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May 9 2002

Inclusive Jet Cross Section Update

Looked at 25% more data 85 $\rightarrow$ 107pb^{-1}

Even more data becoming available...

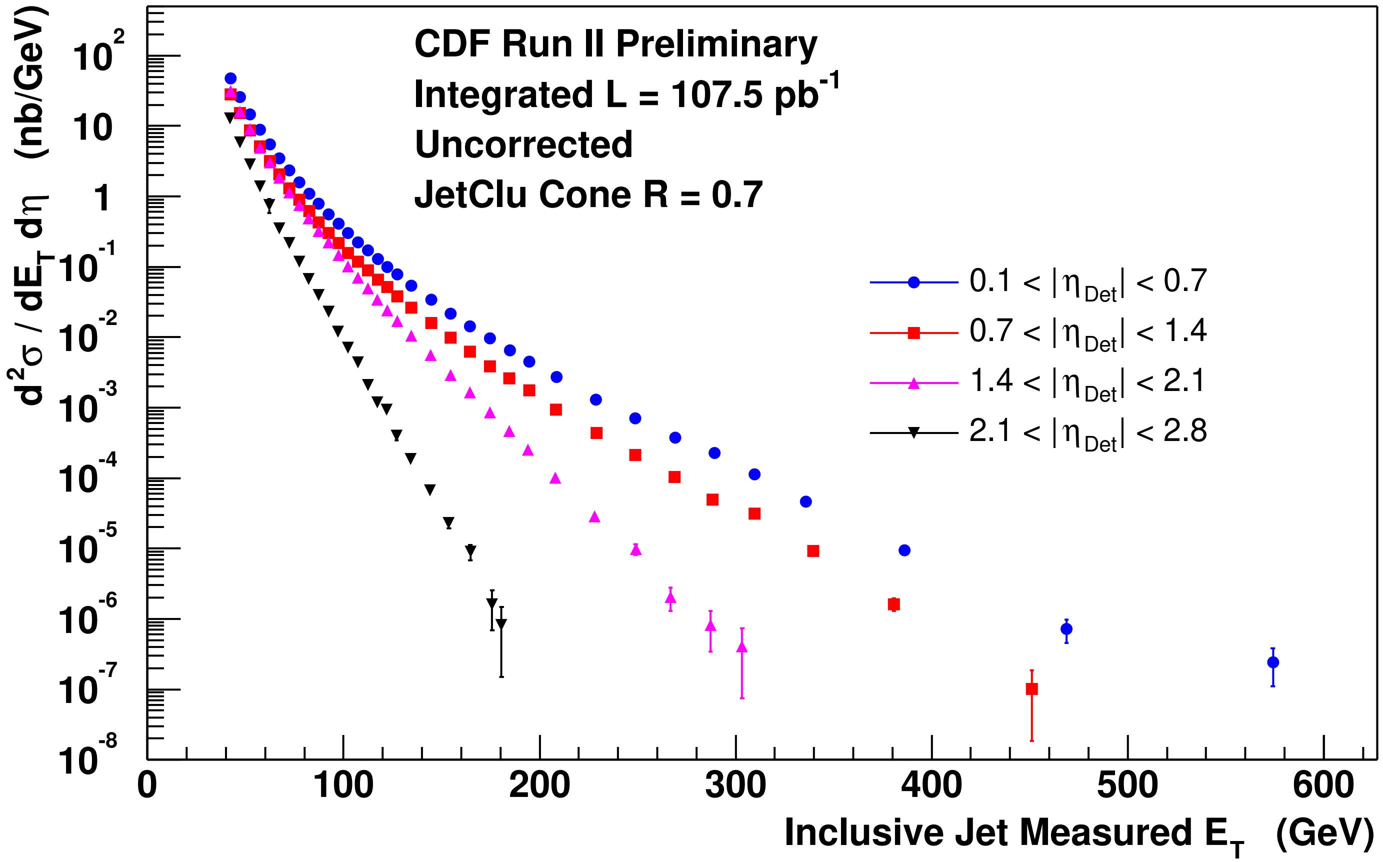
Statistical fluctuations are smoothing out

