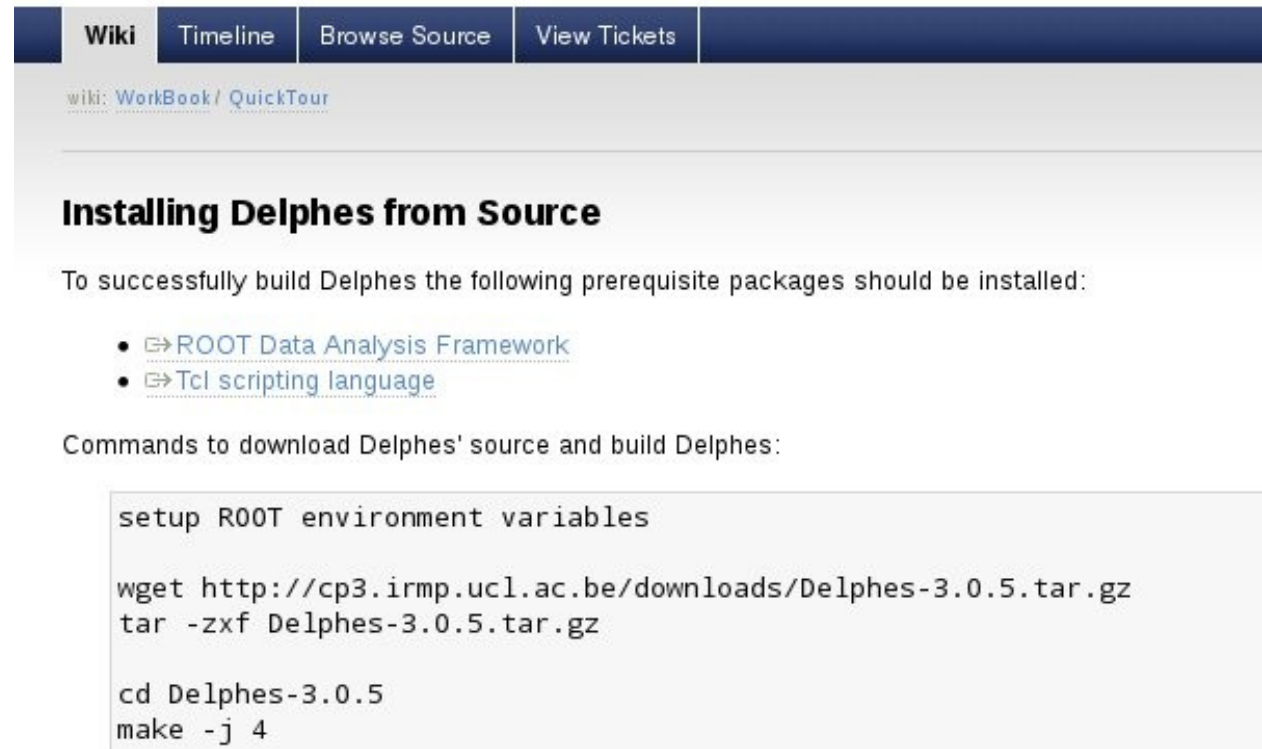


Experience

- 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>



The screenshot shows a web page with a navigation bar containing 'Wiki', 'Timeline', 'Browse Source', and 'View Tickets'. Below the navigation bar, the page title is 'wiki: WorkBook / QuickTour'. The main content area is titled 'Installing Delphes from Source' and contains the following text:

To successfully build Delphes the following prerequisite packages should be installed:

- [ROOT Data Analysis Framework](#)
- [Tcl scripting language](#)

Commands to download Delphes' source and build Delphes:

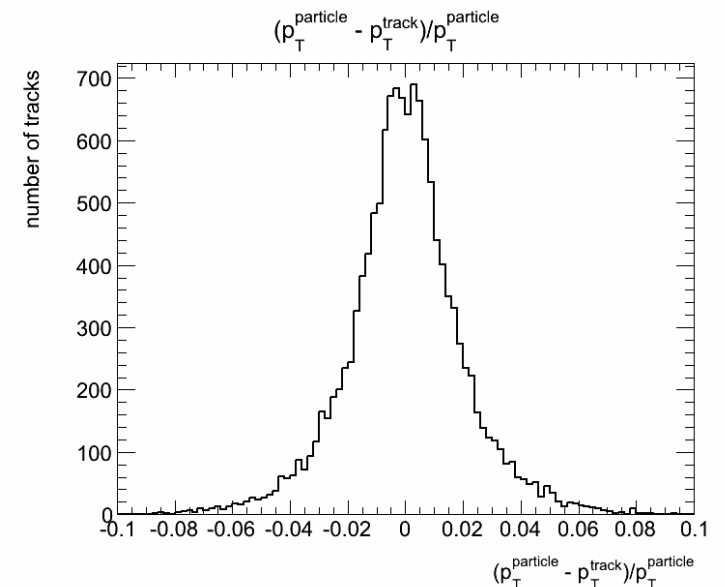
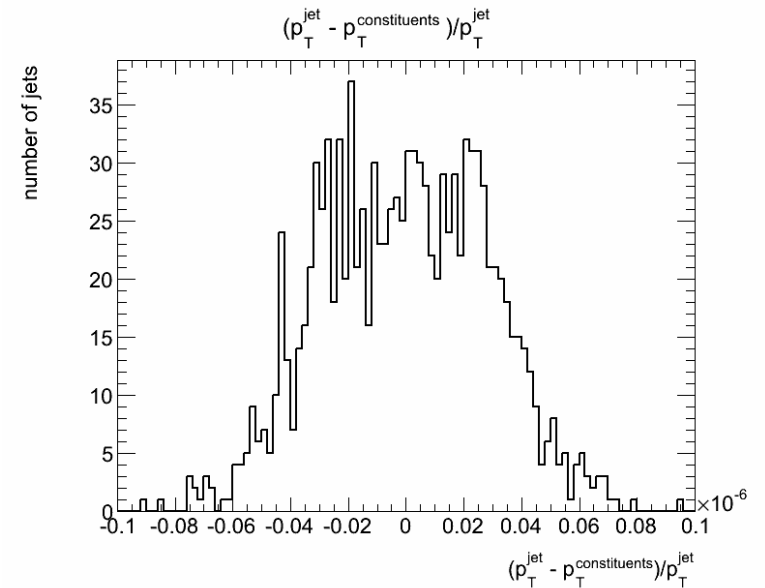
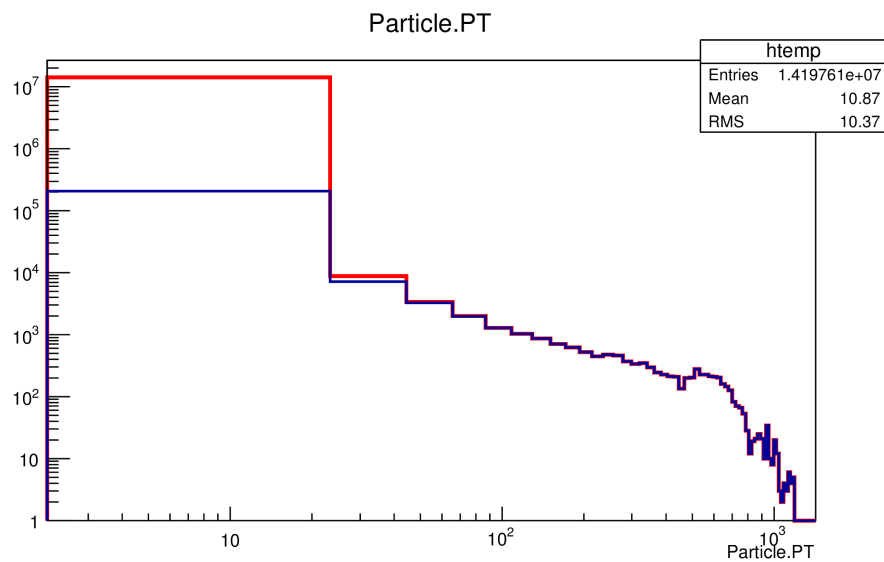
```
setup ROOT environment variables

wget http://cp3.irmp.ucl.ac.be/downloads/Delphes-3.0.5.tar.gz
tar -zxf Delphes-3.0.5.tar.gz

cd Delphes-3.0.5
make -j 4
```

