Measurement of the Inclusive Jet Cross Section using the K_T algorithm

Re-blessing talk

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Why a re-blessing?

- After discussions with the Godparent committee, the first draft of the PRD is basically ready to be sent to the collaboration.
- We made very small (minor) changes in the analysis.

we are here to formally re-bless the results

Updates

- ✓ Include some runs (~4 pb^{-1}) excluded previously
- ✓ Recalculate the pile-up corrections with more statistics
- ✓ Fit the systematic uncertainties with smooth functions to avoid statistical fluctuations
- ✓ Correlations on systematic uncertainties
- ✓ Updated results for D=0.5 and D=1.0 with $1fb^{-1}$

Updates (I)

✓ Include some runs (~4 pb^{-1}) excluded previously

- [155368,155742] -> Cross Section dropped of about ~40%

We found the drop was related to trigger information problems.

0.99 fb^{-1} → 1 fb^{-1}

✓ Recalculate the pile-up corrections with the complete 1 fb^{-1} sample

- Same method than in the PRL results (note 7576)

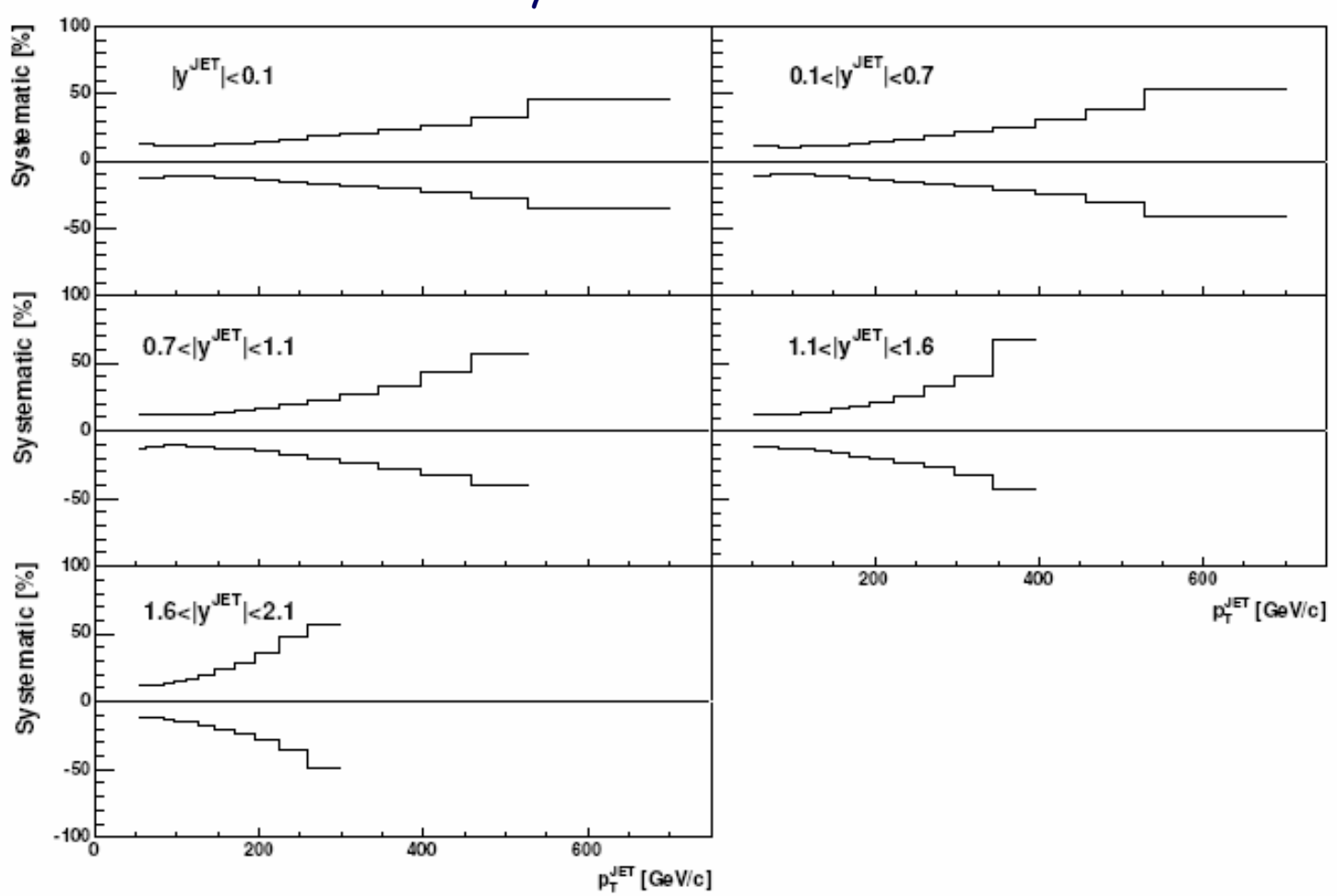
- The new pile-up correction numbers are compatible with previous ones but the error are smaller because we have increased the statistics at high luminosity:

PRD numbers	Note 7576 & 8134
D=0.7: 1.86 +/- 0.23 GeV/c	D=0.7: 1.62 +0.7/- 0.46 GeV/c
D=0.5: 1.18 +/- 0.12 GeV/c	D=0.5: 1.06 +0.35/-0.24 GeV/c
D=1.0: 3.31 +/- 0.47 GeV/c	D=1.0: 2.84 +1.42/-0.47 GeV/c

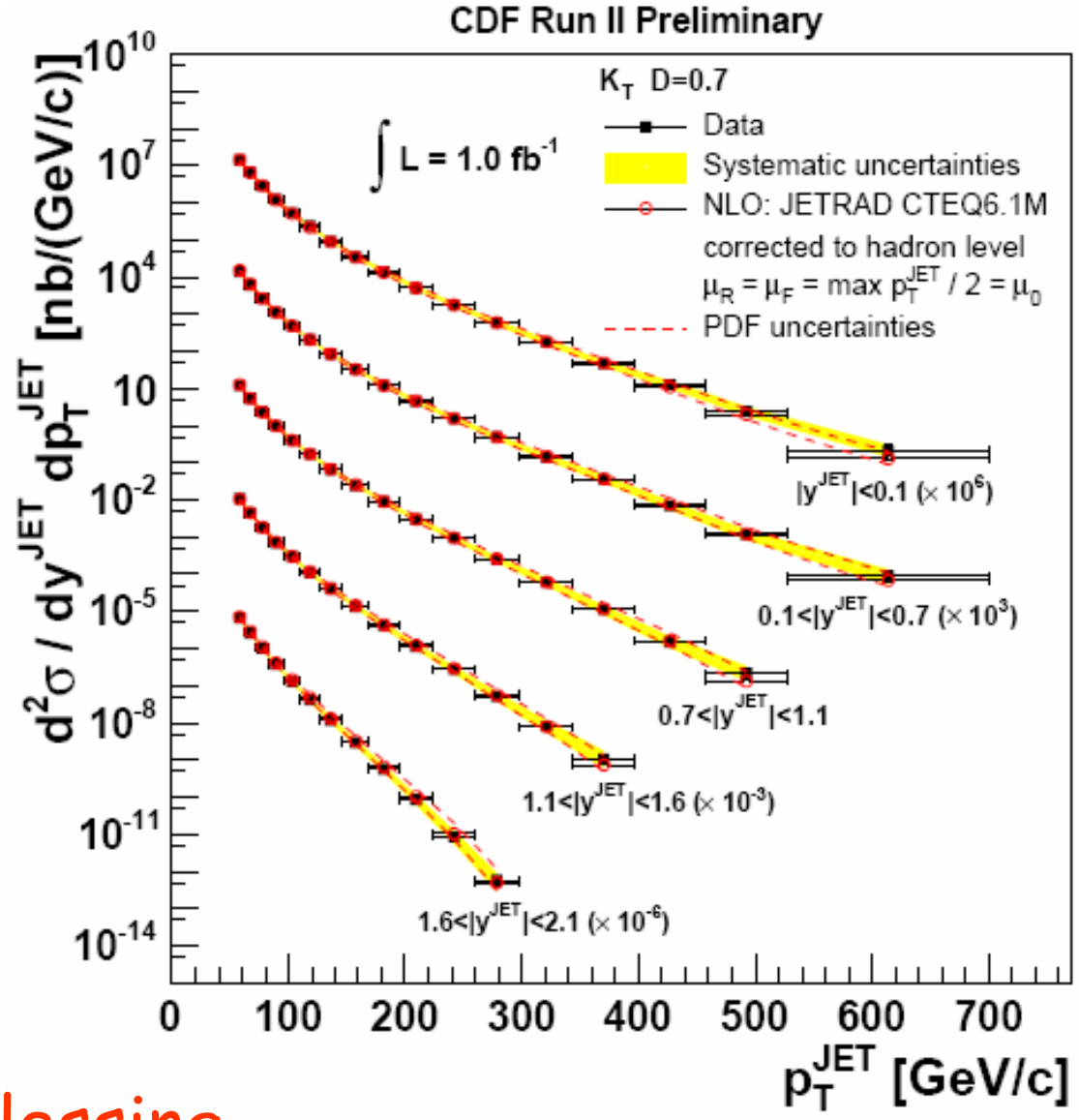
Update (II): Fit the systematics

✓ All the systematic uncertainties have been fitted by smooth functions to remove statistical fluctuations.

