Status of JES (p13 data and MC)

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Status and problems with

- Offset
- Response
- Showering

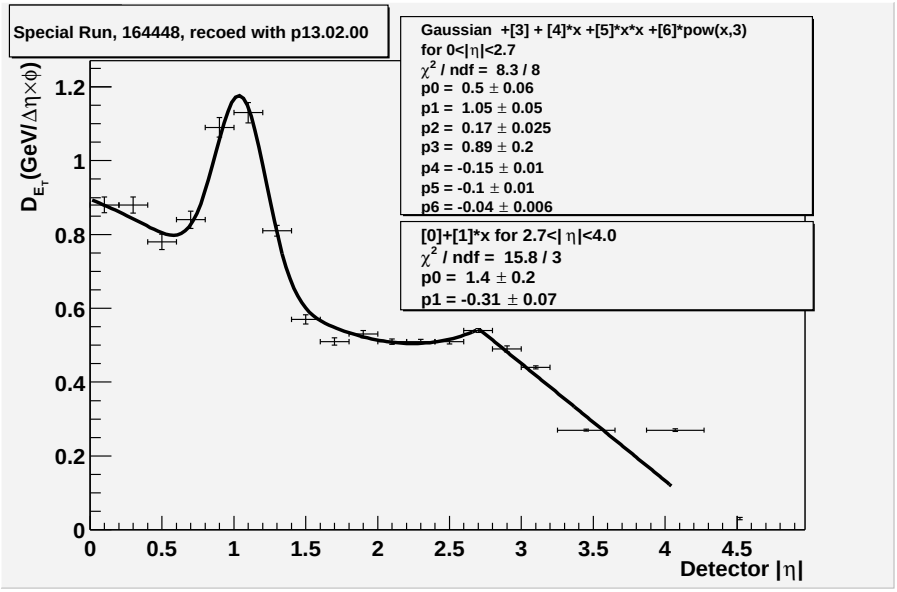
Offset

-Comes from: electronics and Uranium noise, pile-up, additional ppbar interactions, underlying events

- Usually measured using Zero-bias and Min-bias data

- Currently derived using Min-bias data only

$$\mathcal{D}_{E_T} = \frac{\sum_{All\phi} E_T(\eta)}{2\pi \times \omega_\eta \times N_{events}}$$



