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Measurement of the Inclusive Jet Cross Section

Using the

MidPoint Clustering Algorithm

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"A Blessing Talk"

Supporting Documentation

CDF Notes

CDFNOTE 5293: Description of Run II Jet Algorithms
CDFNOTE 6298: Preliminary Run II Inclusive Jet Cross Section
CDFNOTE 6930: Central Calorimeter Energy Scale
CDFNOTE 7206: First Measurement of the Inclusive Jet Cross Section Using the MidPoint Algorithm

QCD Group Presentations

04/16/04: Jet Energy Scale for 5.3.1 Data/Simulation
05/14/04: Hadronization Corrections to the Inclusive Jet Cross Section
06/18/04: Update on Hadronization Corrections to the Inclusive Jet Cross Section
07/09/04: Hadronization Corrections to the MidPoint Inclusive Jet Cross Section From Herwig
10/29/04: Hadronization Corrections to the MidPoint Inclusive Jet Cross Section From Pythia
06/10/05: PrePreBlessing
06/24/05: PreBlessing
07/08/05: Blessing

Web Site

http://ncdf76.fnal.gov/~chlebana/qcd/coneJetPub/

Updates

- Scanned high Et events
- Rescaled luminosity by 1.019
- Using the parameterization of the jet energy scale determined by the JES group
- Using MC to estimate the energy scale uncertainty
- MC reweighted so that the spectrum is closer to that of the data before bin corrections are determined

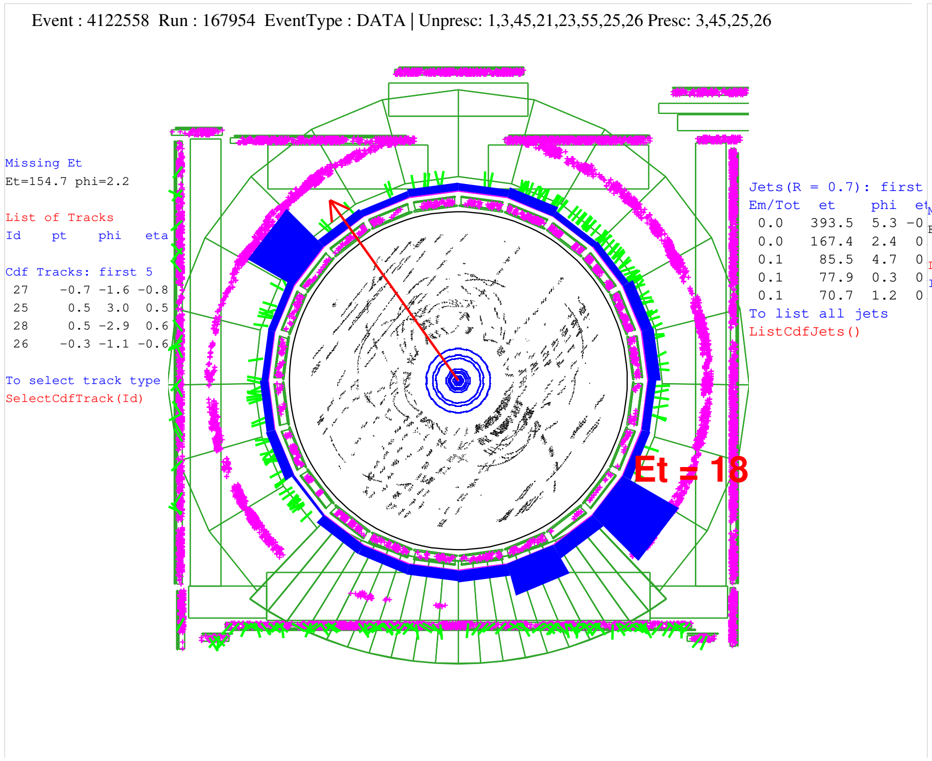
Clarifications

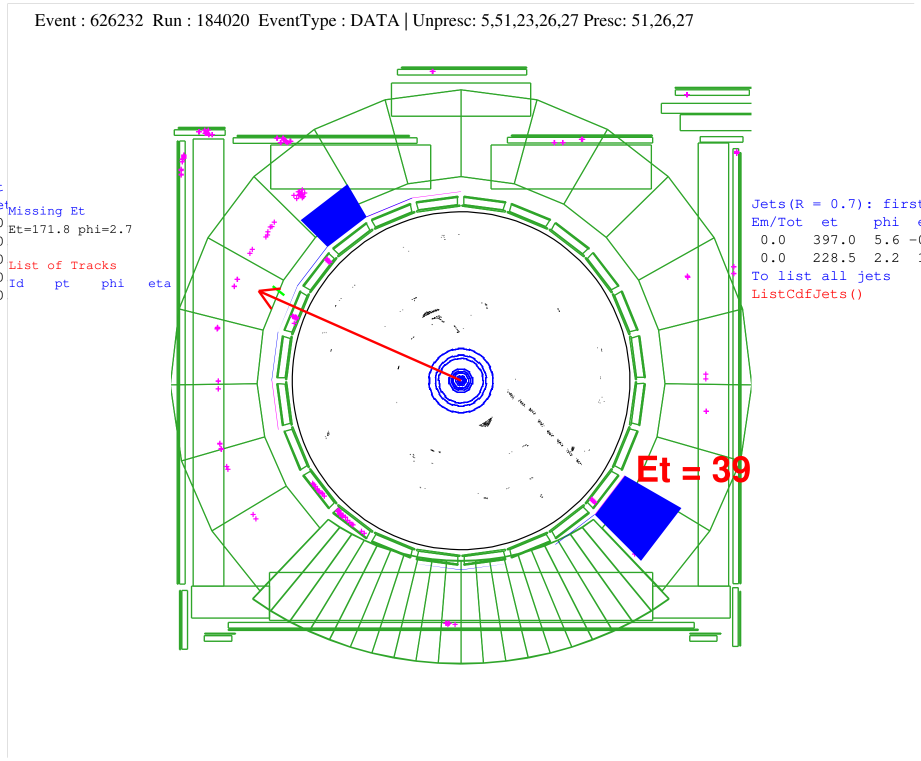
Bad runs found by Regis are excluded (155368 - 155742)

