PDF sensitivity of W cross section ratios at the LHC

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- **Just gotten started…**

Goal

Sensitivity of W boson production to PDFs

Differential cross sections more sensitive than total: pT, y

Look at W+/W- Ratios

Work has been done on this, we will study detector effects

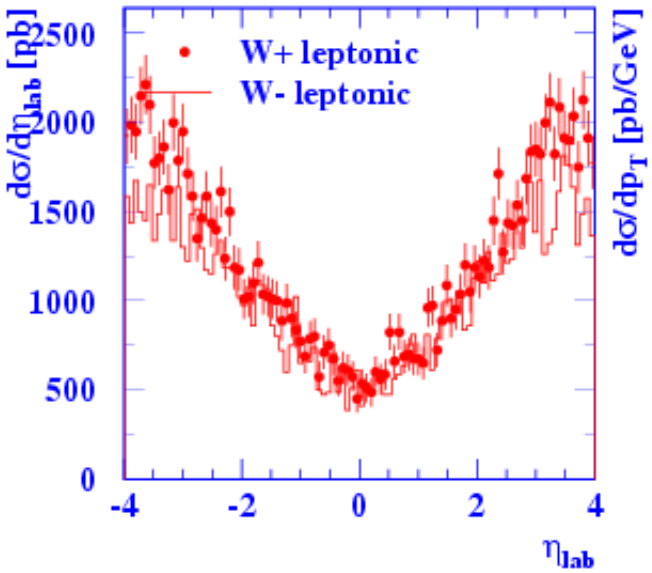
Herwig

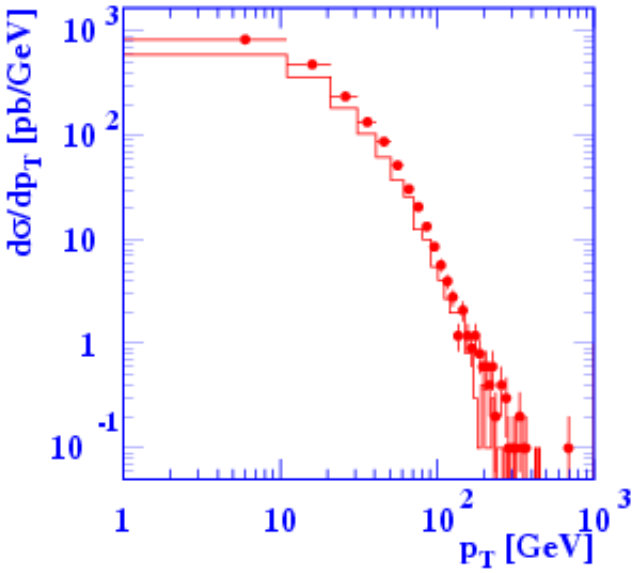
-Herwig6505
- LHC: 7TeV auf 7TeV
- Process 1499 (pp->W+X)
- 6 flavours
- CTEQ 6 m PDF
- QCD lambda: 0.18
- all other parameters default herwig.

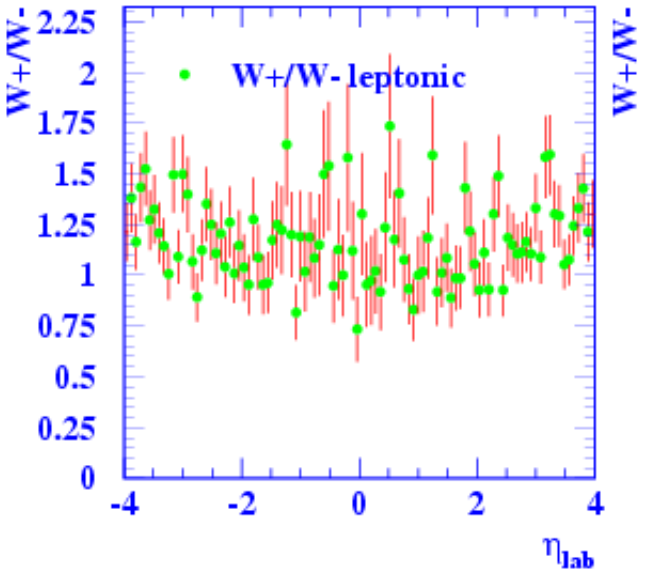
-So far: herwig/pythia (LO) + parton shower