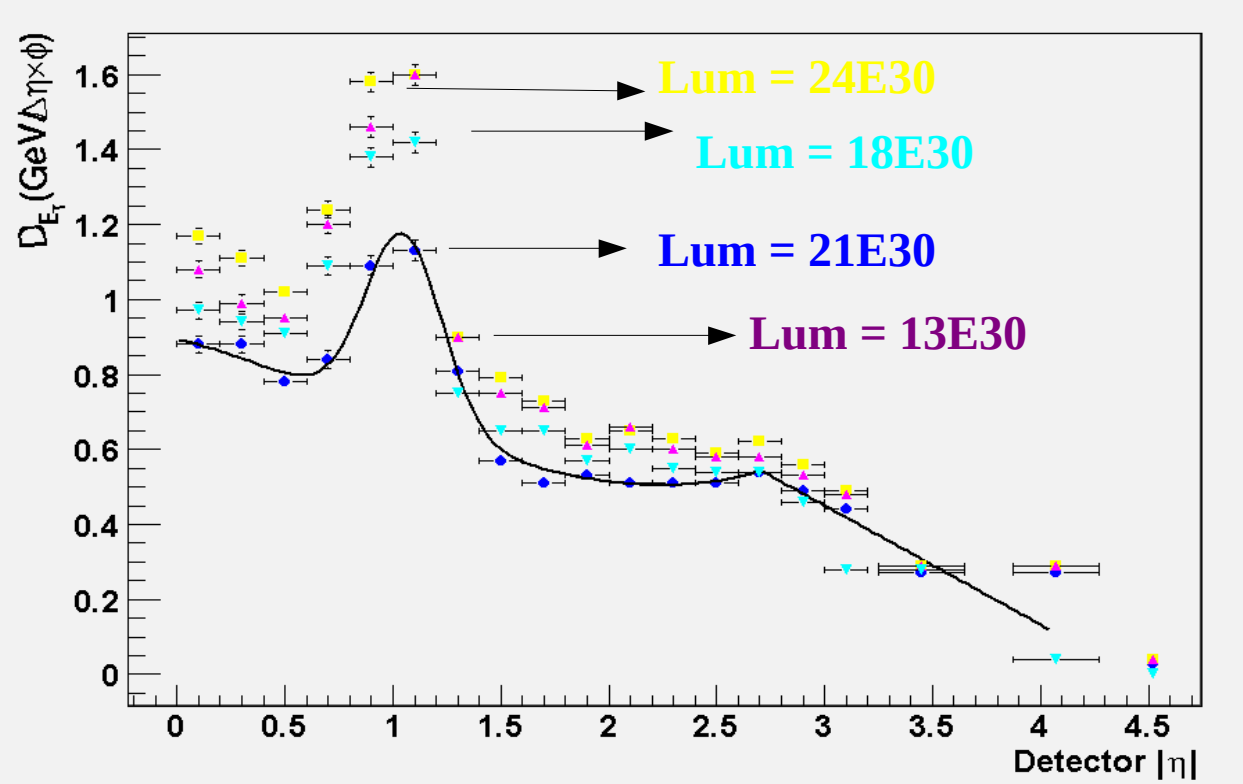
L=21E30/cm^2/s

Offset Size:

D_ET=0.85 GeV in CC, 0.5 GeV in EC, up to 1.2 GeV in ICR

Offset

MinBias runs taken at various luminosities



Data: No clear dependence on luminosity -- some higher luminosity runs have lower densities.

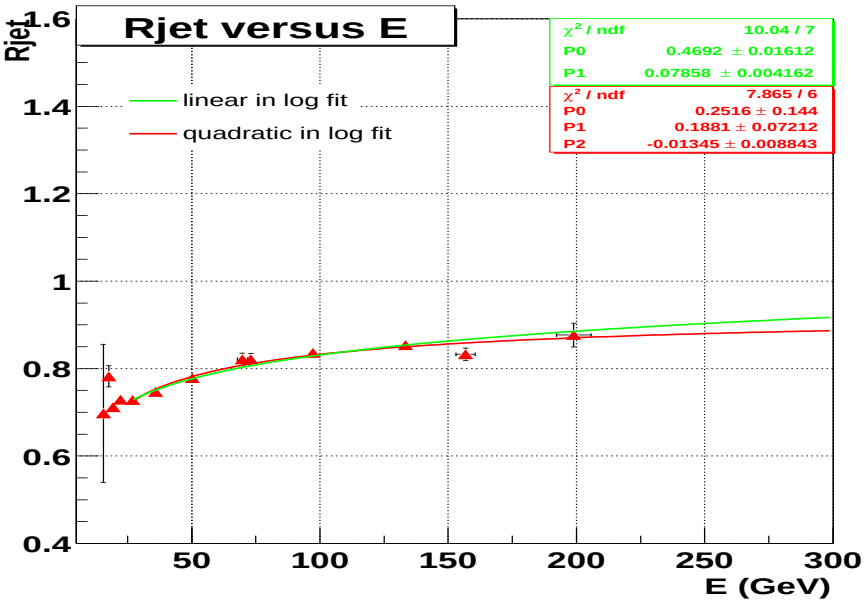
- runs affected by coherent noise?
- Non-uniform luminosity profile? luminosity within LBN can vary by a large factor and depends on tick number, as well as on FEB

MC: packing problem in p13.05/06 MC produces effective cut-off at low energies -- offset derived using MinBias MC can not be applied to high-pT processes -- *use instead data offset for MC samples as well*