Number of events in the highest E_T bins

Bins	85 pb-1	107 pb-1
320 360	165	227
360 440	68	93
440 520	4	7
520 620	3	3

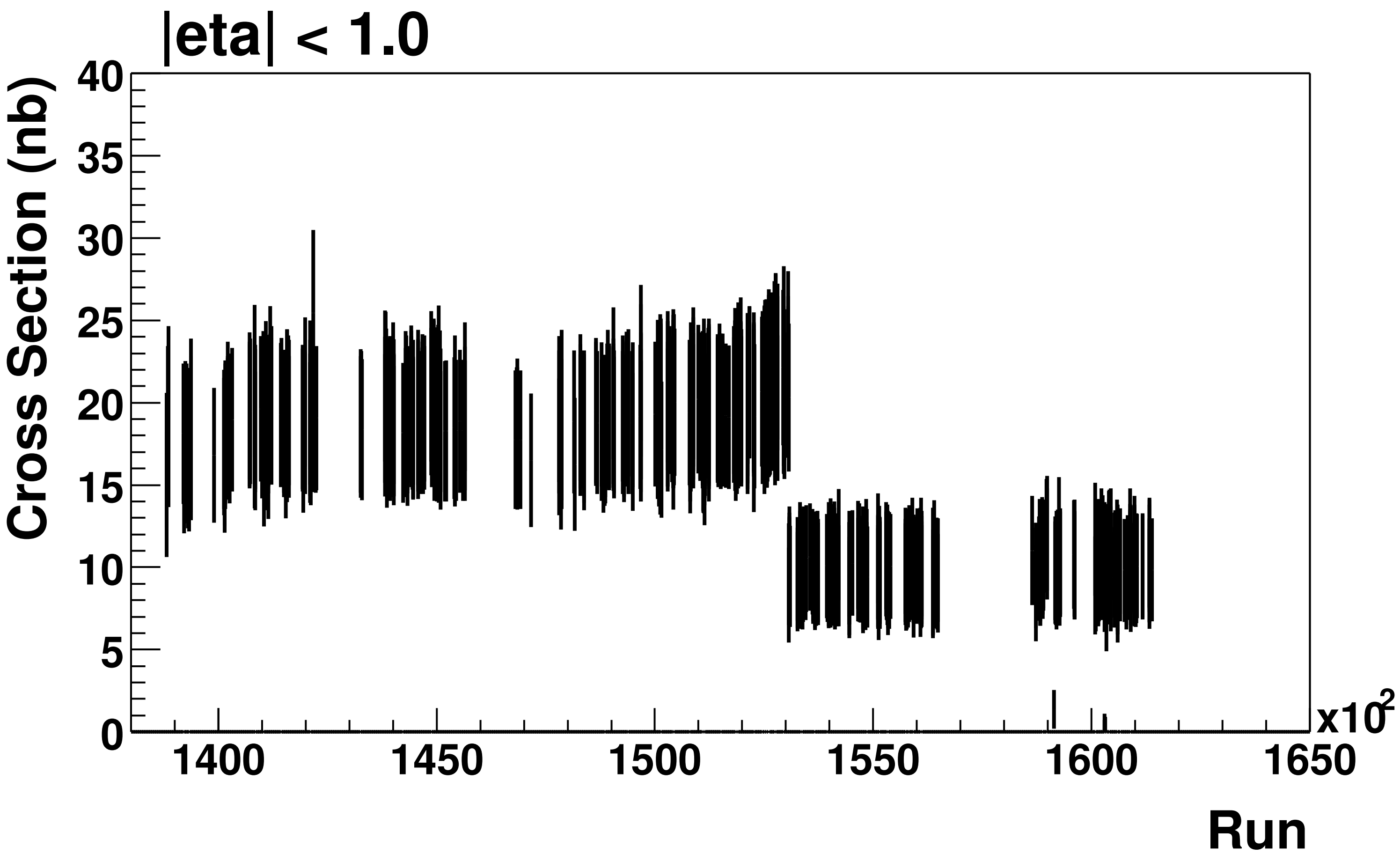
As new data becomes available it is easy to rerun the code to produce updated results

Measured data - input to unsemearing...