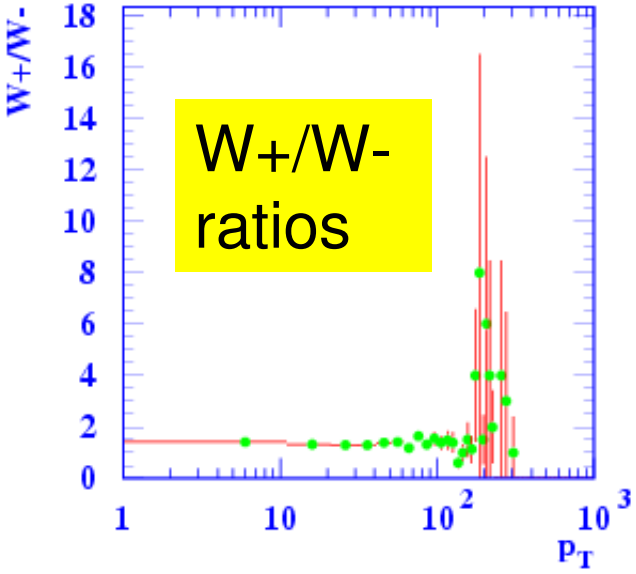
-New: NLO +Parton sh (MC@NLO) + detector

Herwig





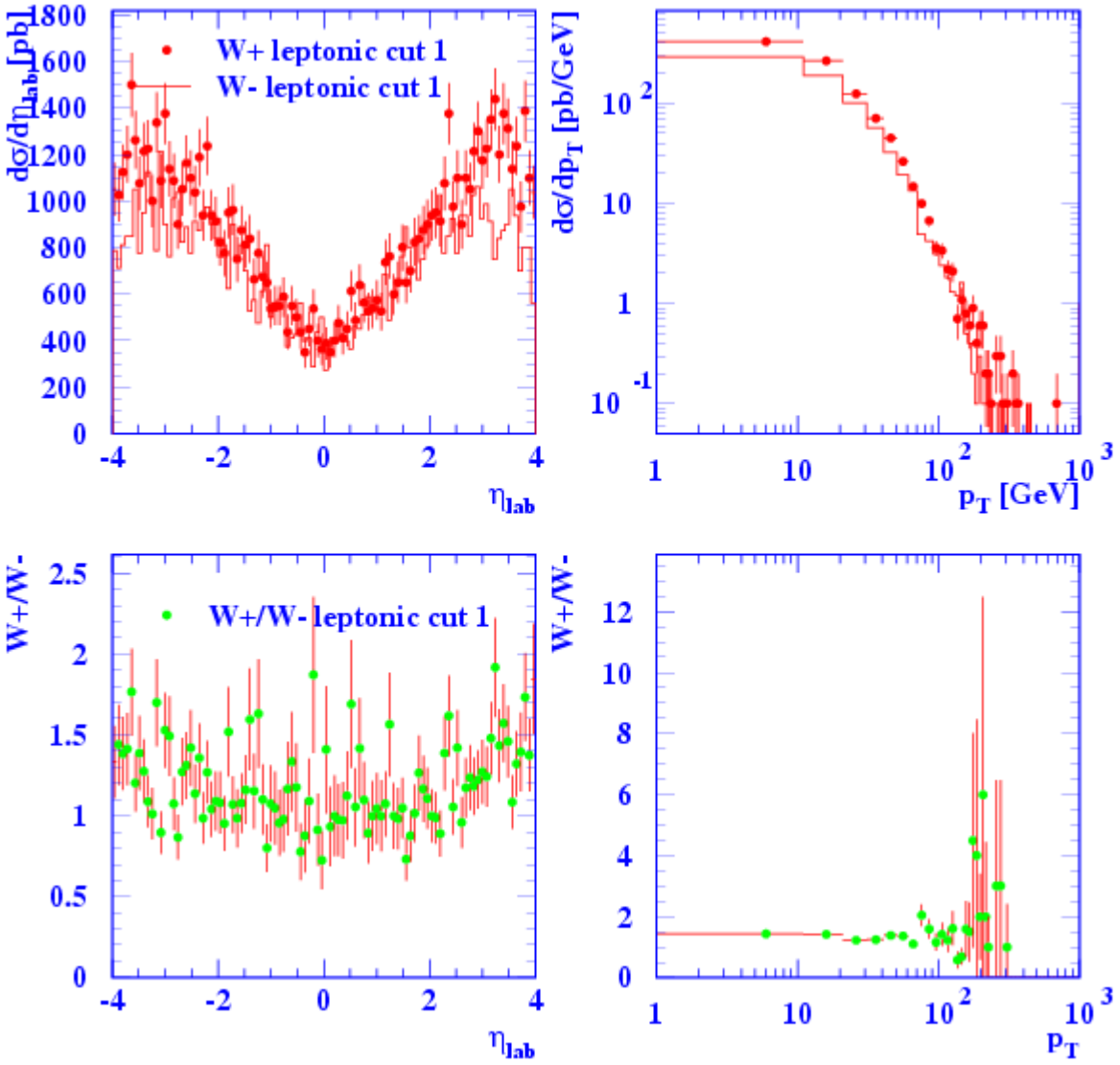




W+/W- ratios

100k events generated, all decay channels

Herwig



Cut1:

$p_T(e)>20GeV$

$|\eta(e)|<2.5$

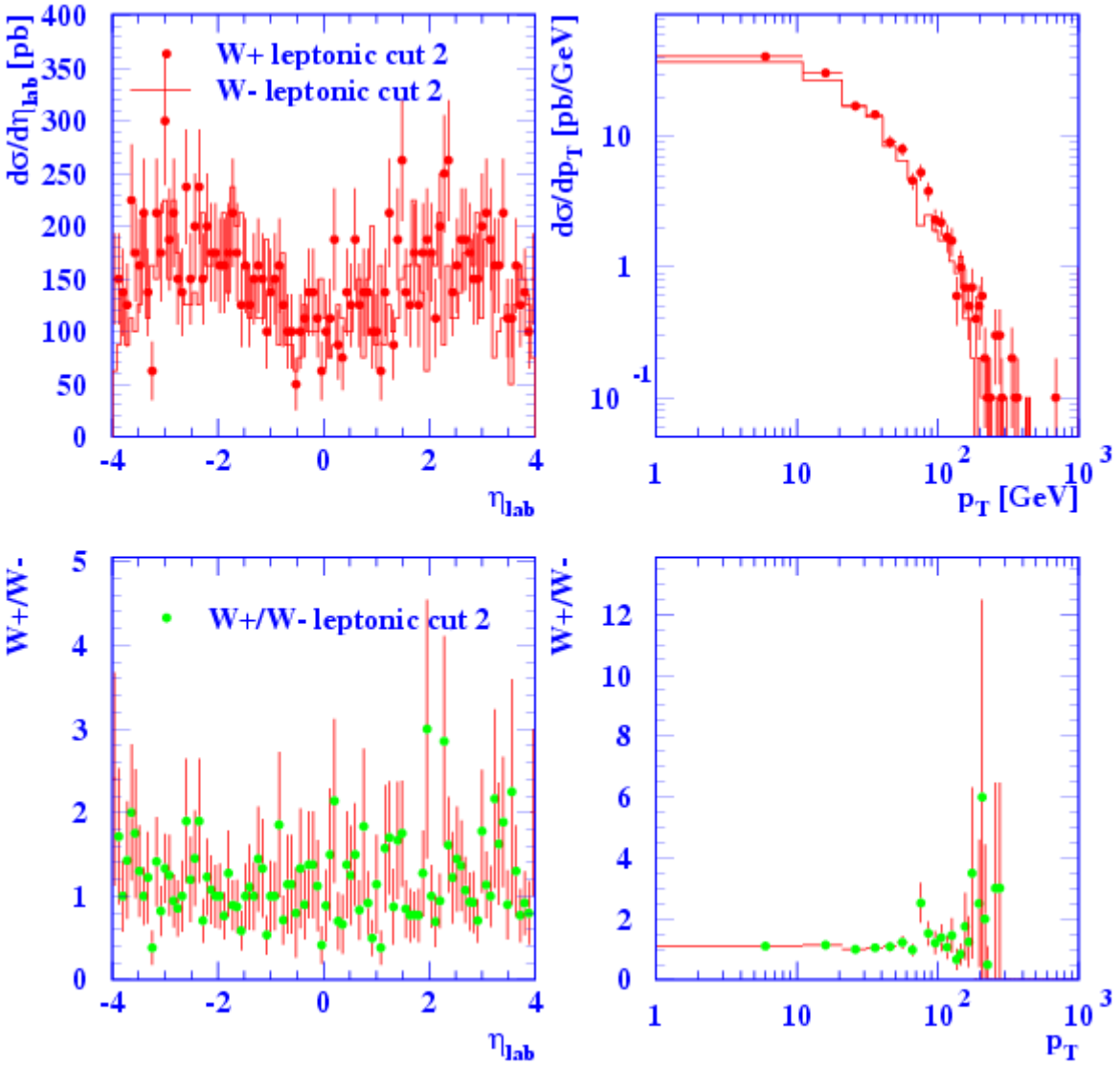
MET>20 GeV

Cuts a la