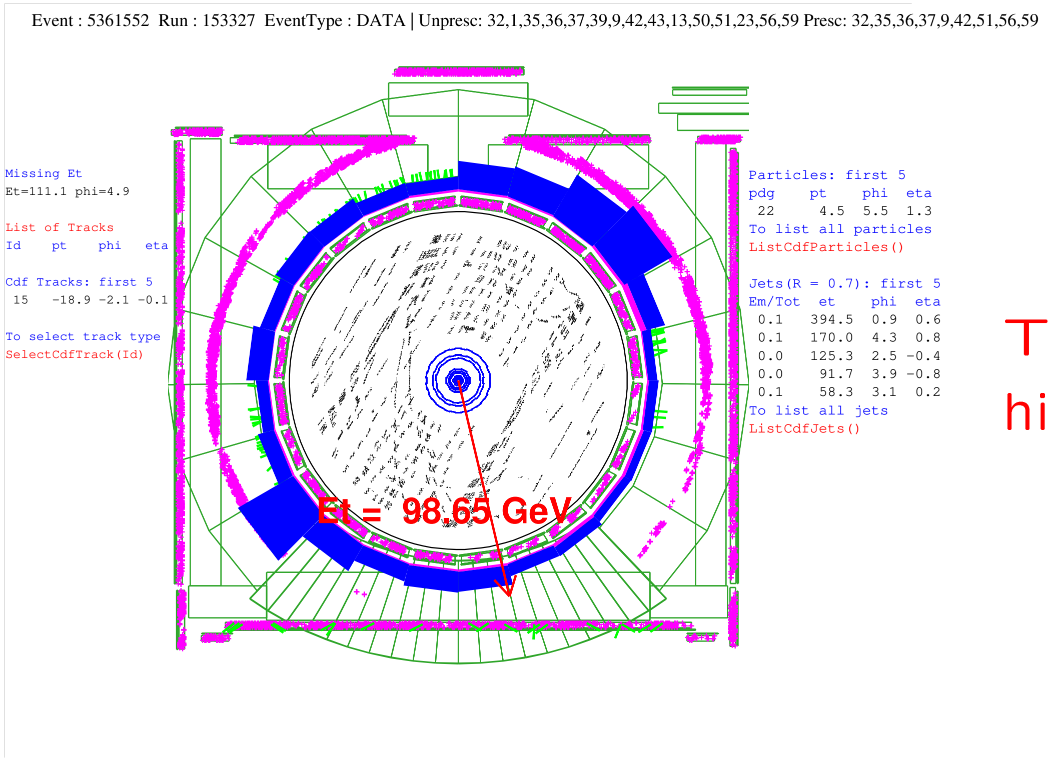
$\rightarrow$ *Consistent dataset as with Kt analysis*

Scanned Events

Stripped events with $E_T > 360 GeV$ $\rightarrow$ *Saw three events in the JetClu sample that were identified as cosmic events*