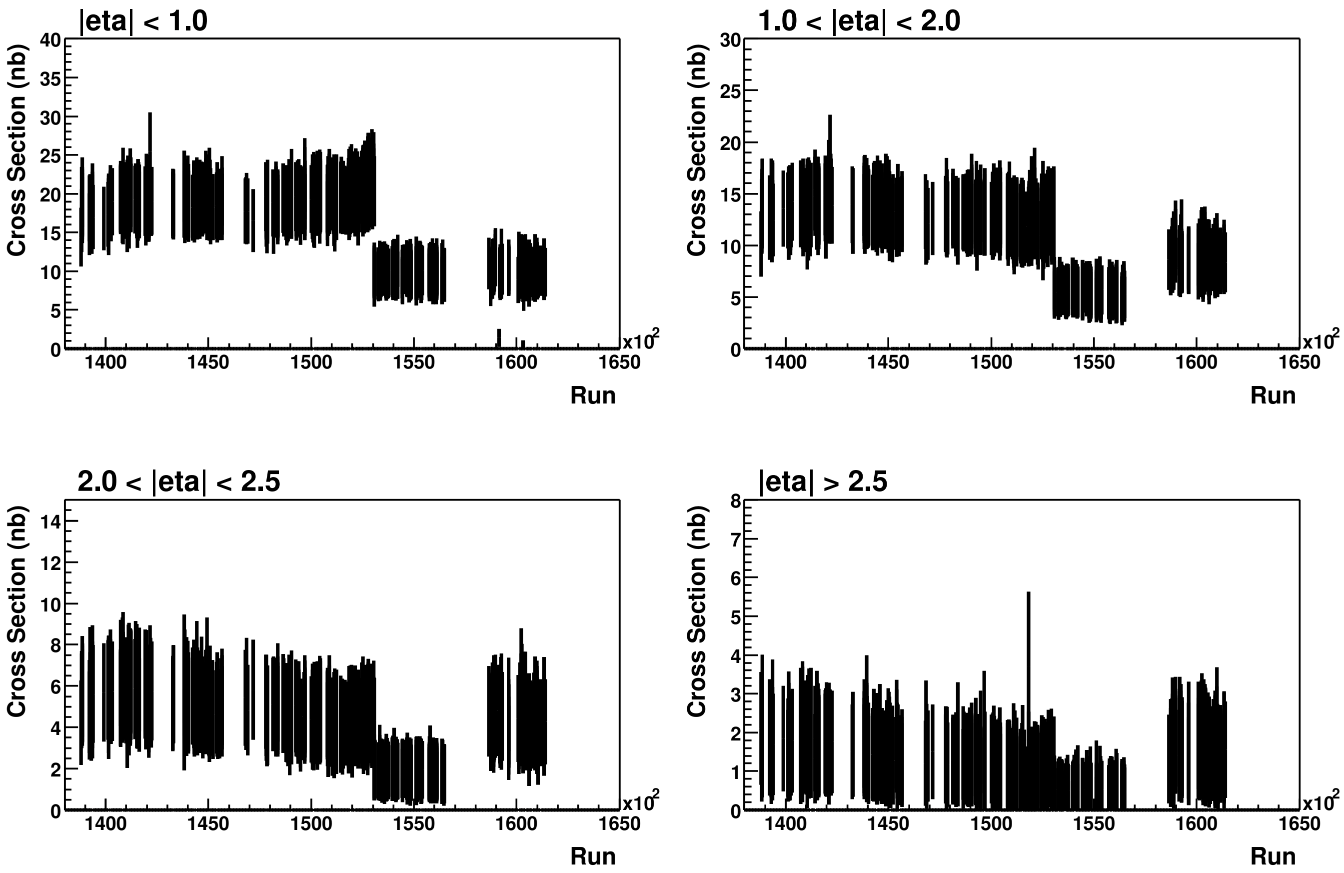
Added a new bin in the second η region.

