# Status of Jet Corrections

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Top Group 12/ 5/ 2002

- Calorimeter E−scale fixed (mostly)
- Jet Energy scale off from run I by 4.4%
- Dijet mass cross section verifies the 4.4% is needed to agree with runI sigma.
- Have developed a method to correct for the plug gain changes.
- Work on underlying event and $N_{vertices}$ in good shape

To do:

- Fix WHA E−scale
- Compare MC with data to understand if corrections in MC are the same as in data.
- Reevaluate absolute jet correction (long range)

# What we have in V4.9.1

Code has been installed (see Beate Heinemann, Jet Corr. Meet. 10/16/02)

- CHA shift +4% (SCL) corrected in offline for runs <152400
- CEM run dependent correction (SCL) in offline (from Larry Nodulman)
- CHA tower−tower corrections (LER) from Anant's muon analysis

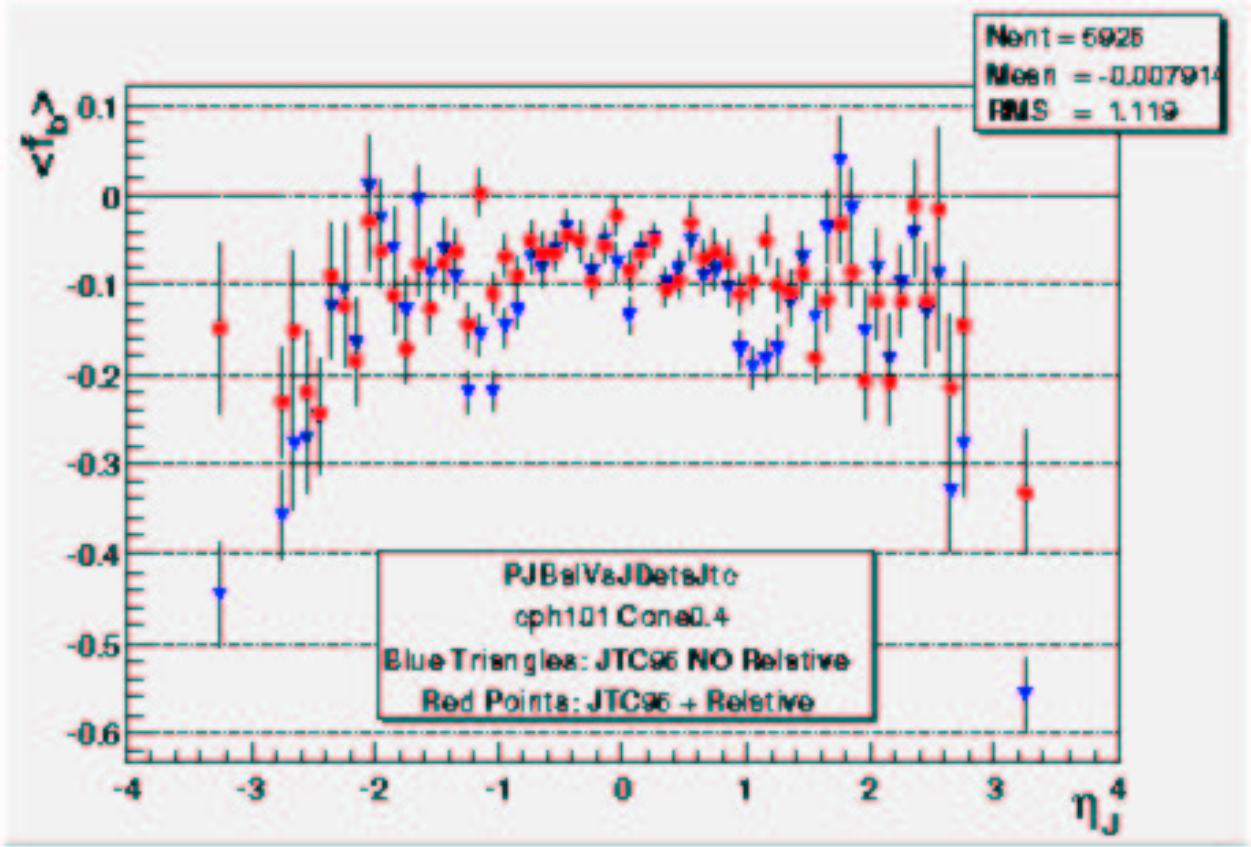
Still needed, long range:

- WHA SCL from muon studies in CMX comparing with run I
- WHA LER's using IMU trigger data, also stability
- PEM SCL using electrons and Z−−> e+e− (need PPR studies as well)
- PHA stability and E−scale

# Jets from gam−jet events

Gam−jet balance (Giuseppe Latino):

- Apply Run I absolute Corrections
- Use Anwar's relative corrections




Expect f_b flat = 0

Find:

|η| < 2 6−8% off

|η|> 2 10−30% off

WE NEED TO FIX THIS

# Jet Energy shift from Run I

- If $<P_T^J(RunI)> = K_J \cdot <P_T^J(RunII)>$

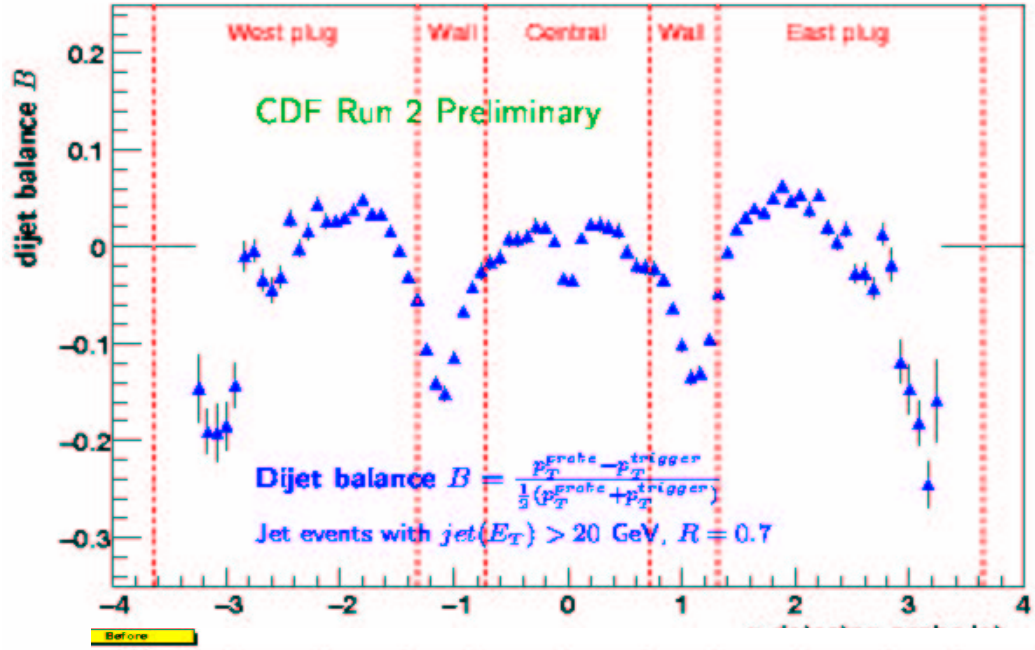
$$\Rightarrow K_J \sim \frac{<f_b^{RunI}>+1}{<f_b^{RunII}>+1}$$

| $R_{cone}$ | RAW Jets $K_J$ | CORRECTED Jets $K_J$ |
|---|---|---|
| 0.4 | $1.0514 \pm 0.0072$ | $1.0462 \pm 0.0061$ |
| 0.7 | $1.0417 \pm 0.0053$ | $1.0441 \pm 0.0050$ |
| 1.0 | $1.0498 \pm 0.0046$ | $1.0513 \pm 0.0046$ |

⇒ The RunI-RunII Jet Energy Scale Difference for RAW and JTC96 Corrected Jets Now Looks to be ~ The Same....

