Di-Jet Resolution Meeting

January 15 2004

Status Report of Studies of H1 Algorithm

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- Reminder of Algorithm
- Some calibration
- Resolution
- Look at low P_T with Z^0 events

Combining Tracks and Calo Towers - H1 Algorithm

- Keep all good quality tracks
- Extrapolate tracks into calorimeter
- Search in a box ($\Delta\eta \pm 0.1$, $\Delta\phi \pm 0.2$) + nearest tower
- Sort towers wrt $\eta\phi$ distance to track
- Loop over towers:
  - Kill successive towers so that $\sum E_{\mathrm{Killed}} < E_{\mathrm{Track}}$
  - If $\sum E_{\mathrm{Calo}} > E_{\mathrm{Track}}$ rescale last tower such that $\sum E_{\mathrm{Killed}} = E_{\mathrm{Track}}$

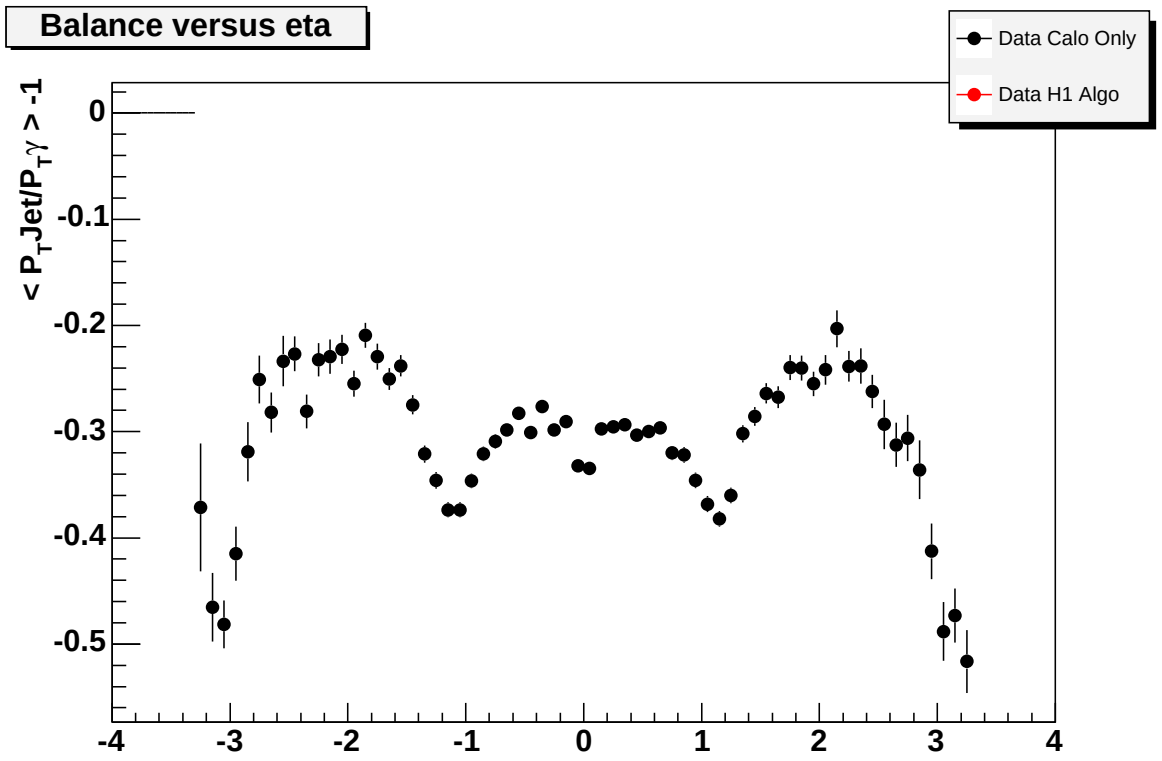
Algorthm avoids double counting when calo has perfect energy response