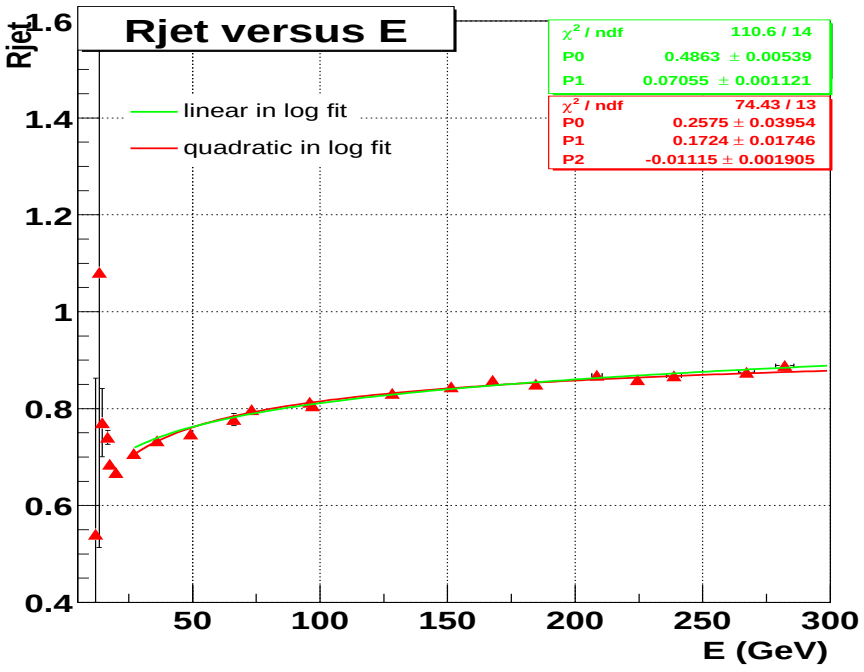
Assign 100% systematic errors for both -- data and MC

Response

- Use MPF method
- Need very clean data sample -- method relies on Missing ET measurement
- Use only good runs; discard events with at least one ``bad'' jet, or with a jet in ICR region