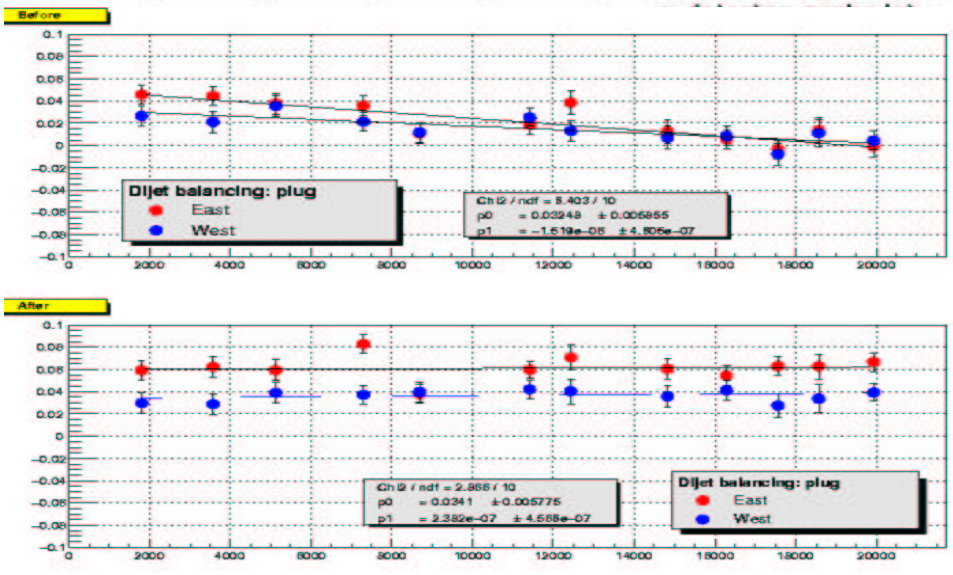
# Correction for plug gain variations

- Plug E−scale studies, using di−jet balance (Currat, Lys, Galtieri)