Total systematic uncertainties



Results (I): Cross sections with D=0.7



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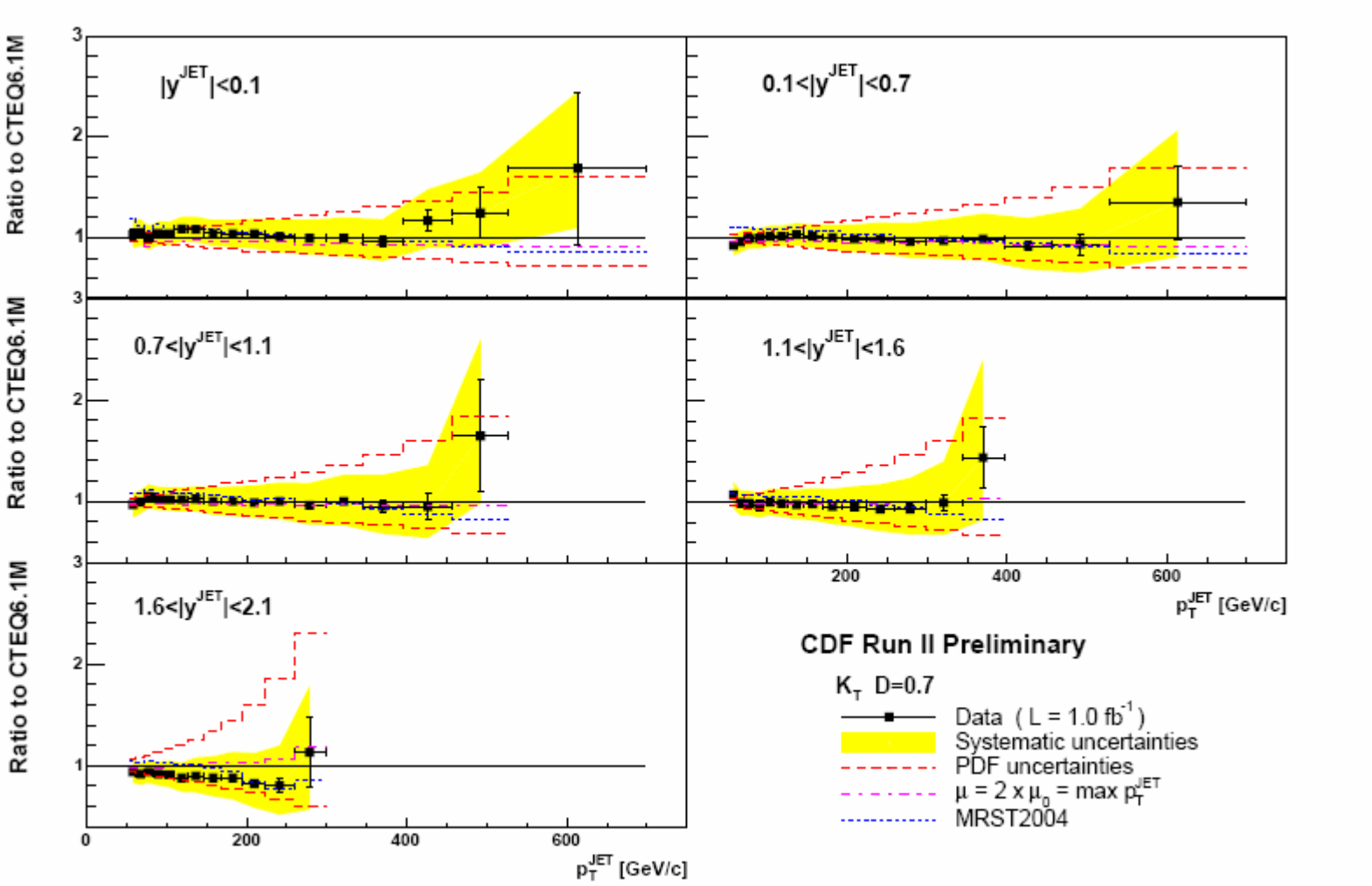
Results (II) : Data/NLO



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Correlations on syst. uncertainties

✓ Correlations among systematic uncertainties in different Y and pt jet bins are considered (help for the future use of the data)

✓ An appendix in the PRD includes the decomposition of the absolute JES uncertainty (according to A. Bhatti *et al.*, hep-ex/0510047, "Determination of the Jet Energy Scale at the Collider Detector at Fermilab")

→ 1.82% on the JES independent of p_T^{jet} coming from:

± 0.5% uncertainty from calorimeter stability

± 1.0% uncertainty due to the modeling of the jet fragmentation

± 0.5% uncertainty from simulation of the EM calorimeter response

± 1.3% uncertainty from simulation of the calorimeter at the boundary

→ Description of the calorimeter response to hadrons:

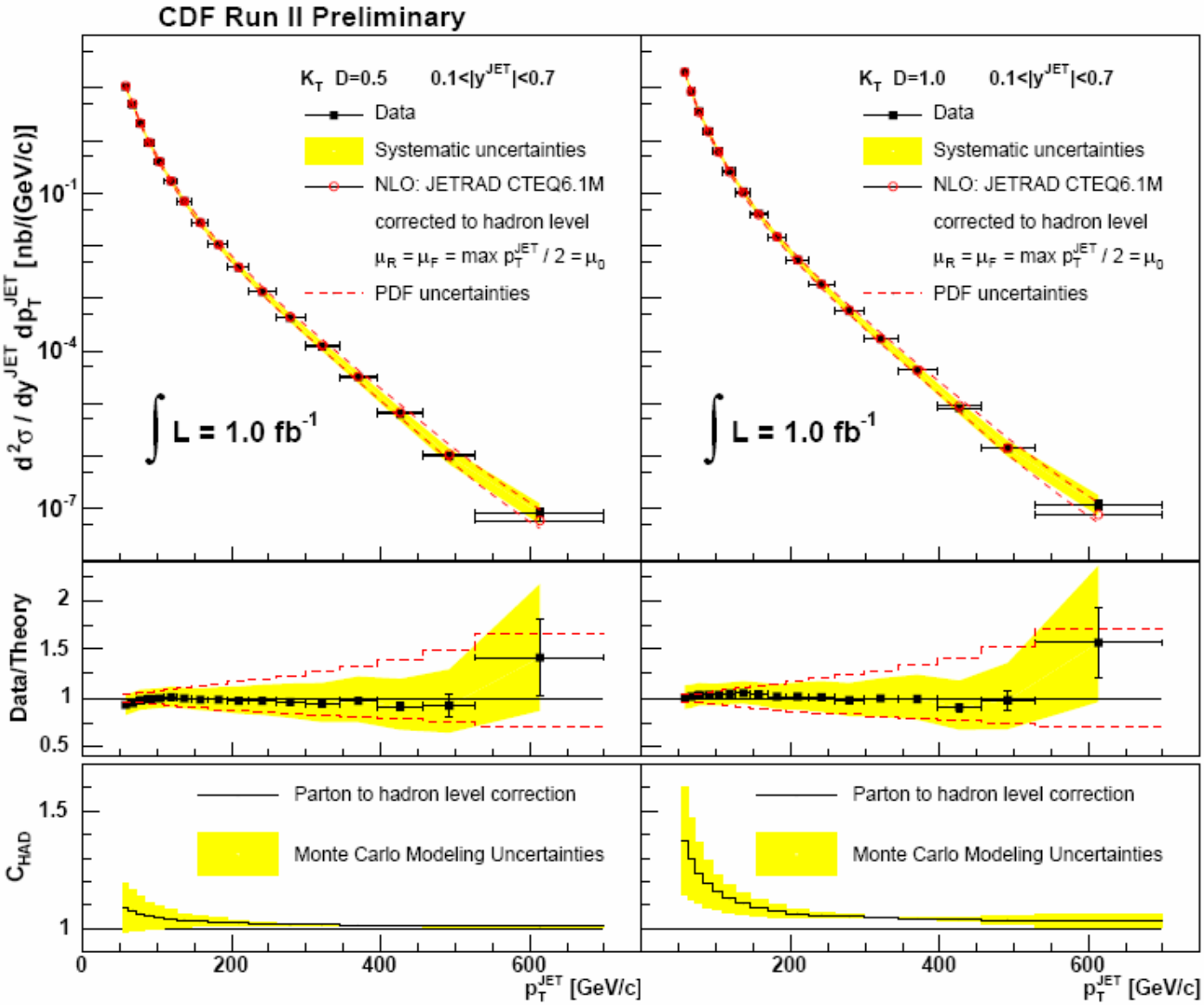
Hadron p range (Gev/c)	Uncertainty on e/p (%) ***	JES uncertainty (lowest pt jet) (%)	JES uncertainty (highest pt jet) (%)
p<12	1.5	~ 0.76	~ 0.11
12<p<20	2.5	~ 0.30	~ 0.35
P>20	3.5	~ 0.27	~ 2.0

*** extracted from hep-ex/0510047

$$d_{ij} = \min(P^2_{T,i}, P^2_{T,j}) \frac{\Delta R^2}{D^2}$$

Results (IV) : CS vs D

$0.1 < |y^{Jet}| < 0.7$



- ✓ Measurement based on 1 fb^{-1}
- ✓ Same analysis method than for central jets with D=0.7
- ✓ Same results than those with 385 pb^{-1}

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