Data

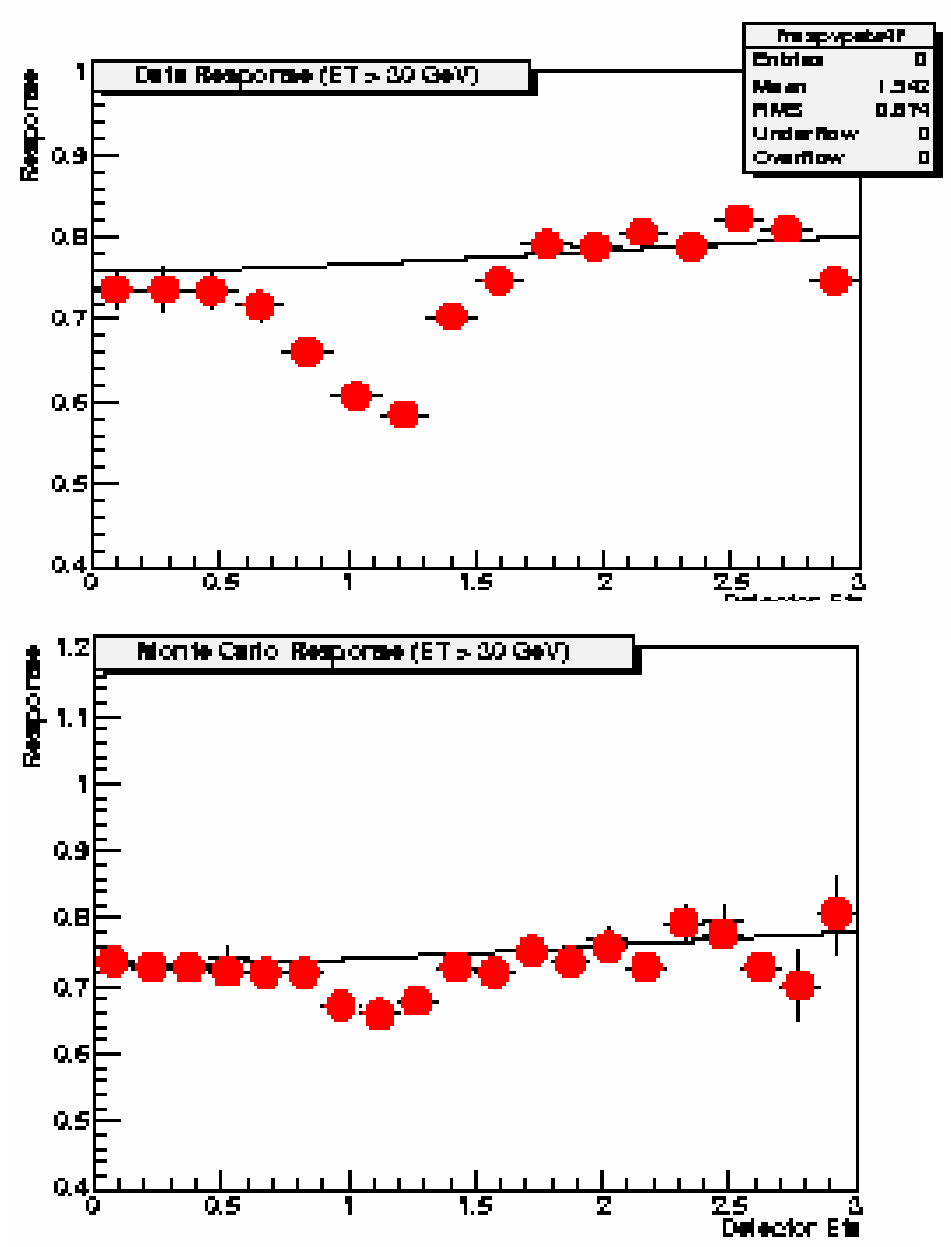


MC

MC and Data are closer than in any previous versions

Eta dependent corrections

- Response as a function of detector eta – nonuniformity of the detector in the ICR region

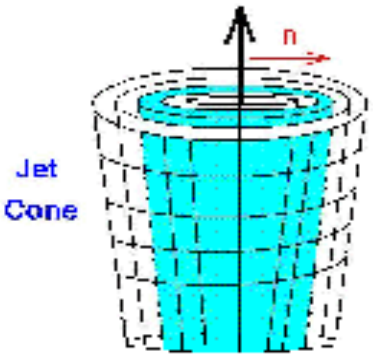


Bigger ``dip'' in the ICR reagon in data compared to MC
-- expect improvement in p14 with fixed weights in ICD

Showering

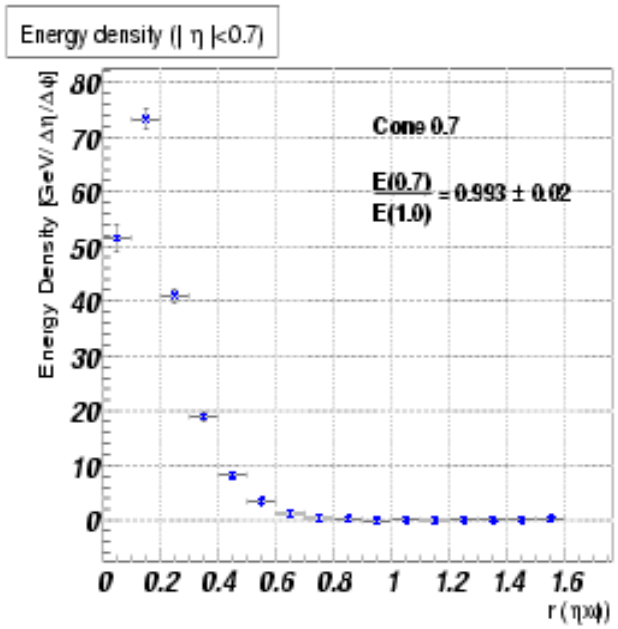
- Use photon+jets events;
- select clean sample by removing events with “bad” jets