Data from Feb. 4/02 to June 02

Eta Detector



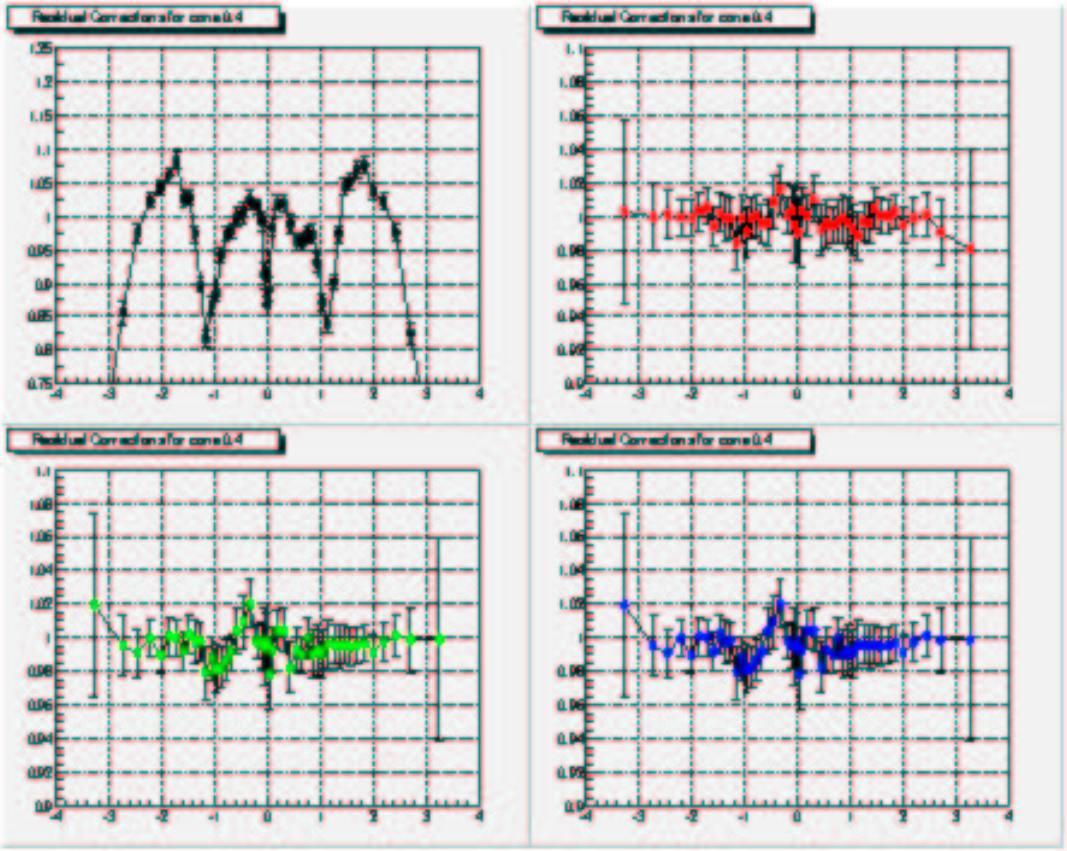

Eta >1.8
Use laser data to get time dependence.
Corrections flattens out the distributions.

Delivered luminosity

# Relative correction (Anwar)

## $P_T$ and Run Dependent Corrections Jet 20

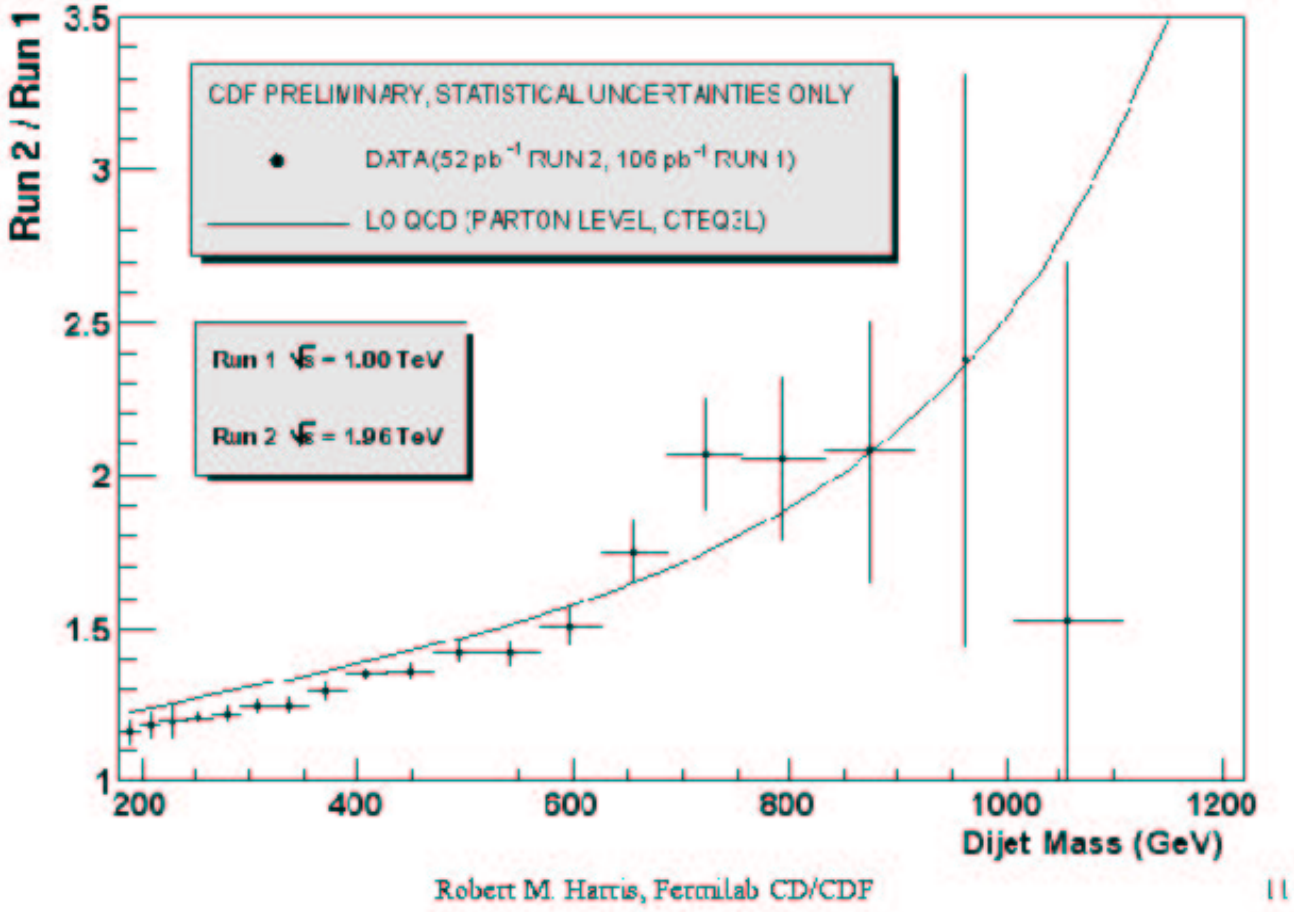
$P_T$ mismatch after NO, generic Jet20, Pt dependent, time dependent corrections