Hep-ph/0405130

Frixione, Mangano

Herwig



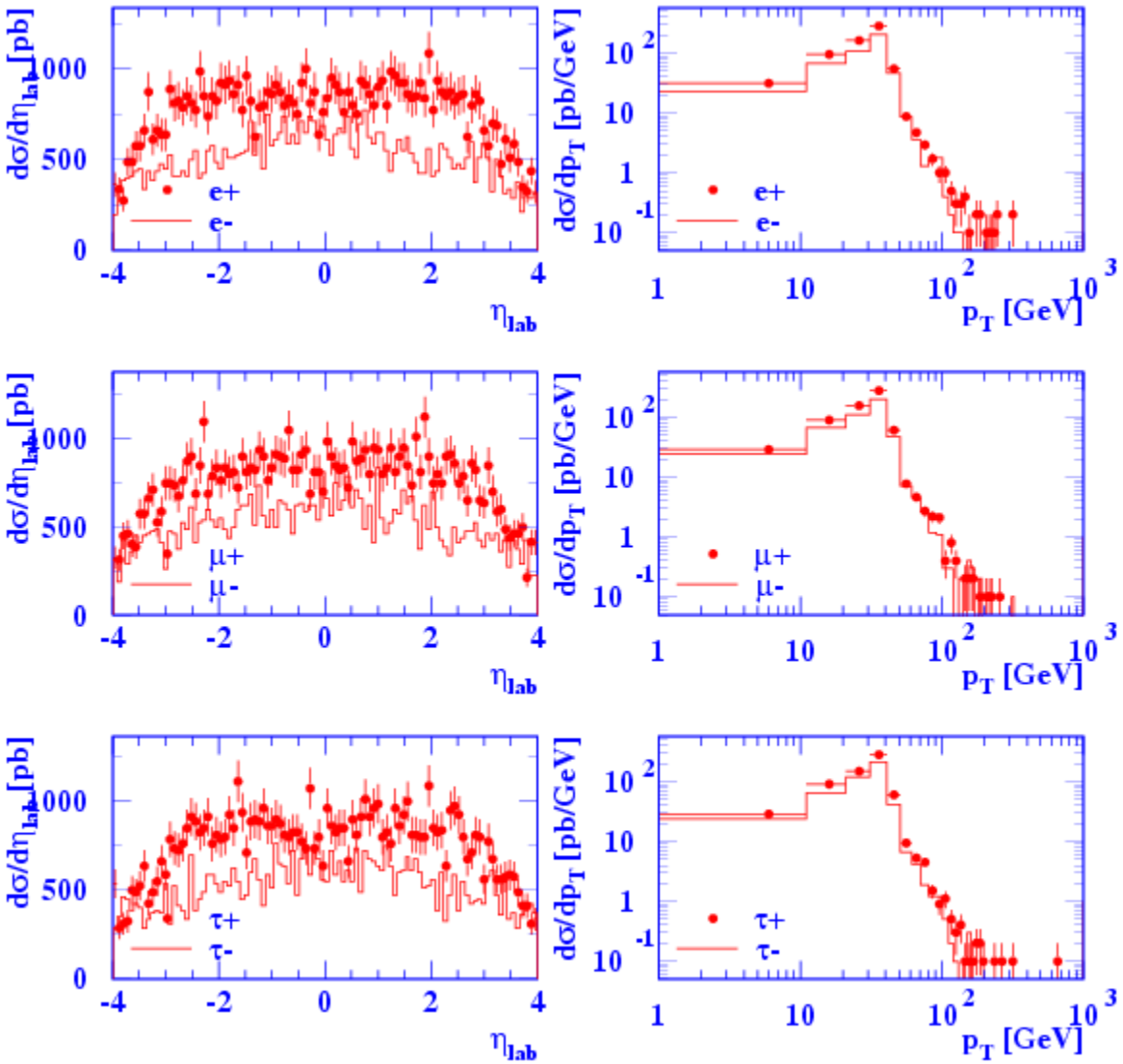
Cut2:

$p_T(e)>40GeV$

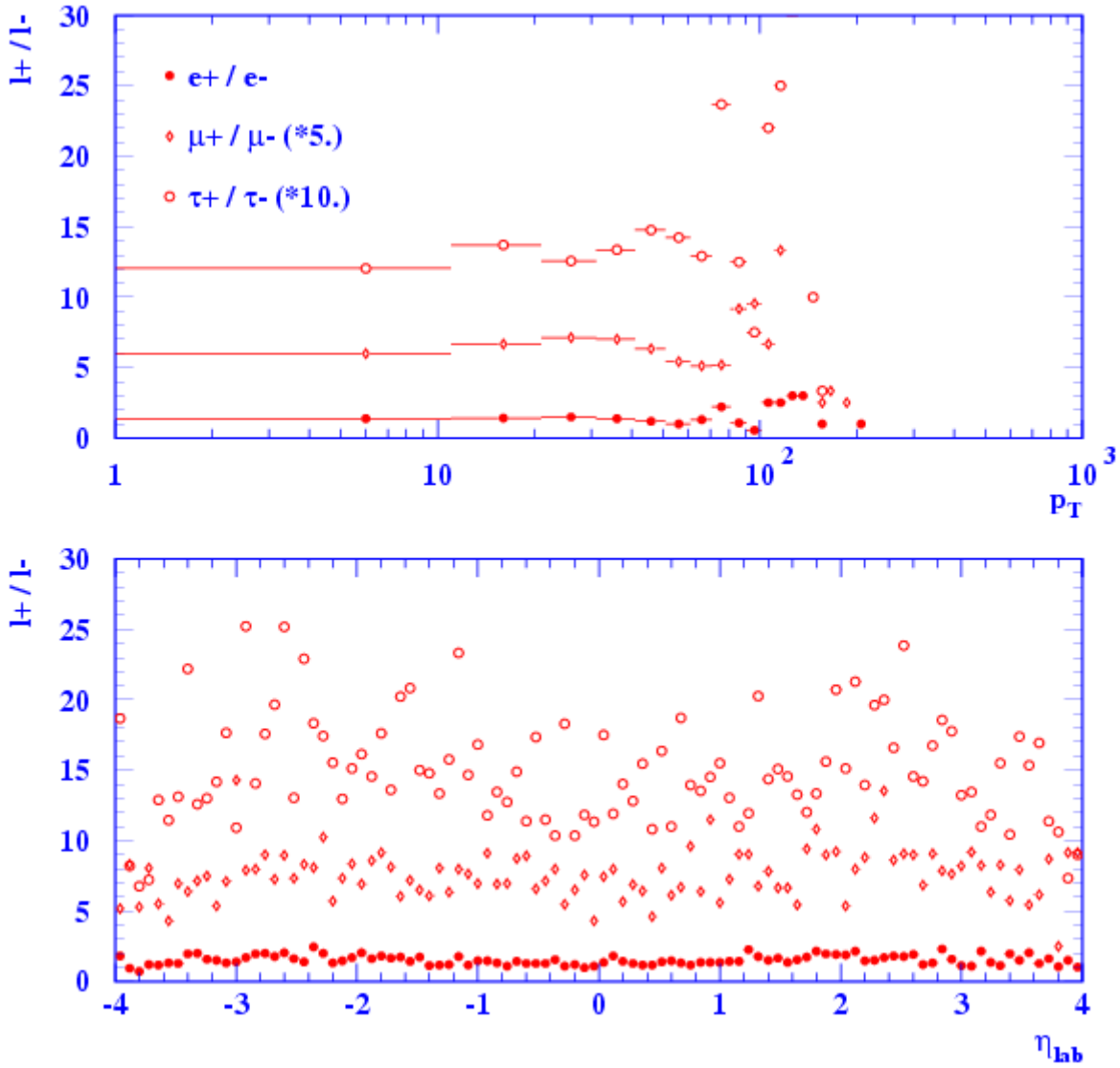
$|\eta(e)|<2.5$

MET>20 GeV

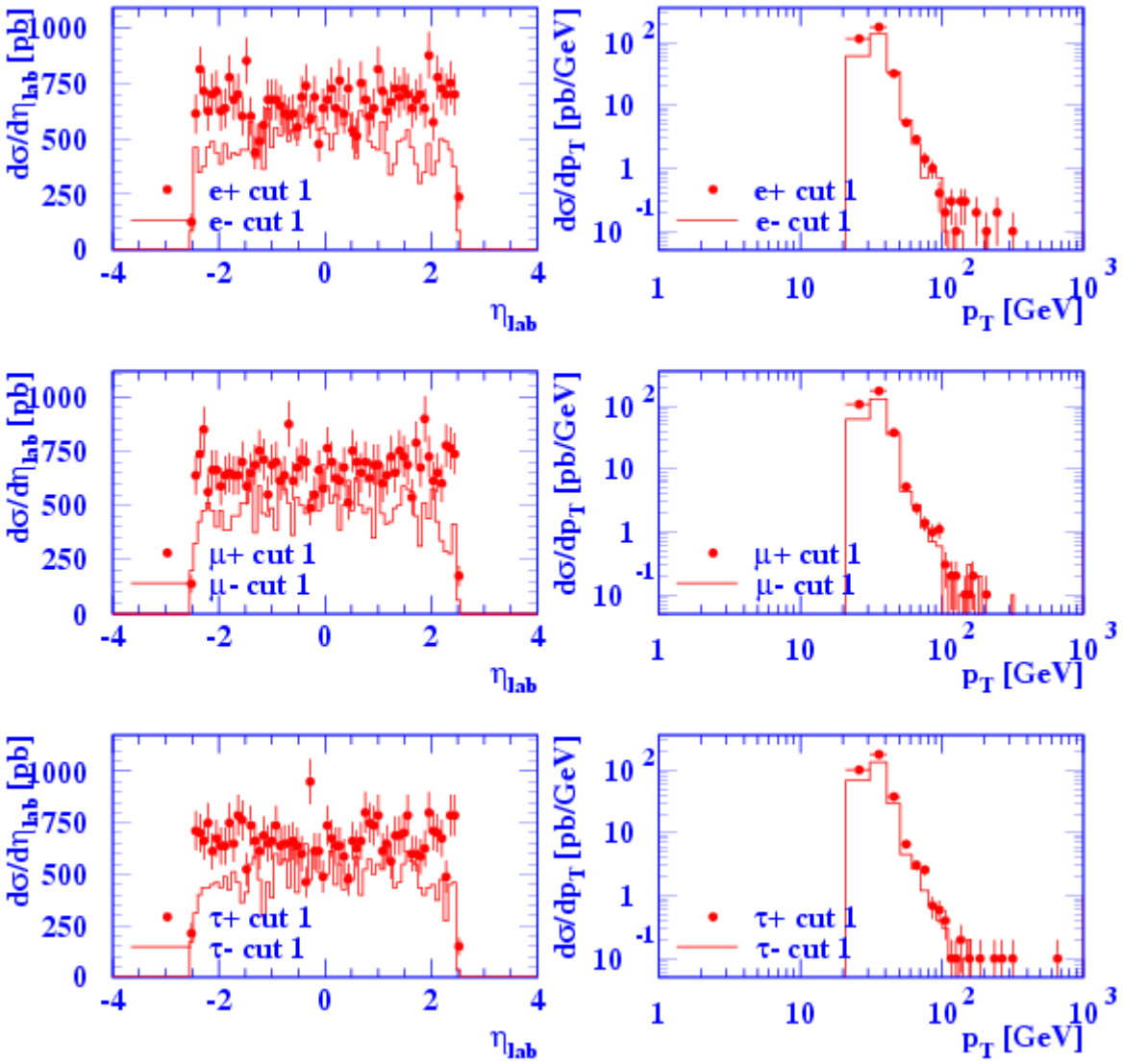