Energy of jets with high particle density will tend towards calo energy

Latest -apply η dependent calibraion on calo before algorithm and jets after

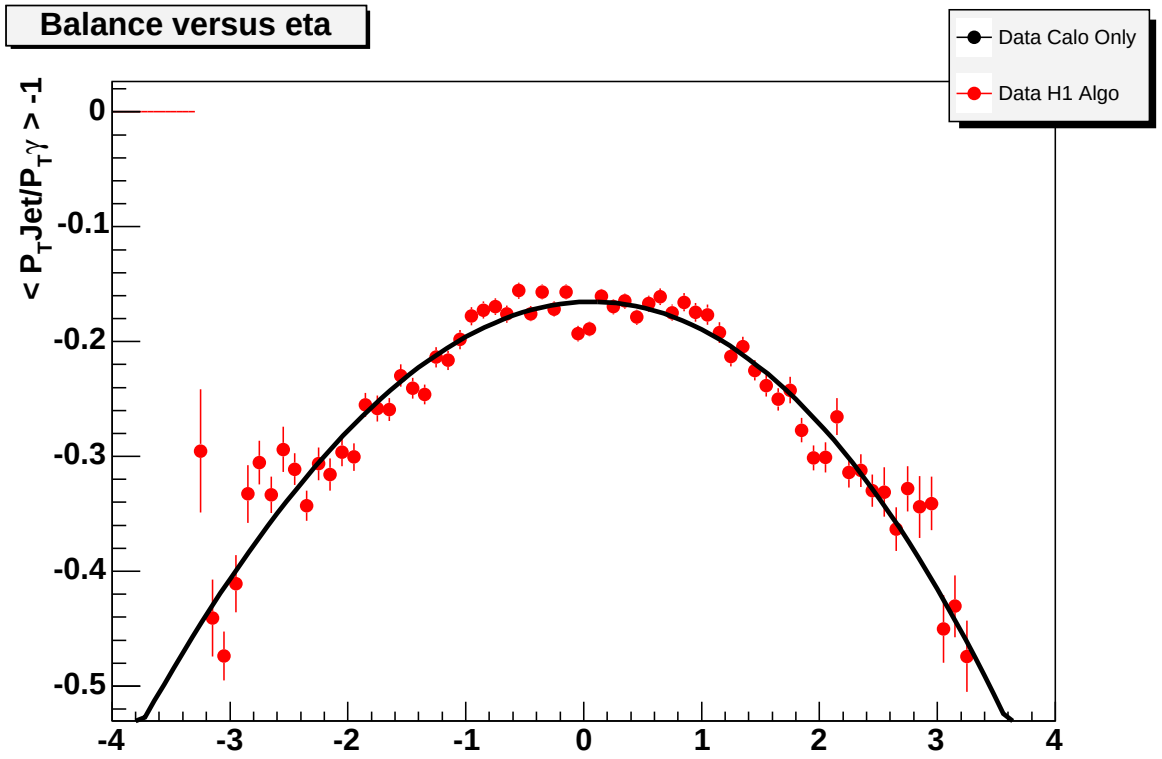
All results shown today for cone size= 1

η Dependent correction (on Calo before algorithm)



Apply usual η dependent correction on calo before running H1 algorithm.