Jet 20 data from Feb-June 2002 (gjet01), cone size R=0.4

# Dijet Mass cross section

- Jet energy corrected by 4.4%. Good agreement with expected cross section



# What next?

Plan:

- Use the 1.0044 (R dependent) jet energy "fudge factor".
- Provide relative correction and a systematic error.
- Continue with studies to understand "fudge factor"

detector is different (more material), need MC study.

- Start work on absolute correction, it may explain some of the 4.4%.

# Short range program: present activities

Calorimeter E_scale

Determine WHA E−scale shift (Hyunsoo Kim)

Jet E Scale

Understand −4.5% shift in gam−jet balance (after CHA correction)

Loss of low PT signal? (Robin) not likely

WHA? (Hyunsoo Kim) not much in central, stay away from large eta

More material in Run II? (Giuseppe , EM fraction)

Corrections in Central

N vertices in event (Jean−Francois Arguin, Beate): algorithm being tested

Study underlying event. (Mario, Jean Francois). It agrees with run I.

Implement new N_int correction.

Relative correction to Central Calorimeter

Get Corrections from di−jet balance using V4.9.1 (CEM, CHA fixes): AB

Stay away from WHA, i.e., restrict eta in central to <0.8

Find time dependence of plug calorimeters response (Charles Currat et al.)

# Short range program(cont.)

WHA E−scale fix: why is it needed?

- Comparison of data and Monte Carlo in the 30D crack showed large disagreement.
- WHA is very close to the crack, likely to influence the jet energy there.
- The 10% total shift for CHA is likely to be also present for the WHA.
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Monte Carlo:

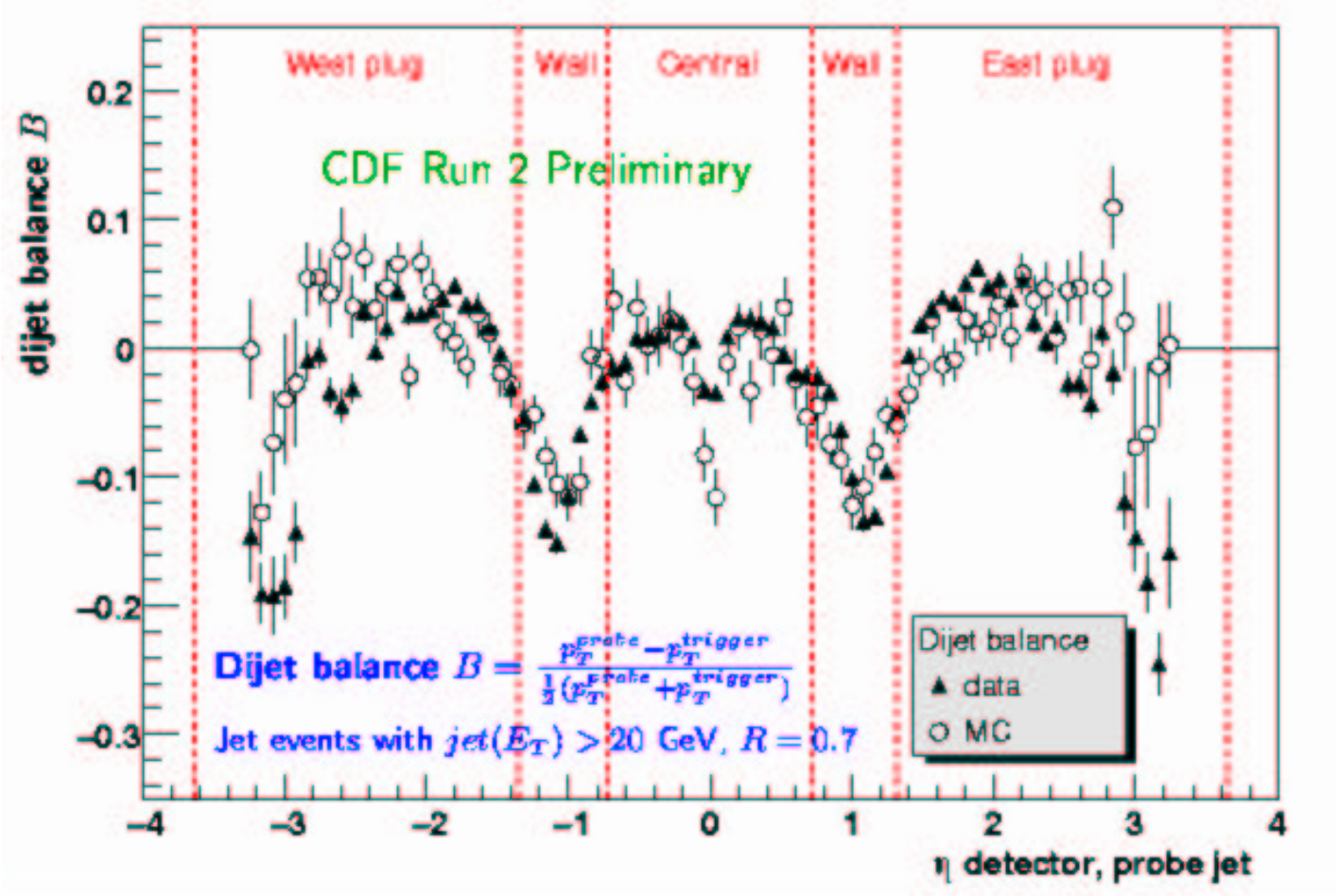
- We need to check that corrections in data and Monte Carlo are the same.
- For Monte Carlo time dependence of plug gains is zero, so relative corrections at time zero should apply.

Systematic uncertainty :

- Propose to quote a flat value, non energy dependent. Guess 10%.