- Method: measure energy densities in rings about jet axis



$$r = \sqrt{(\eta - \eta_0)^2 + (\phi - \phi_0)^2}$$

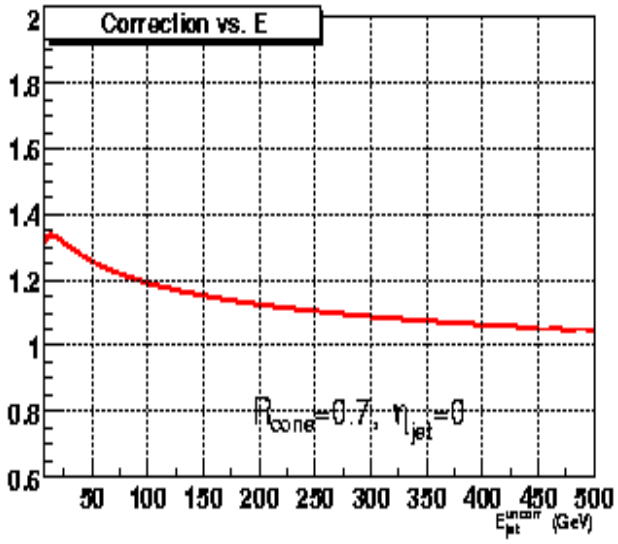
$$S_{cone} = \frac{E_{cone}}{E_{jetlimit}}$$

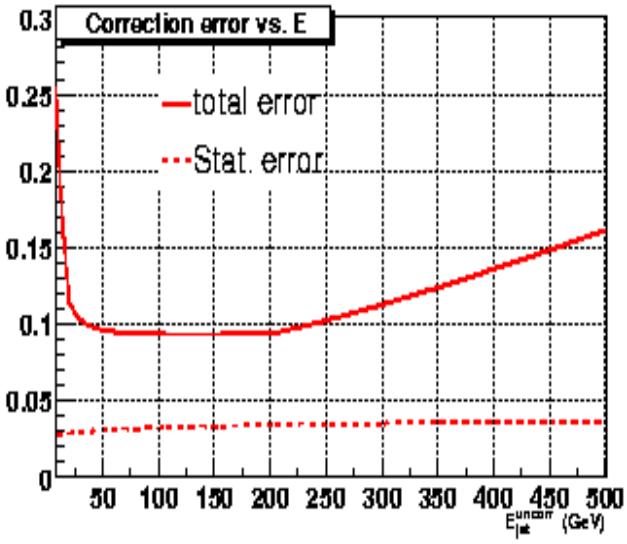


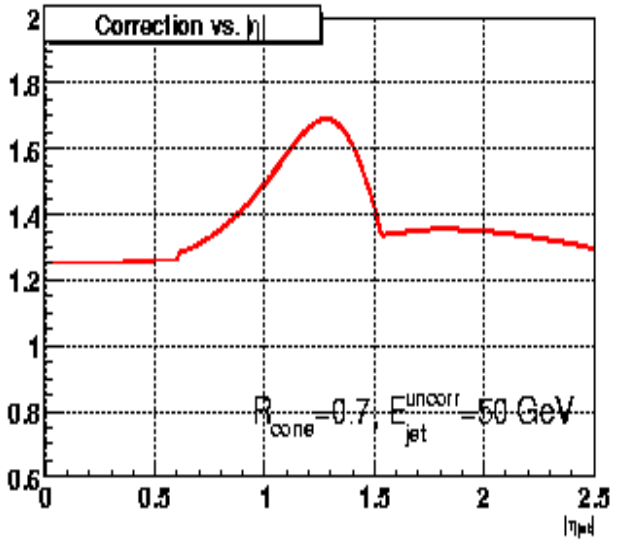
	$r = 0.7$	$r = 0.5$
Central	0.99	0.92
ICR	0.96	0.89
Forward	0.94	0.85

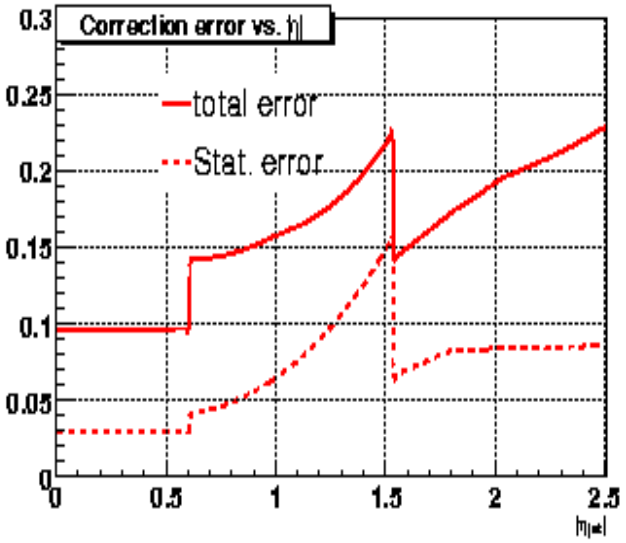
- 5 (20)% syst. error in Central (End) Calorimeter