Cross section in the central region looks stable



See the change in the prescale

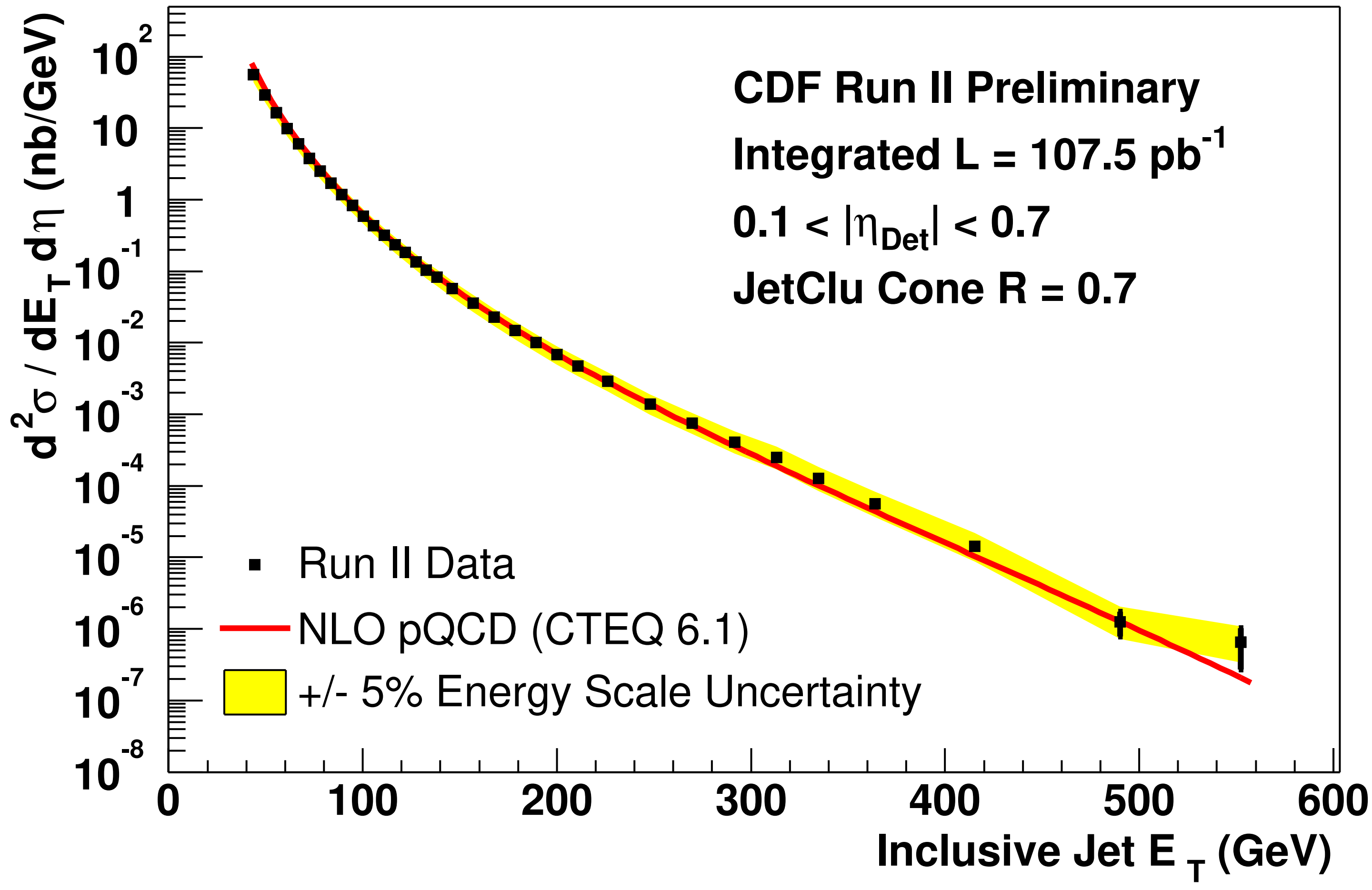
Few runs with lower cross section in the central region - I suspect problems with the ntuples...