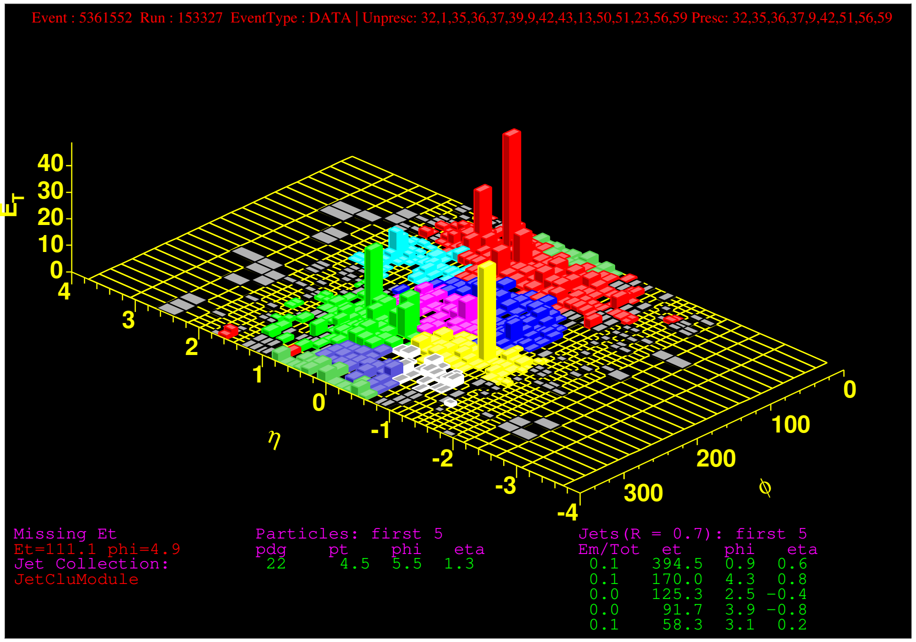


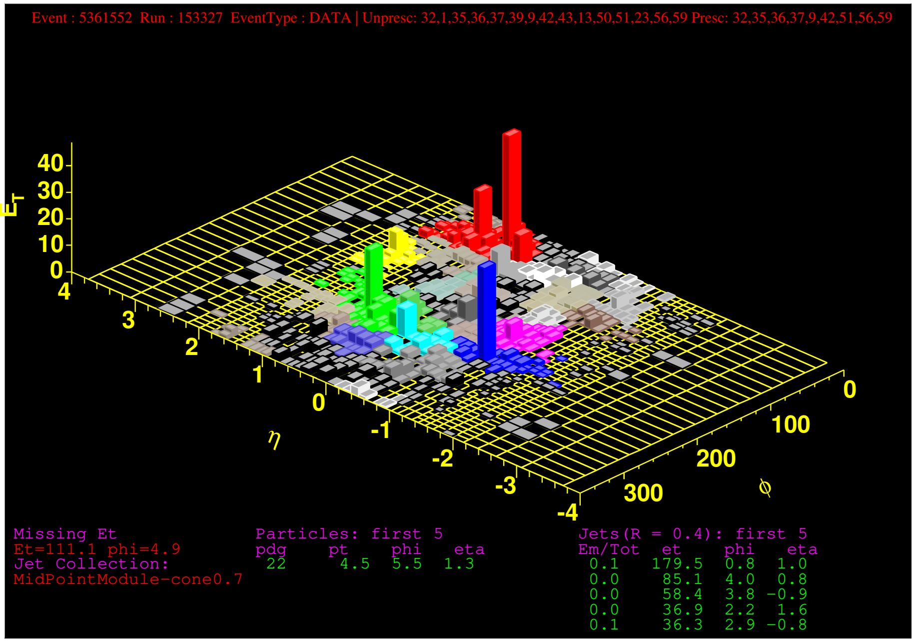




The events were *not* in the high p_T MidPoint sample

JetClu includes more towers





"Jets" were reconstructed with different p_T

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MidPoint : 179.5 GeV
JetClu   : 395.5 GeV
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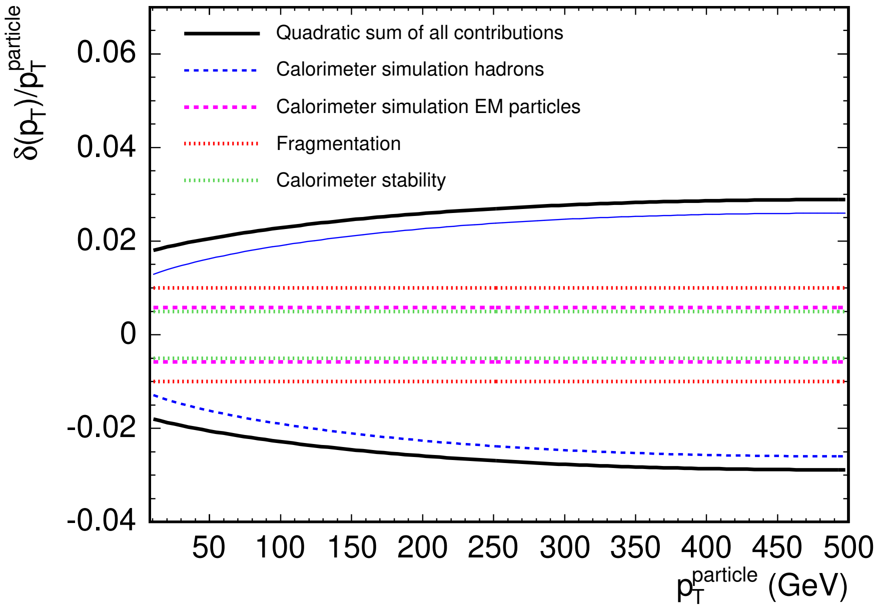
Energy Scale Uncertainty

Previously we shifted the jet energy by a constant 3% and looked at the change in the cross section using the data.

Change in cross section was fit to a straight line, $\rightarrow$ *statistics limited at high* E_T

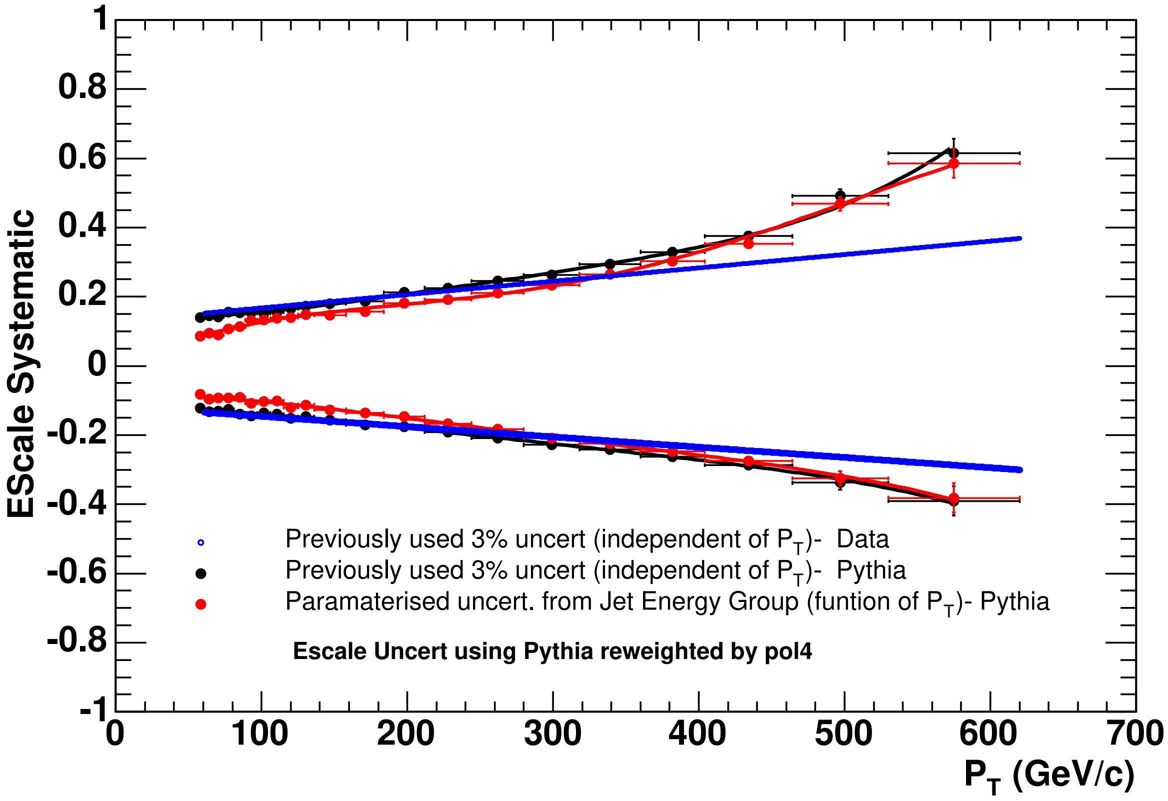


Now using the results from the jet energy scale group.