Herwig Leptons



Herwig Leptons



Herwig Leptons Cut1



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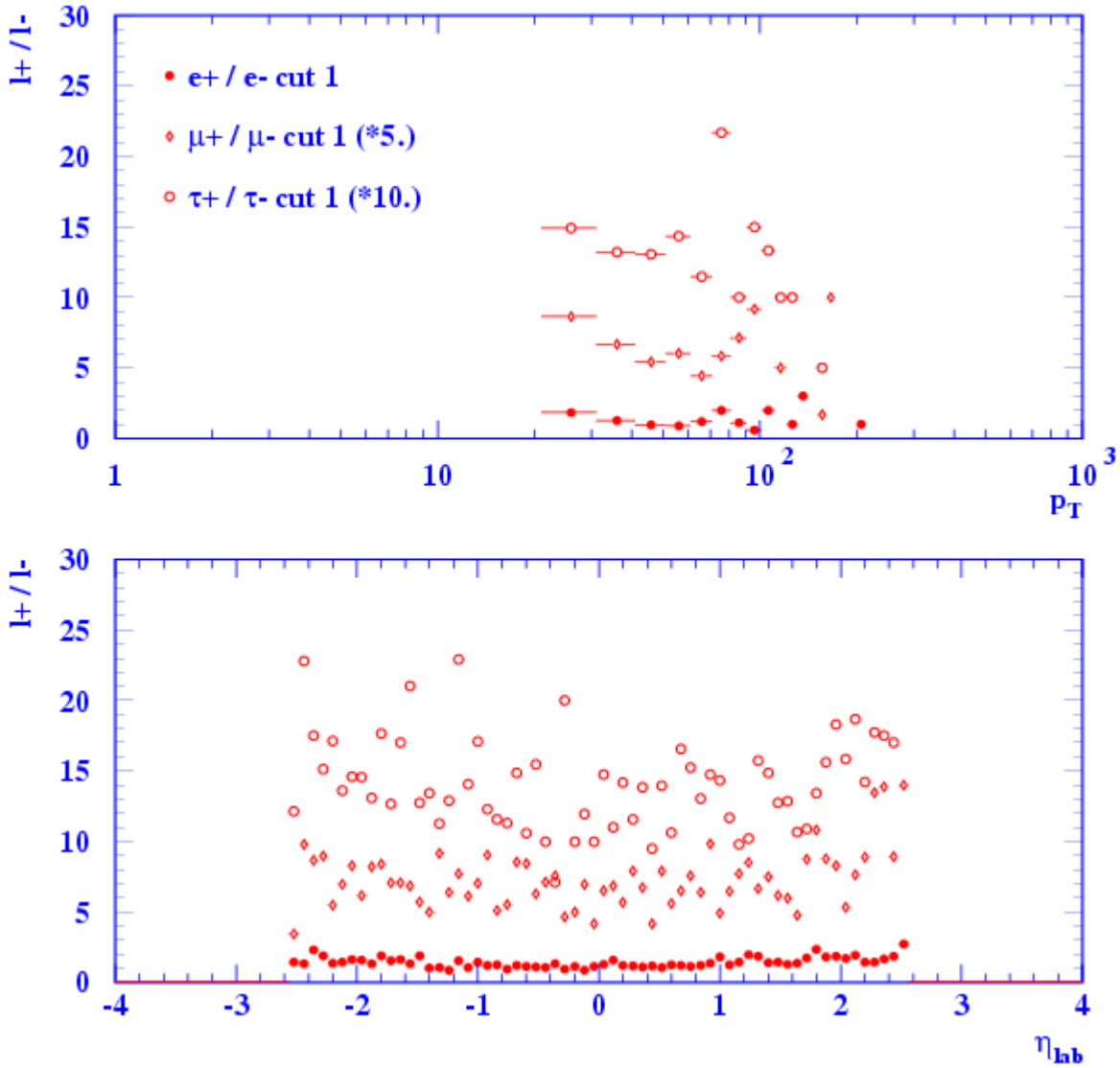
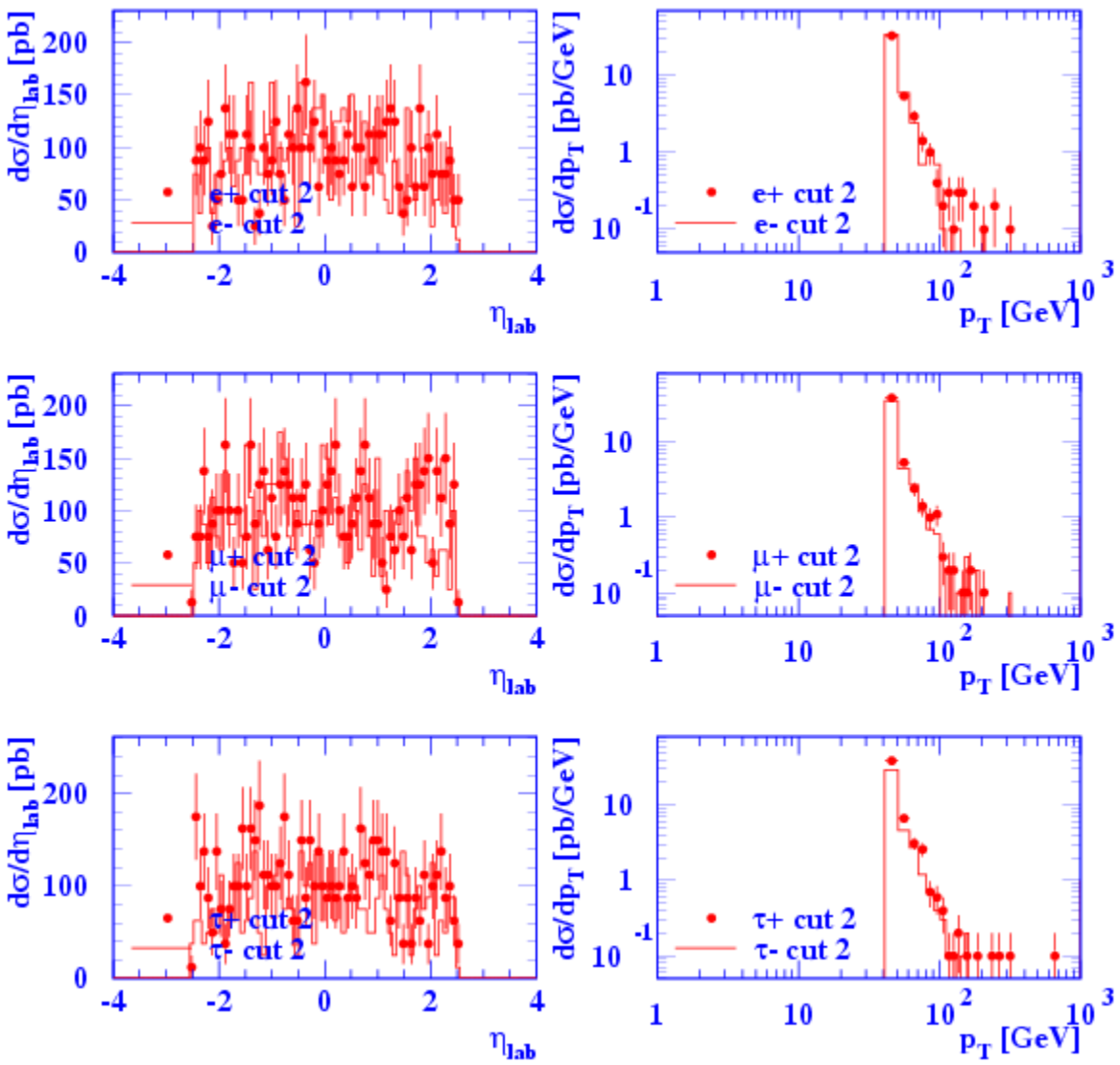
Herwig Leptons Cut 1