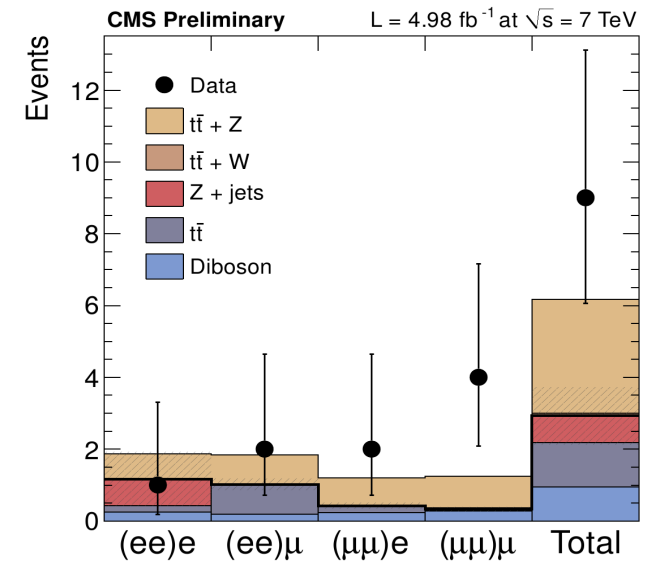
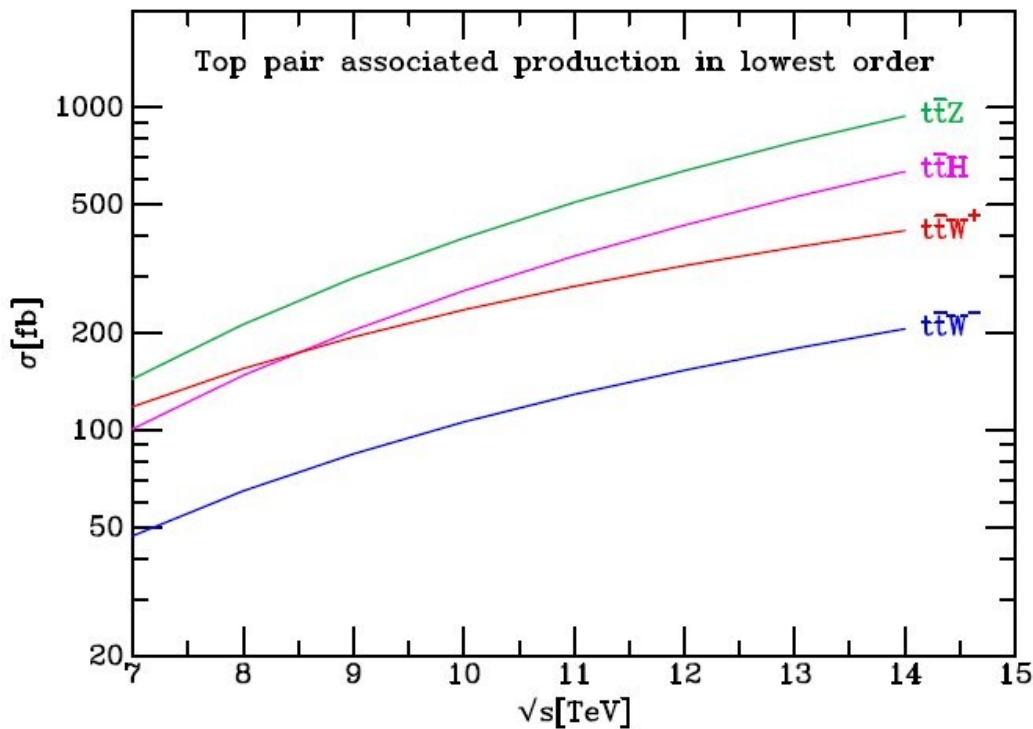
Experience

- 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 $t\bar{t} + X$ 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

$$\sigma_{t\bar{t}Z} = 0.30 \begin{matrix} +0.14 \\ -0.11 \end{matrix} \text{ (stat)} \begin{matrix} +0.04 \\ -0.02 \end{matrix} \text{ (syst) pb}$$

$$\sigma_{t\bar{t}W} = 0.28 \begin{matrix} +0.14 \\ -0.12 \end{matrix} \text{ (stat)} \pm 0.04 \text{ (syst) pb}$$