Nonlinear in p_T

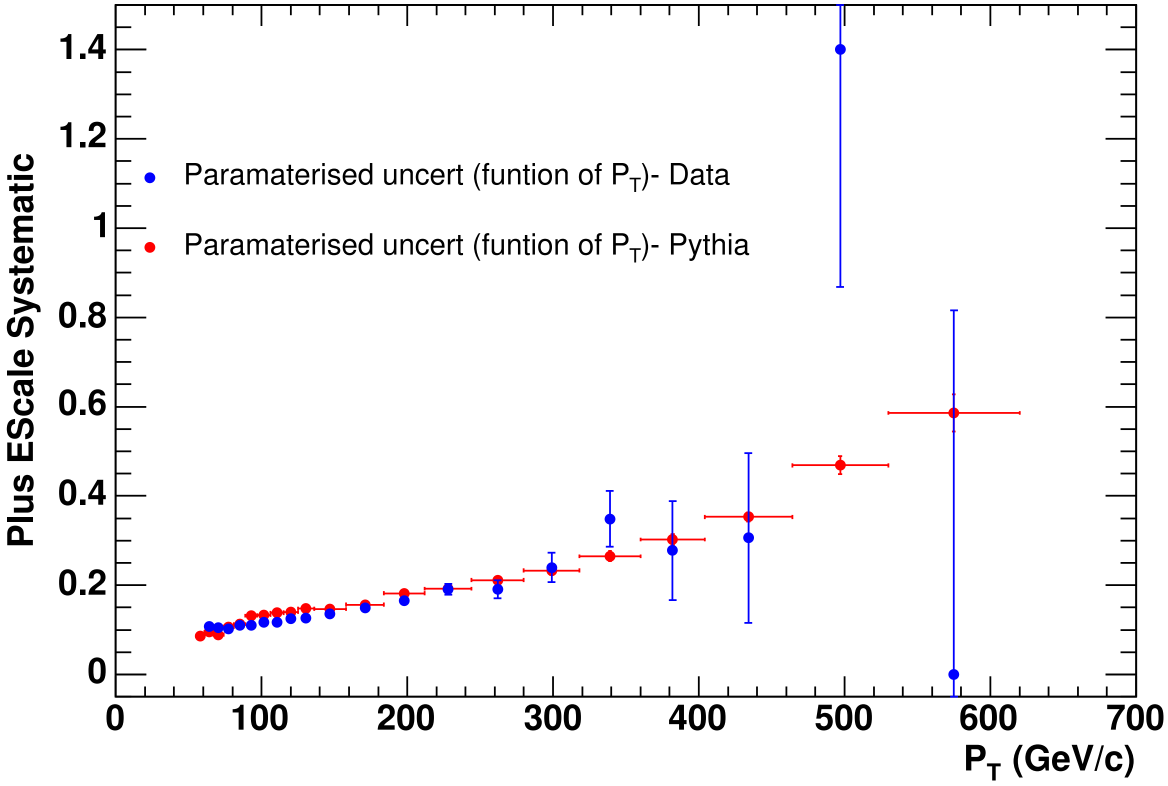
In order to reduce the statistical fluctuations we determined the error on the cross section using the MC

MC spectrum is first reweighted in order to match the raw data spectrum more closely