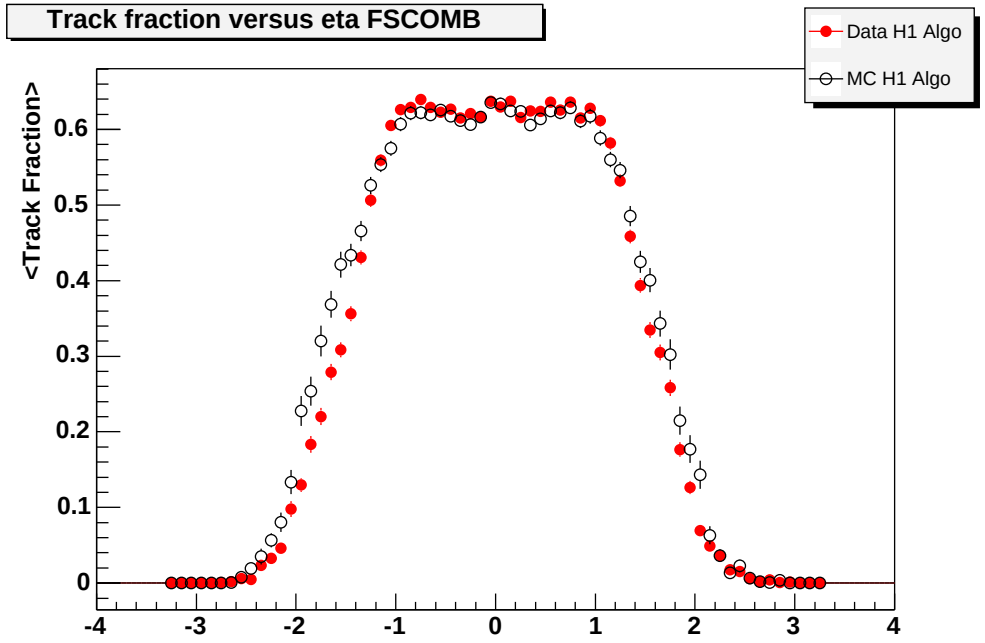
η Dependent correction (after algorithm)



Corrects mainly for tracking inefficiency.

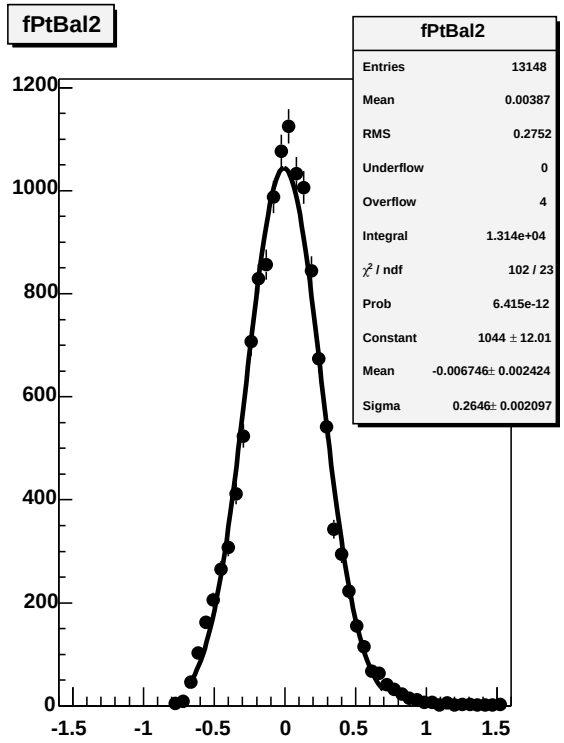
Not a great fit - needs improvement if used by default.