Overall Correction in data

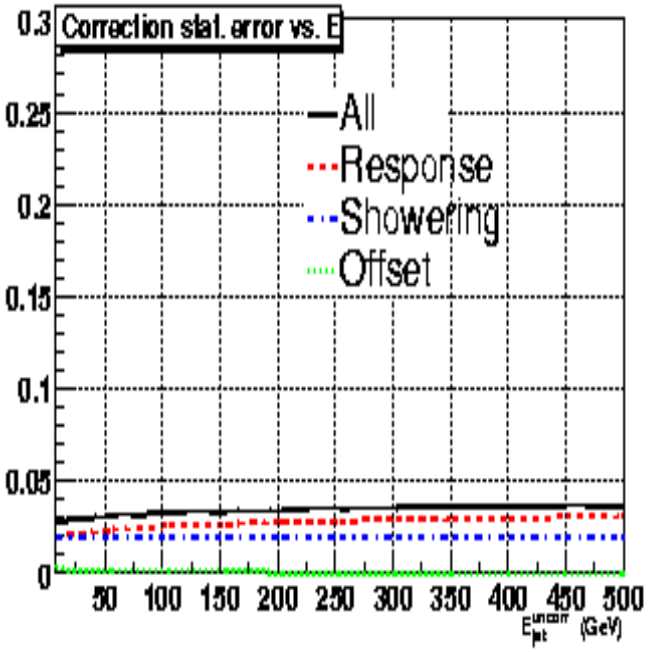


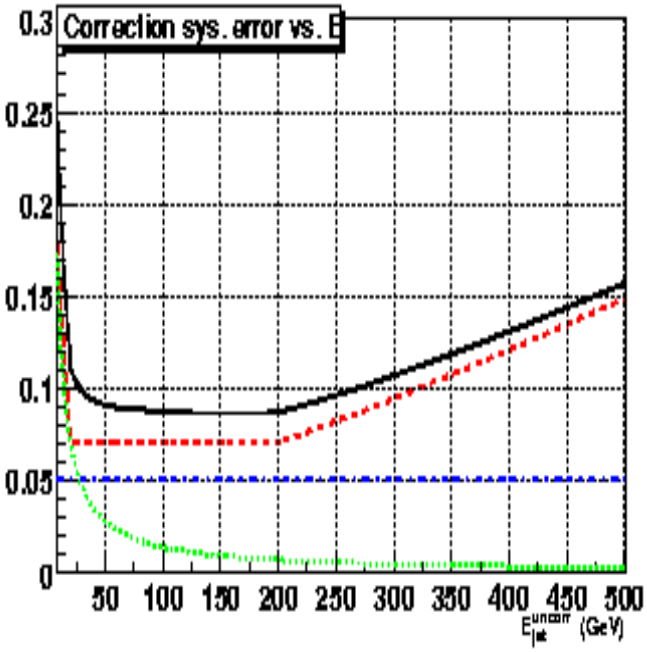






Error on Correction





- Error dominated by systematics
- at energies below~50GeV offset and low ET bias errors are dominant constribution

- at energies above 200 GeV dominant error comes from the response due to limited statistics of photon+jets events - more data and will allow to reduce; one can also constarint respnse fits with adequate MC o

Summary

- High quality calorimeter data is crucial to derive unbiased JES

- It is possible to select relatively clean samples for the purpose of JES measurement. However, it is important that calibration sample is good representative of physics data sets

- adequate MC is of an importance to reduce JES error due to offset, at low ET region, and constarin response fits at high energies

- Optimizing sampling weights for ICR detectors should alow more uniform response in eta, and thereby smaller JES error in this region