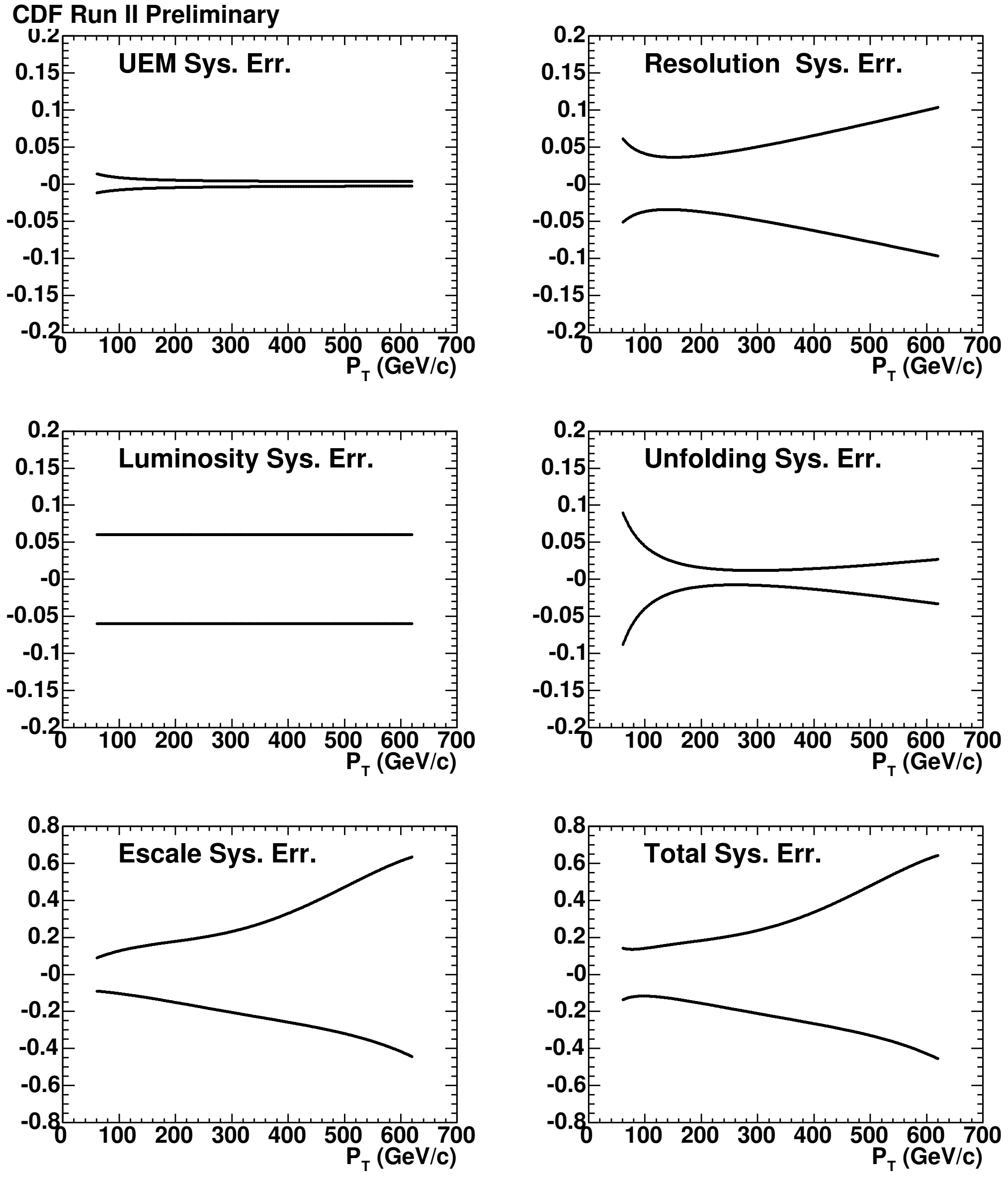


The results of a linear fit undershoot the high p_T points

MC follows the data

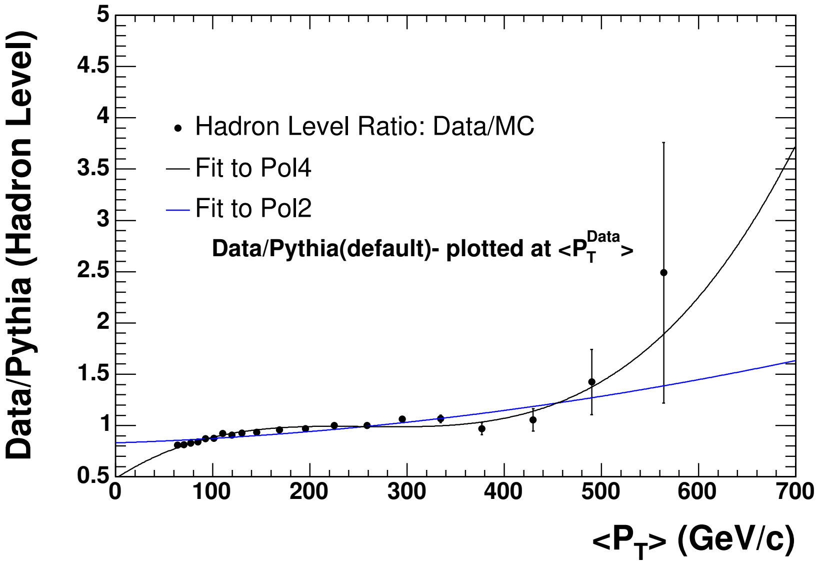


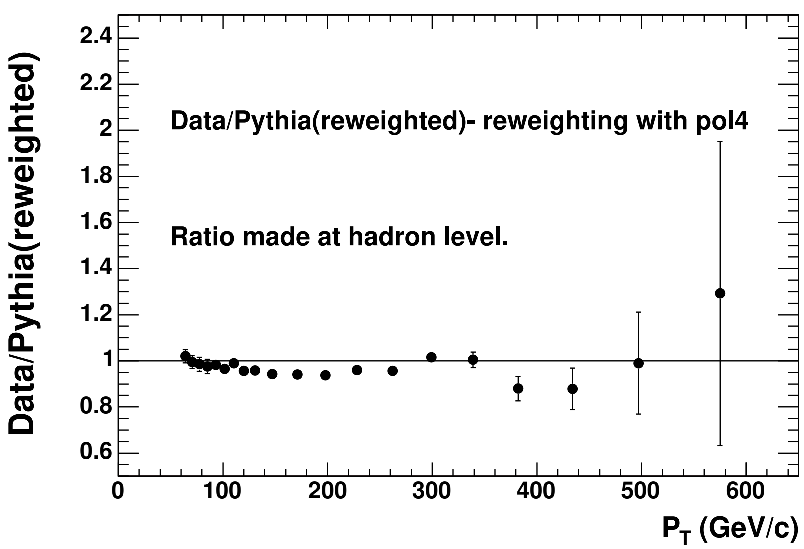
For Blessing...