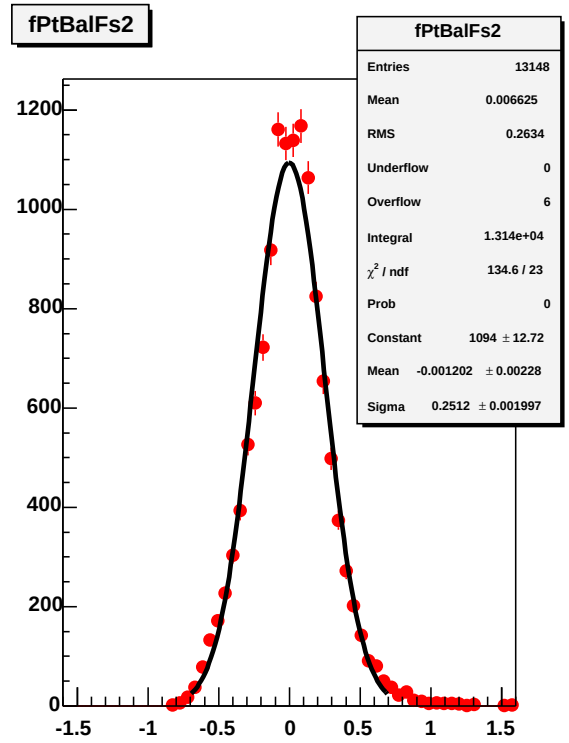
Track Fraction



Track fraction is close to expected charged pion ratio of 2/3

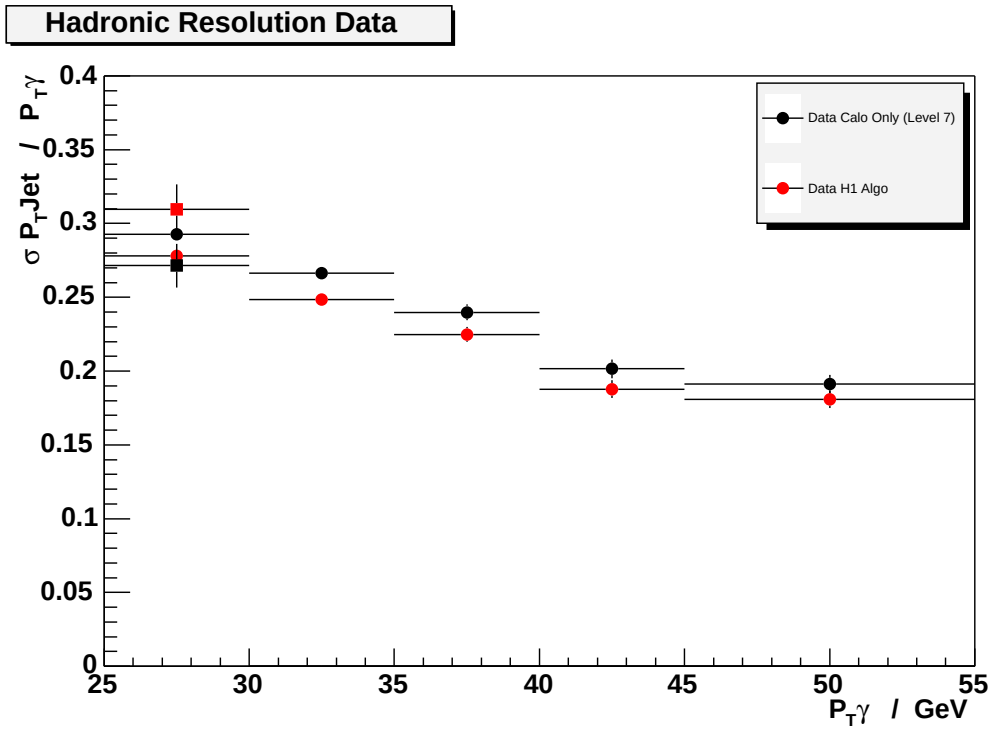
Resolution studies ($P_T > 25$ GeV)