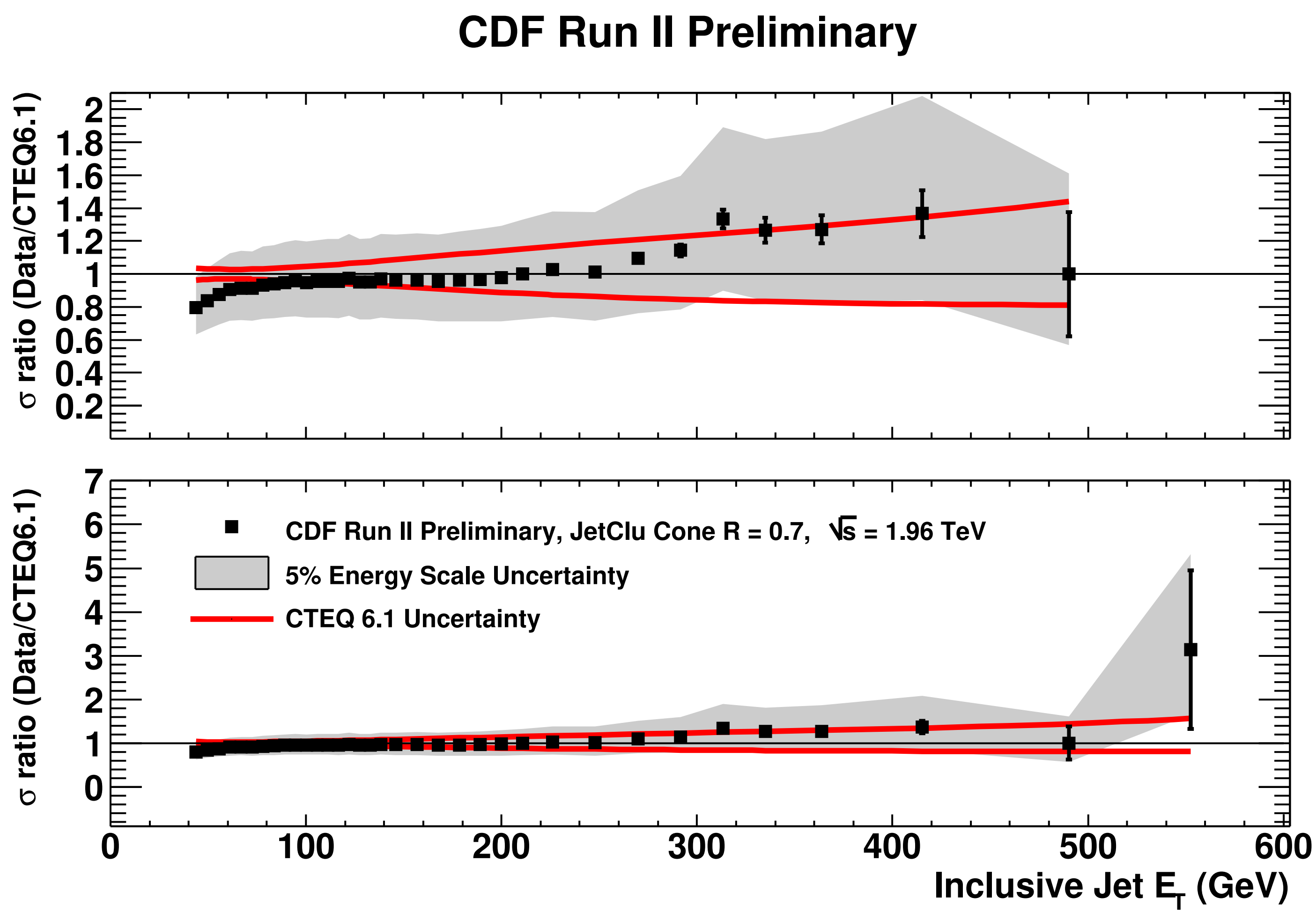
Response dropping in the forward region

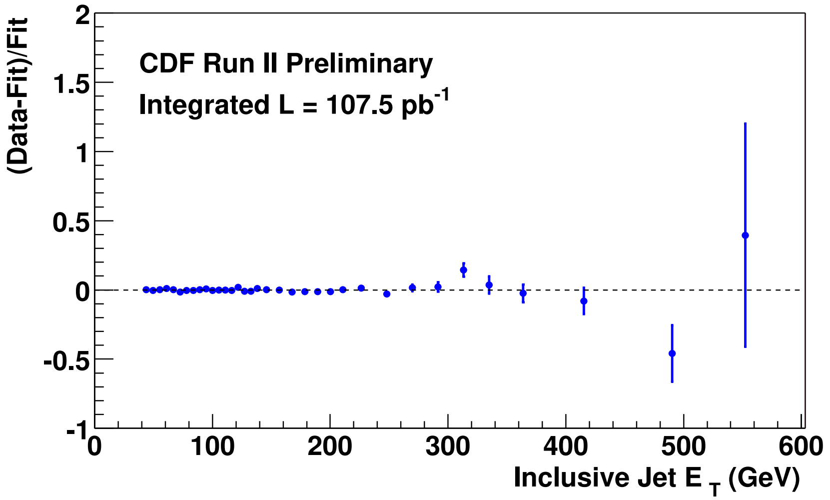
See the change in the gain after the shutdown