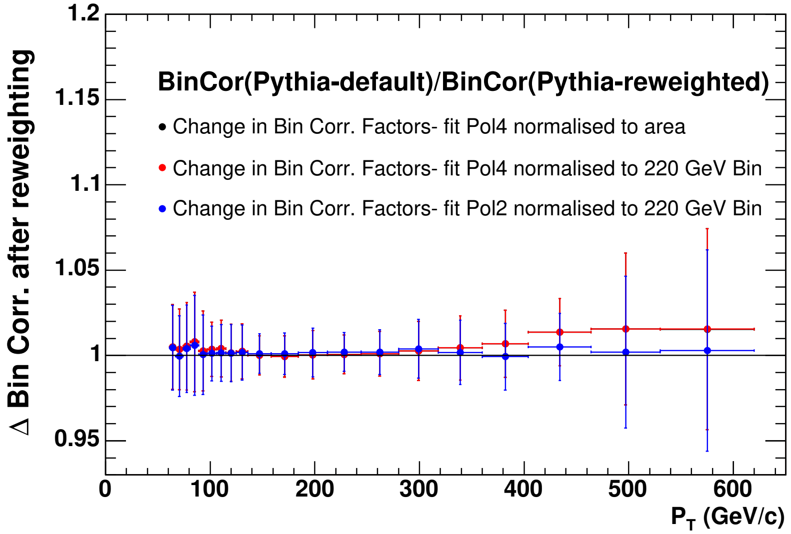


$\rightarrow$ *Larger systematic error*

Reweighting the MC



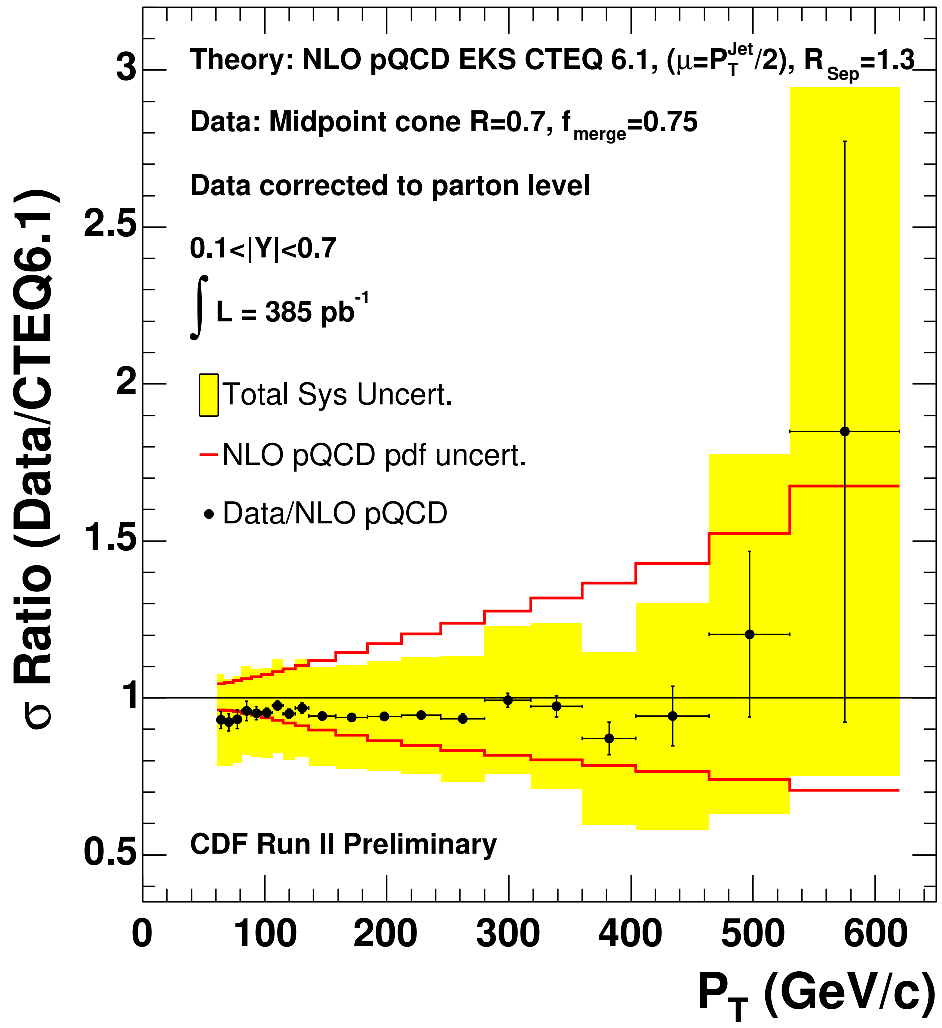




Not so sensitive to the reweighting function (Pol2 or Pol4) $\rightarrow$ *less than a 2% effect at highest* p_T

Central value uses the reweighted MC (Pol4)

For Blessing…



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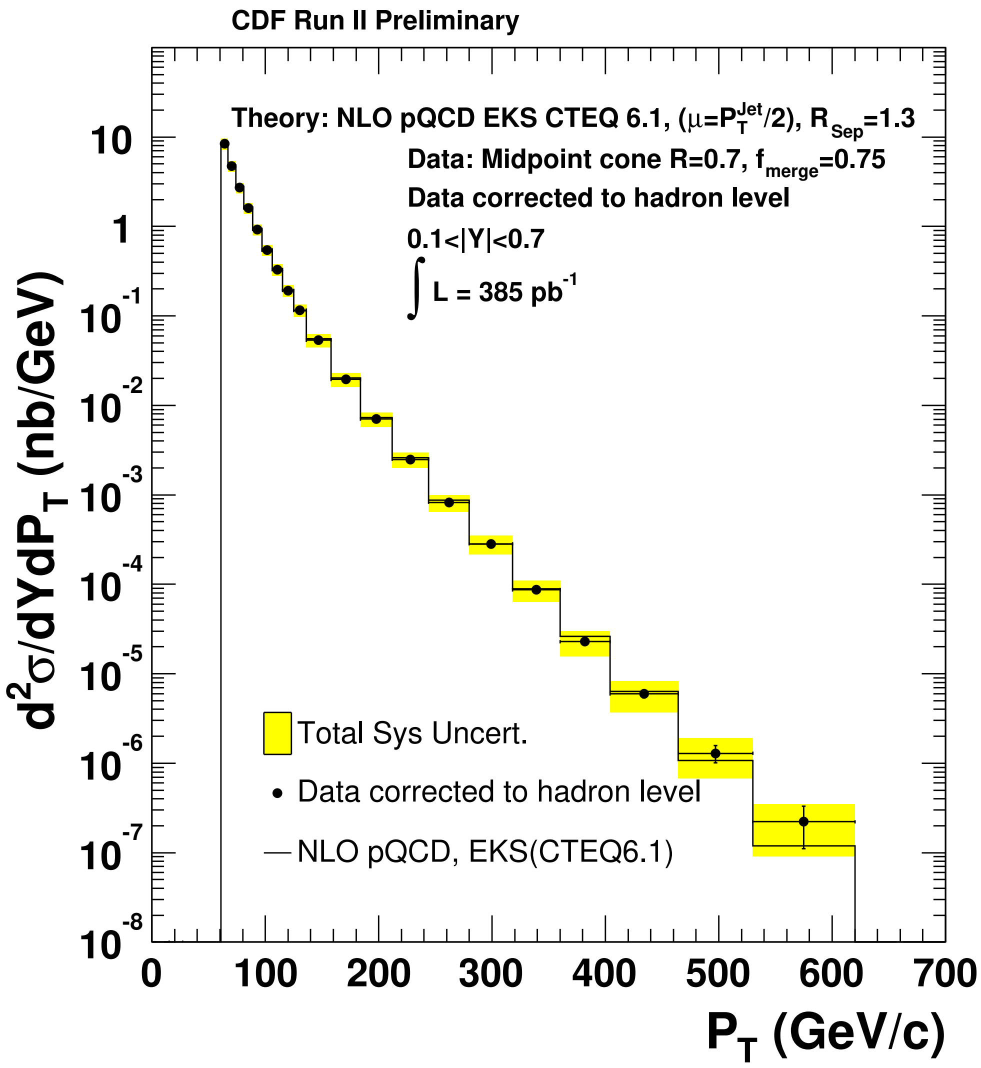