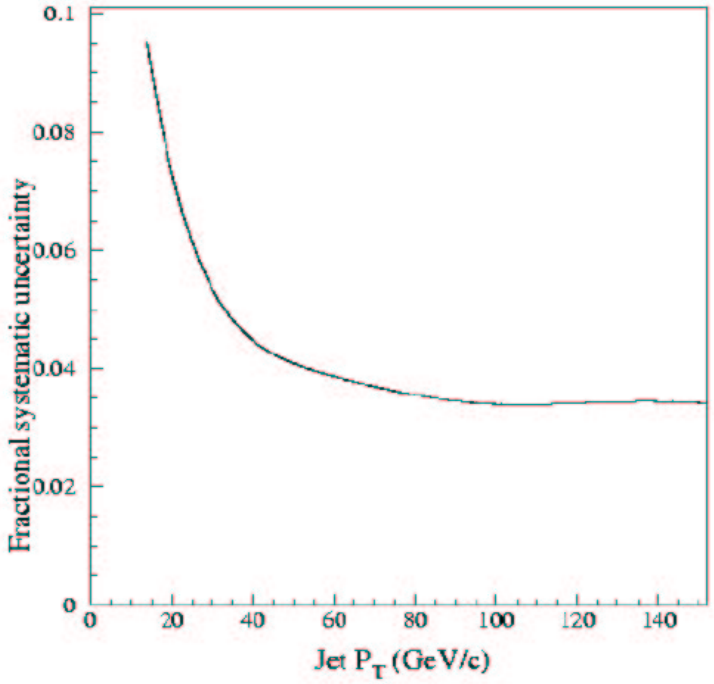
# Comparison of data and MC

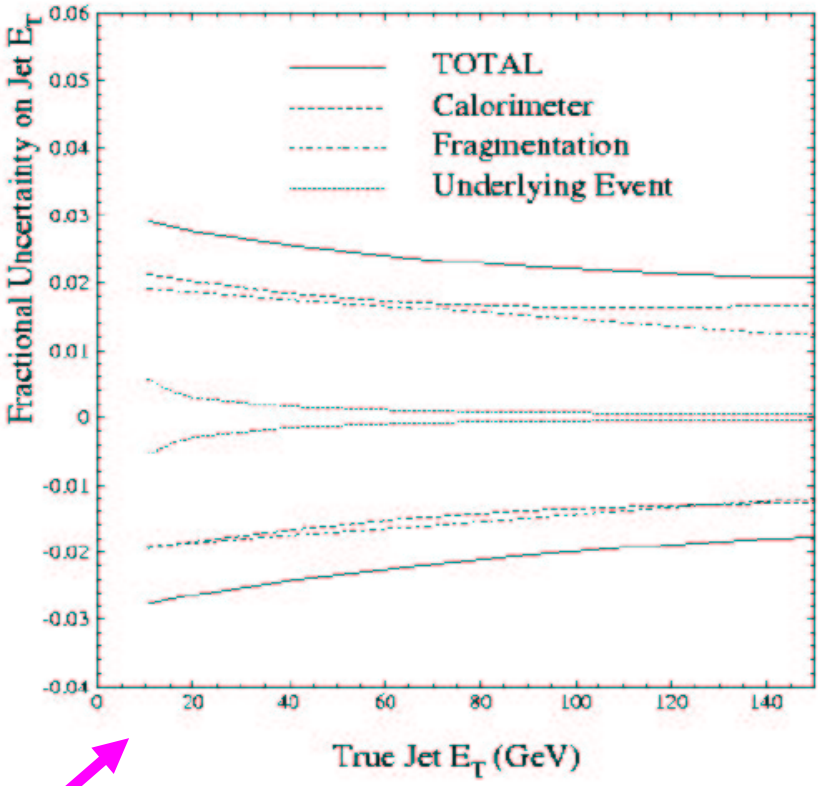
- Need to check if corrections for MC are the same as for data.




3 Million events being generated (we had 600K above. Charles Currat)

# Where do we need to go? Systematics on jets for top mass




Major systematics from jets (cone=.4)

| | |
|---|---|
| Calorimeter stability | 1% |
| Absolute corr. ( +UE) : | 2.5% |
| Relative correction | 0.2%, 4% in cracks |
| UEM (UE from mul. int.) | 100 MeV/vertex |
| OOCC (exp to 55, >55) | 6−1.4% |

Need new numbers for Run 2 ?????