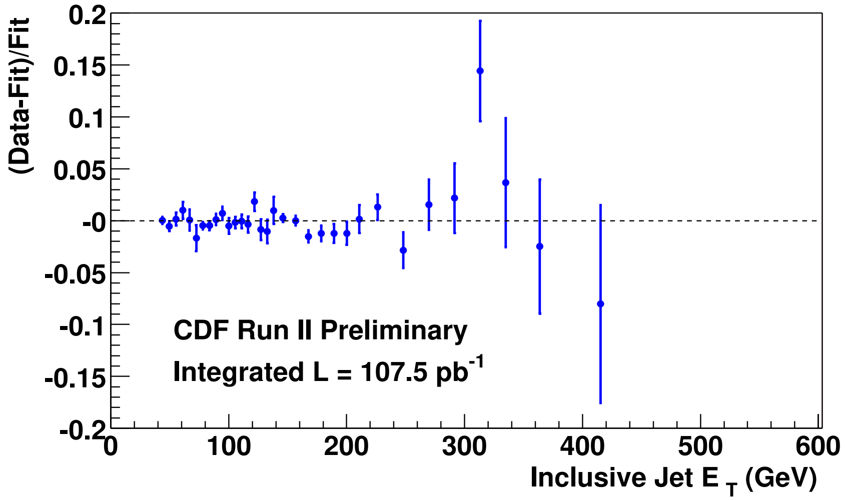
Almost looks like the change in the gain does not account for the prescale change...

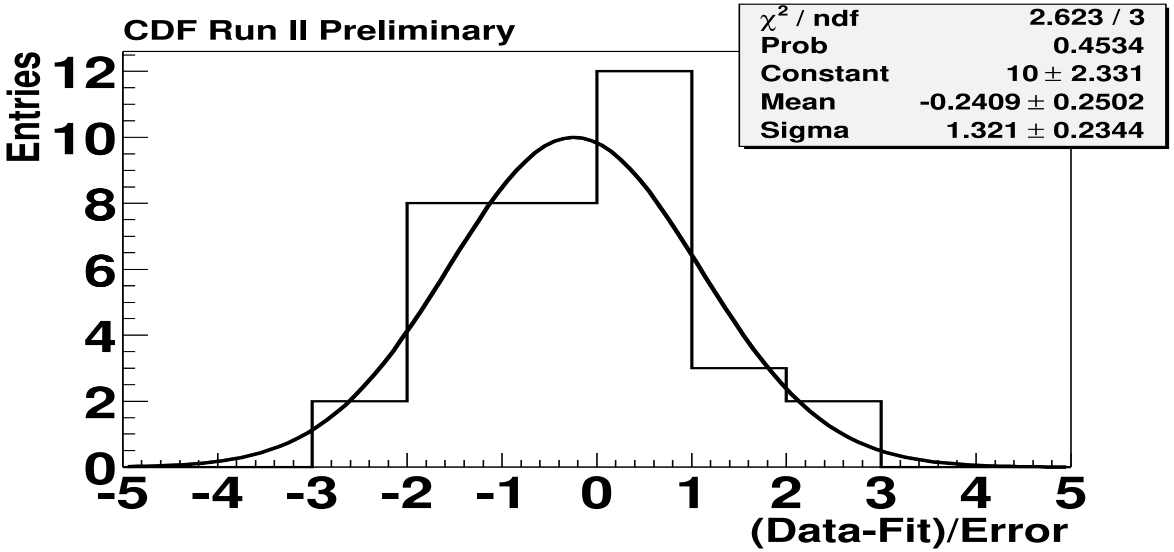


CDF Run II Preliminary
Integrated L = 107.5 pb^{-1}
0.1 < $|\eta_{Det}|$ < 0.7
JetClu Cone R = 0.7
Run II Data
NLO pQCD (CTEQ 6.1)
+/- 5% Energy Scale Uncertainty
$d^2\sigma / dE_T d\eta$ (nb/GeV)
Inclusive Jet E_T (GeV)
10^2
10
1
10^{-1}
10^{-2}
10^{-3}
10^{-4}
10^{-5}
10^{-6}
10^{-7}
10^{-8}
0
100
200
300
400
500
600


CDF Run II Preliminary
σ ratio (Data/CTEQ6.1)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
σ ratio (Data/CTEQ6.1)
7
6
5
4
3
2
1
0
CDF Run II Preliminary, JetClu Cone R = 0.7, √s = 1.96 TeV
5% Energy Scale Uncertainty
CTEQ 6.1 Uncertainty
0
100
200
300
400
500
600
Inclusive Jet E_T (GeV)