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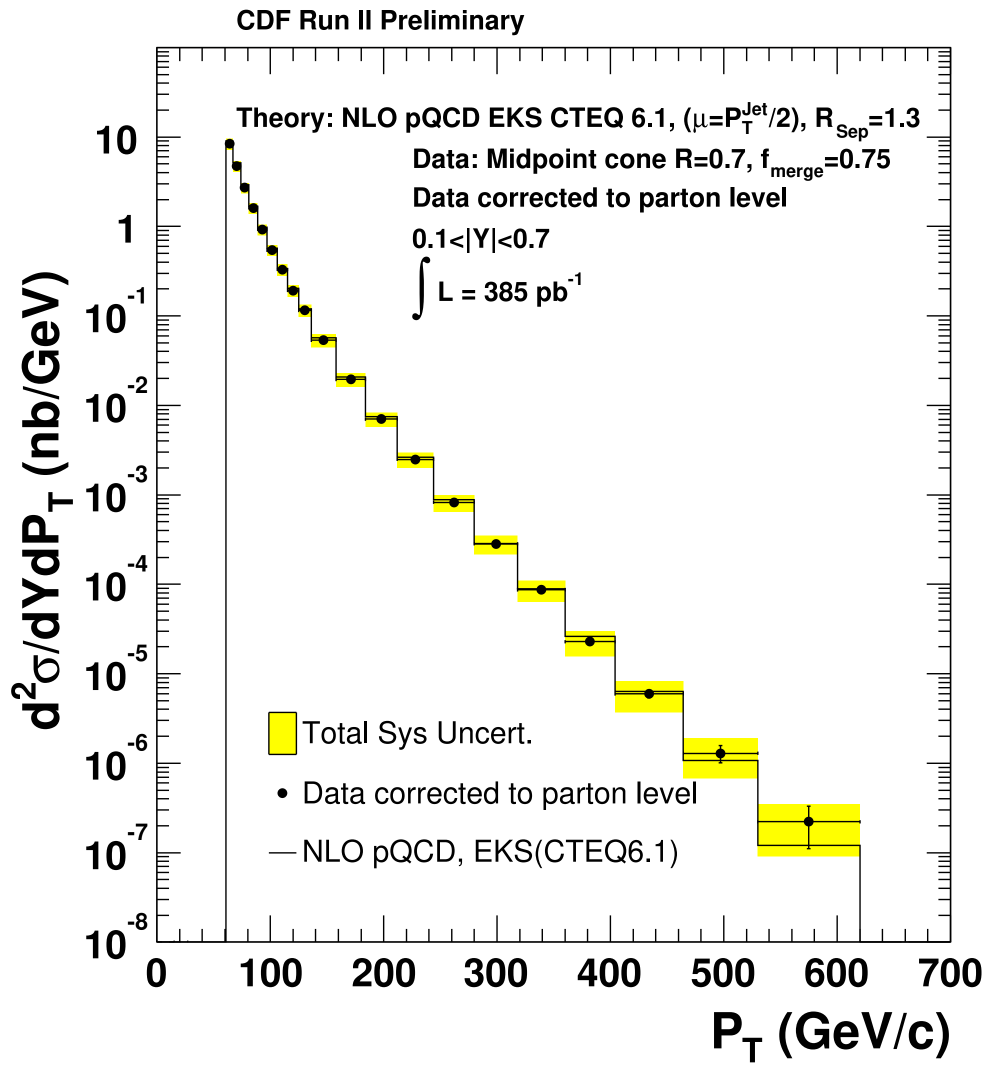

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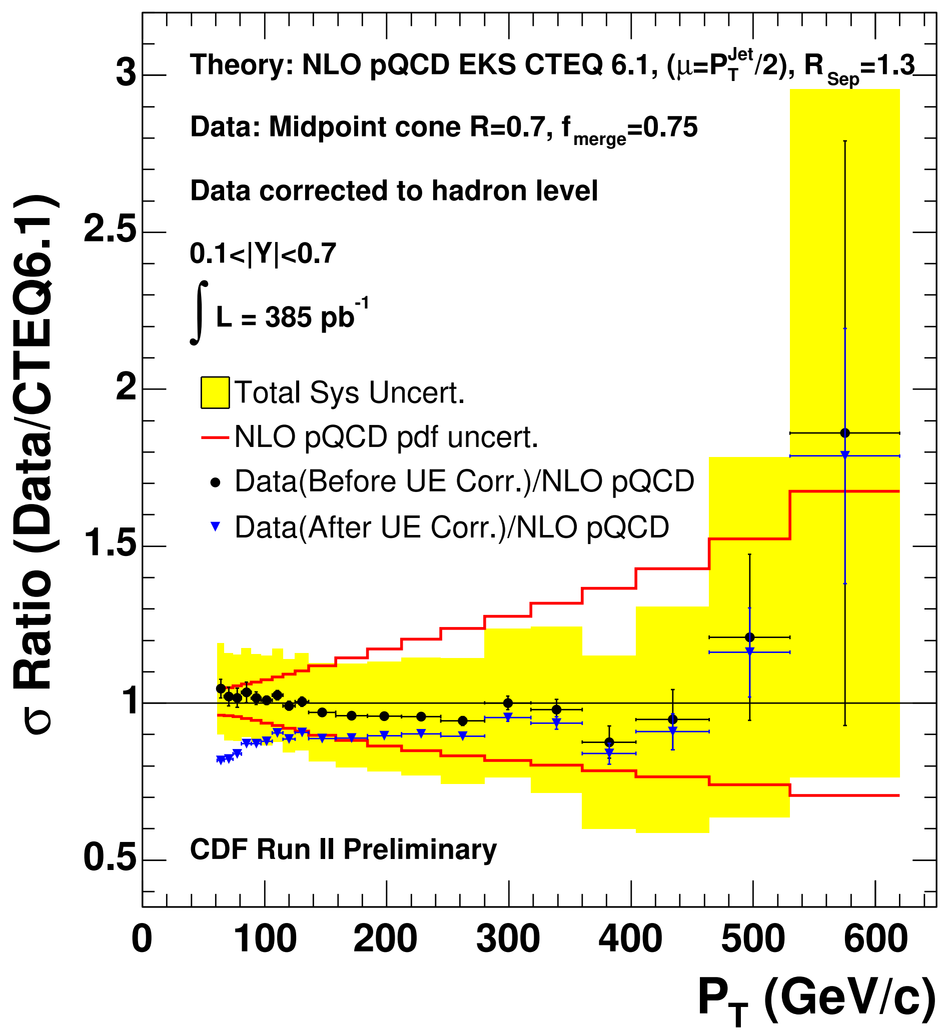