Herwig Leptons cut2



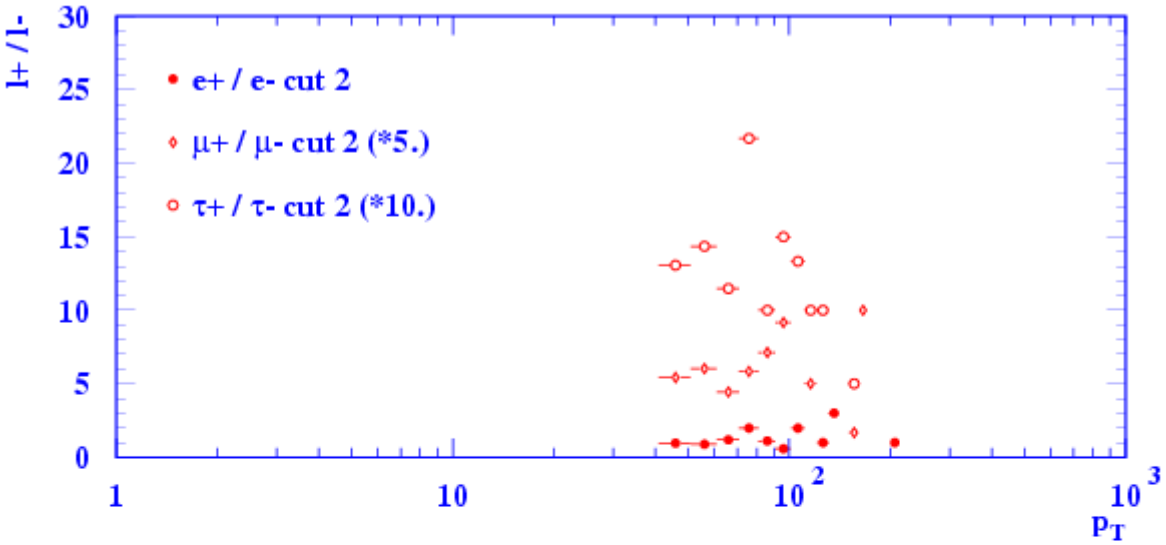
Cut2:

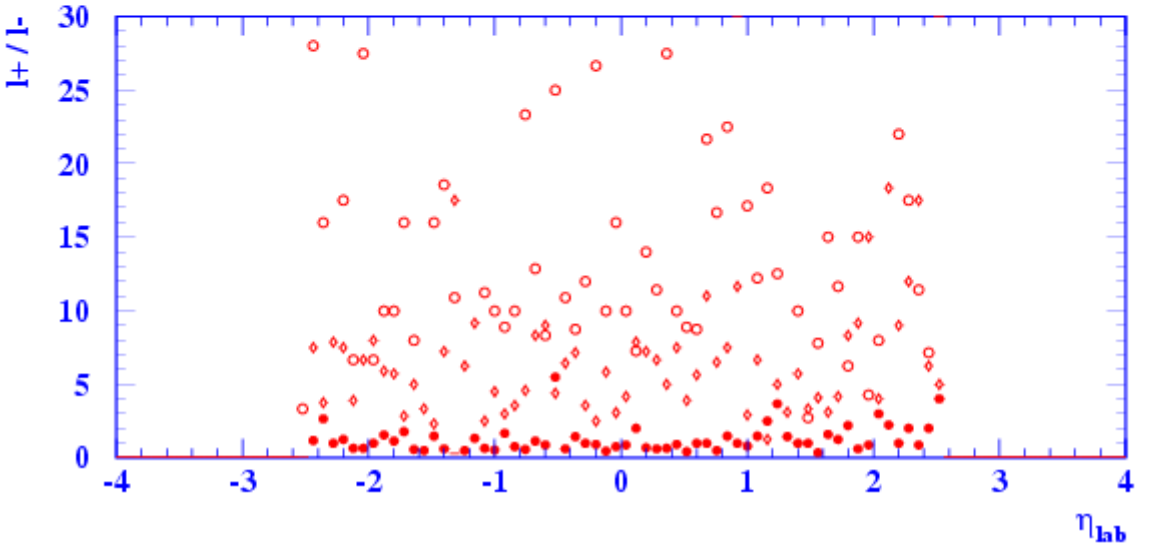
$p_T(e)>20GeV$

$|\eta(e)|<2.5$

MET>20 GeV

Herwig Leptons Cut 2





Next steps: MC

- PDFs
  - Use different PDFs
  - CTEQ6 error PDFs
- Generators:
  - pythia
  - have started to use MC@NLO some technical issues with Herwig ana routines...
- Suggestions welcome!

Next steps: Detector

- Detector Effects: Lepton Acceptance, sign identification, resolutions (?), backgrounds
- Parametrized detector response (Resolutions/eff/acc might be enough)
- In parallel have started to run the CMS software:
  - Using this as an excuse to get familiar with the CMS environment.
  - Successfully ran a few events through the full generation/reconstruction chain at CERN, but not useful for large data sets (disk space, CPU time)
  - Starting to install CMS software locally