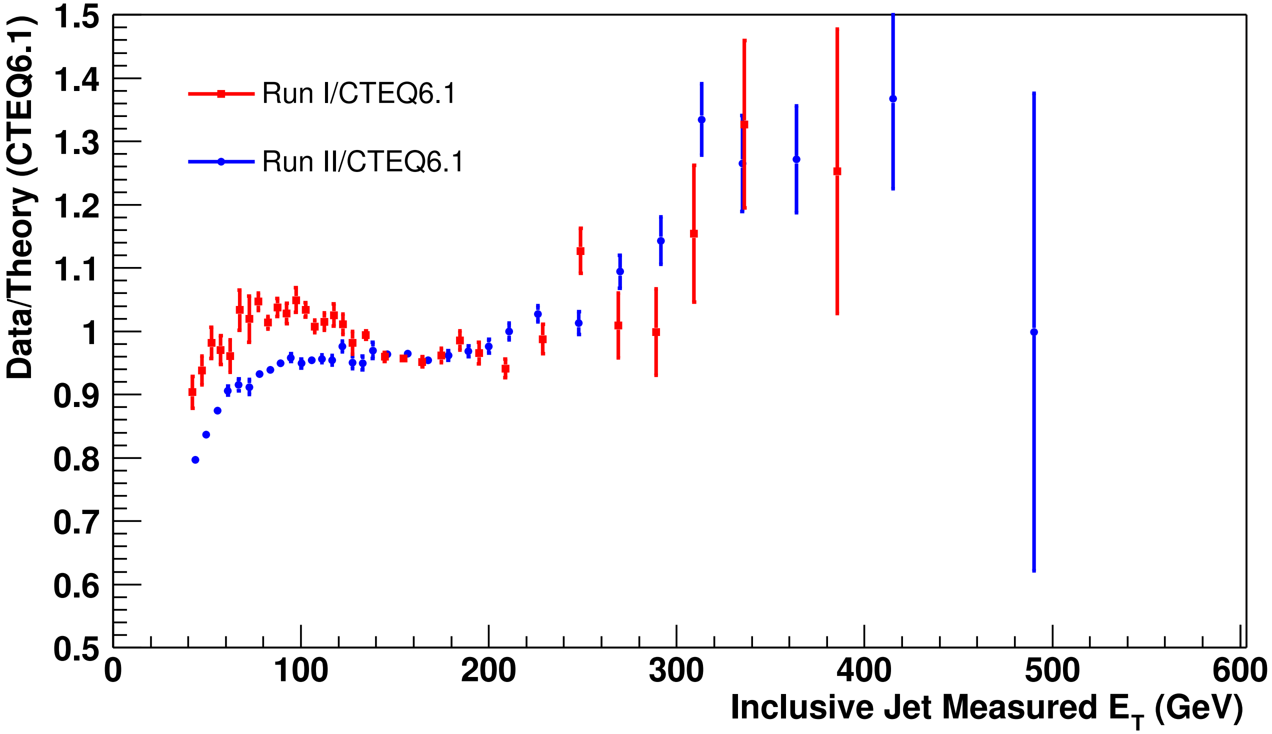

CDF Run II Preliminary
Integrated L = 107.5 pb^{-1}
(Data-Fit)/Fit
Inclusive Jet E $_T$ (GeV)


CDF Run II Preliminary
Integrated L = 107.5 pb^{-1}
(Data-Fit)/Fit
Inclusive Jet E $_T$ (GeV)