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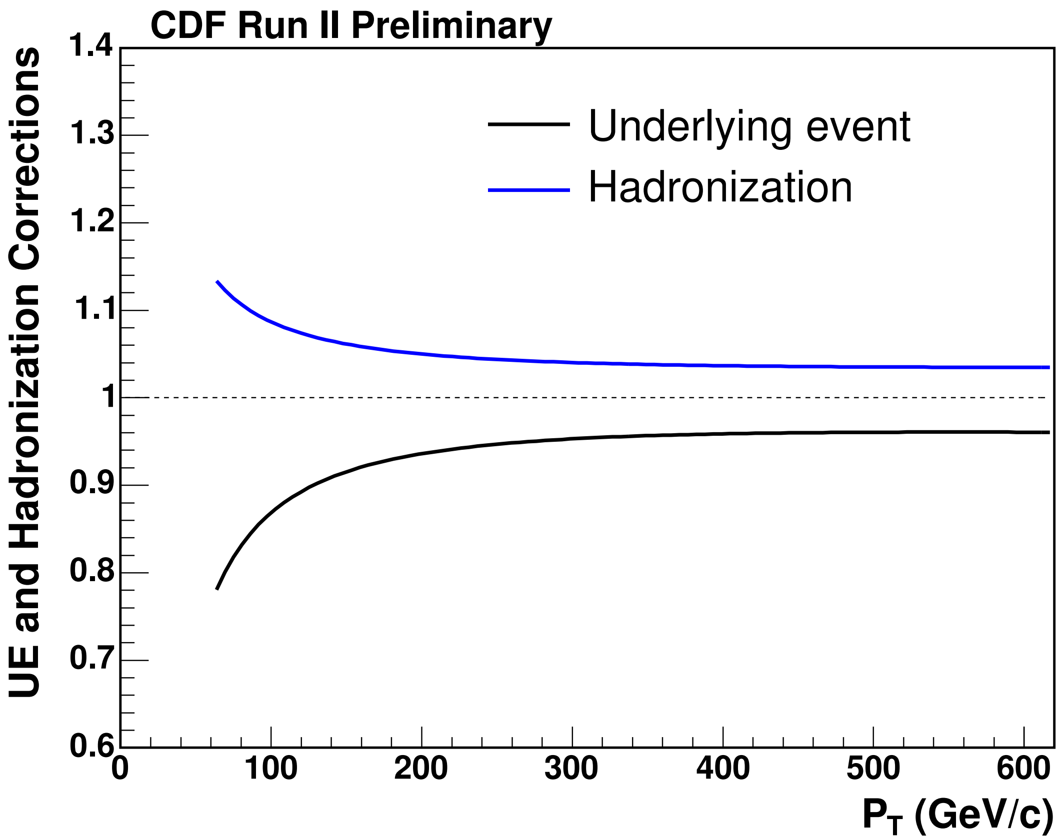

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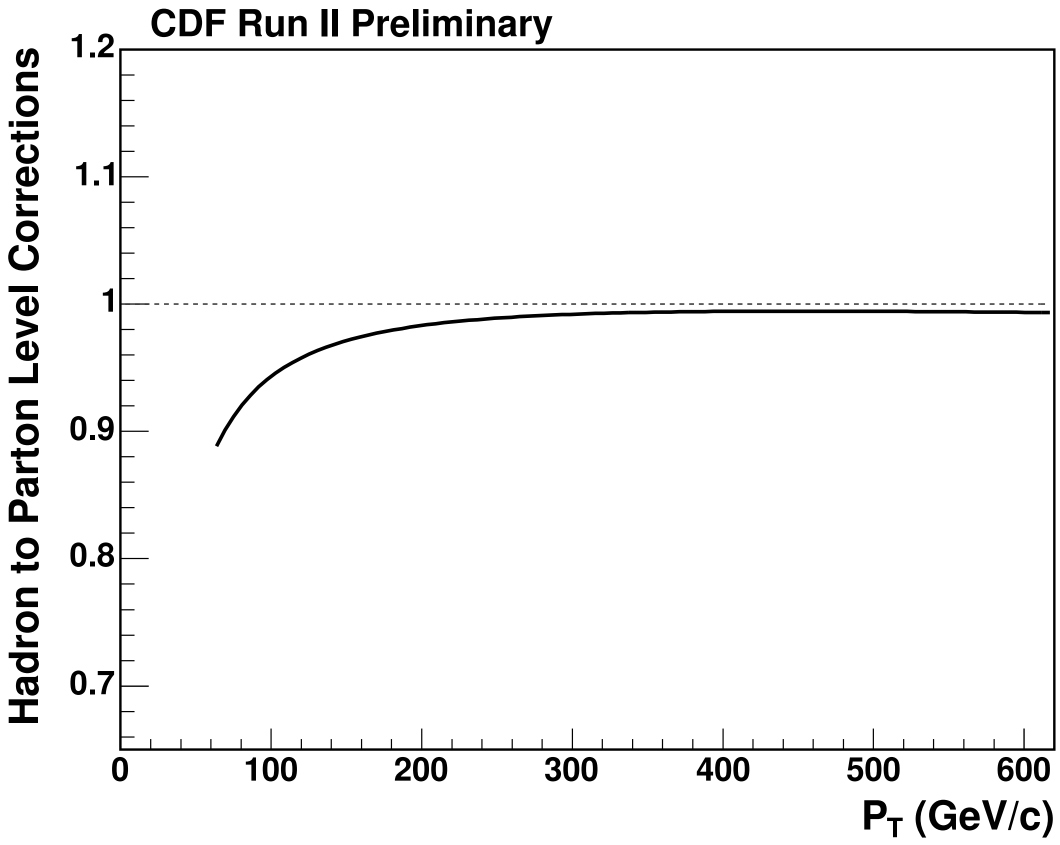

Other issues...

There are some differences between the MidPoint and KtClustering analysis which we should resolve in order to make sure we present a consistent picture and so speakers know what to say...

$\rightarrow$ Should having a meeting with two groups and conveners

- Energy scale error should be treated consistently. This is the dominant error and we should avoid having one result with significantly smaller errors just because of the treatment.

- Direct comparison between results (present on same plot). We see an overall shift which is partially explained by the theory scale. *Should quantify this...*

- Correcting data to the hadron or parton level