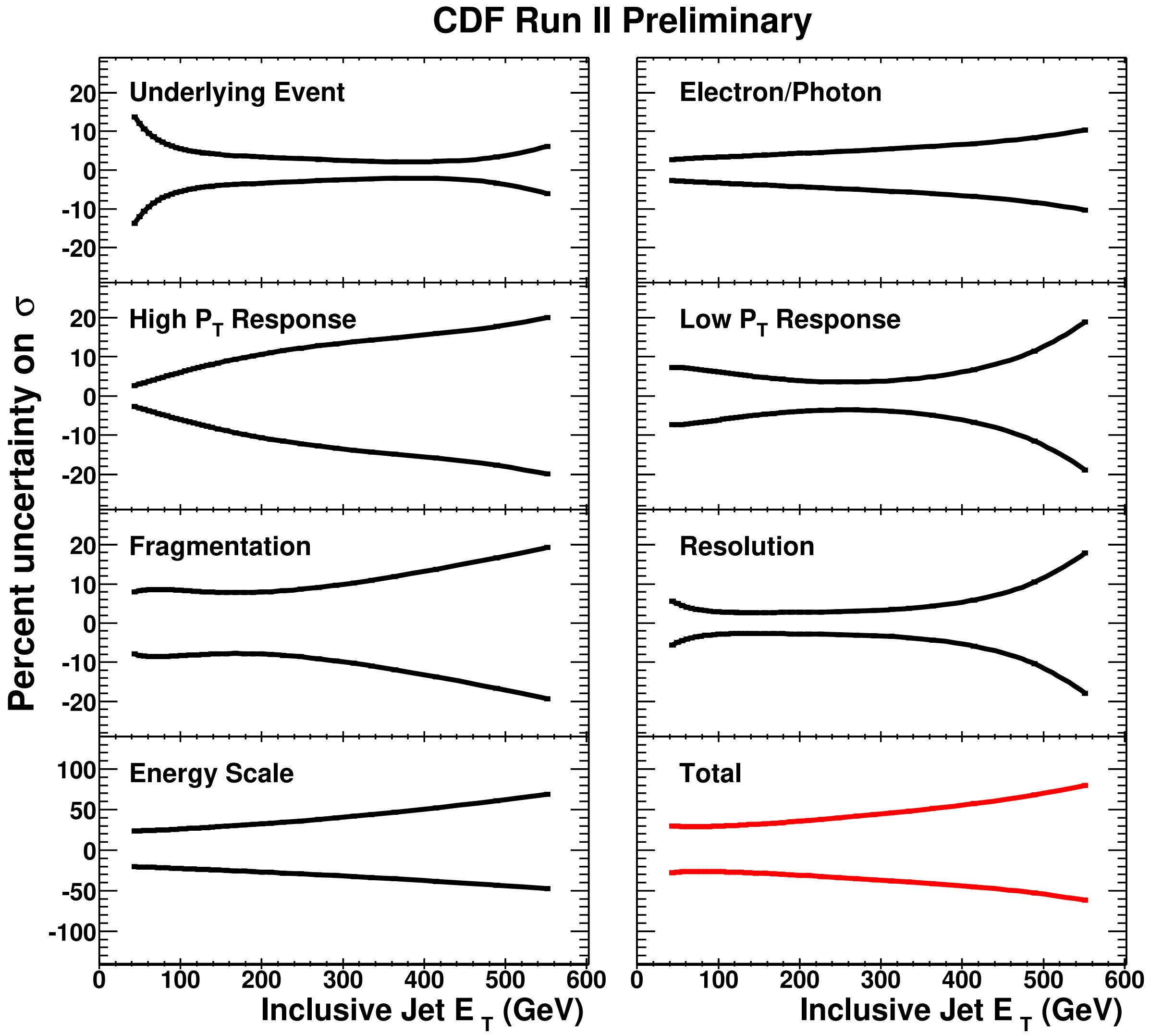

CDF Run II Preliminary
χ^2 / ndf 2.623 / 3
Prob 0.4534
Constant 10 ± 2.331
Mean -0.2409 ± 0.2502
Sigma 1.321 ± 0.2344
Entries
(Data-Fit)/Error

Speculation:

The larger statistical error at low E_T allowed a good fit. With increased statistics we can better resolve the shape.



Need to understand correlated systematic errors to see how free the shape is allowed to change.



The underlying event systematic has a shape at low E_T that can lead to the observed deficiency.

What do we want to show for summer conferences?

Inclusive Jet Cross Section

→ more data
→ better understanding of energy scale?

Even if we do not have a better understanding of the energy scale we should present updated results with more data (otherwise people will not want to fund our experments...)

For publication need to validate the unsmearing procedure and demonstrate that the technique is valid for Run II conditions

Comparisons to Monte Carlo

Angular Distributions

Differential Dijet

→ Uses E_T distribution in central region, uses same unsmearing as for the central measurement

→ Uses only the position measurement of the second jet

More ambitious...

Forward Inclusive Jet Cross Sections
Cross Section Ratios

→ These require a better understanding of the forward region

→ Develop unsmearing in the forward region,

→ For ratio measurement unsmearing is not needed.

→ Develop tools and understanding that can be used for other high profile analysis (top, higgs...)

Results with different jet algorithms

→ Midpoint - unsmearing was developed for JetClu...

→ KtClus - noisy hadron collider environment...