H1 Algorithm gives modest improvements

Resolution studies



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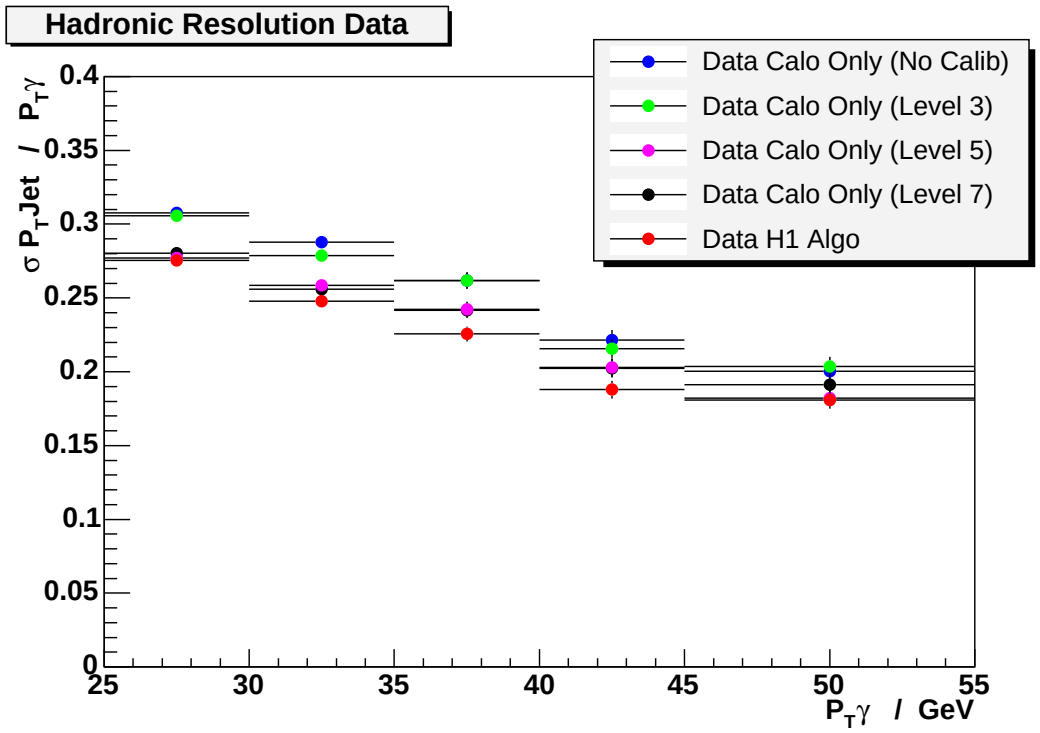
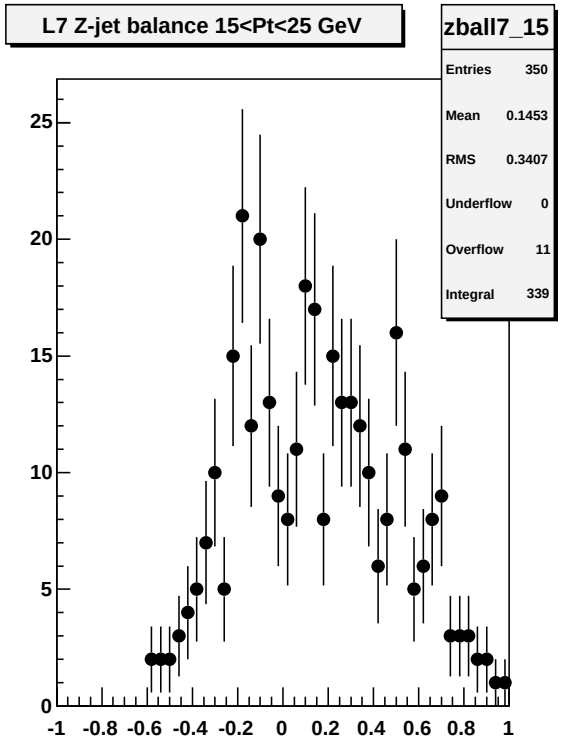
Resolution studies

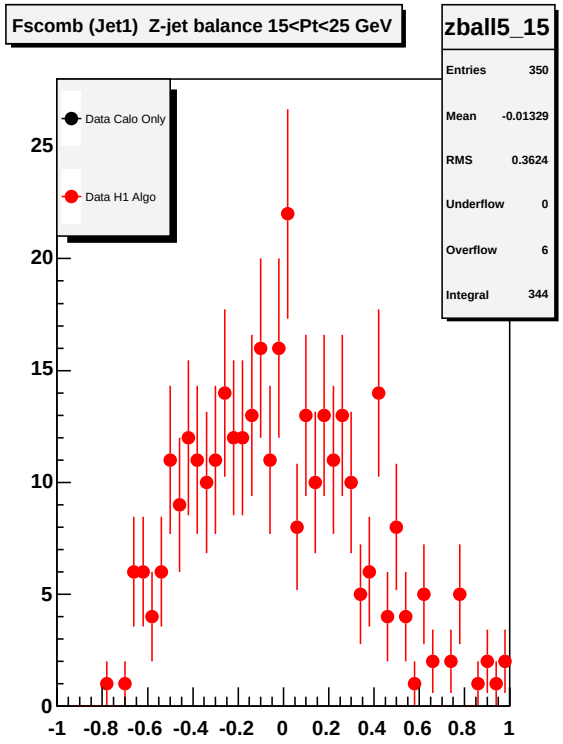


Calo only shows marked improvements after P_T dependent step

(Little P_T dependence for H1 algo so no improvements expected)

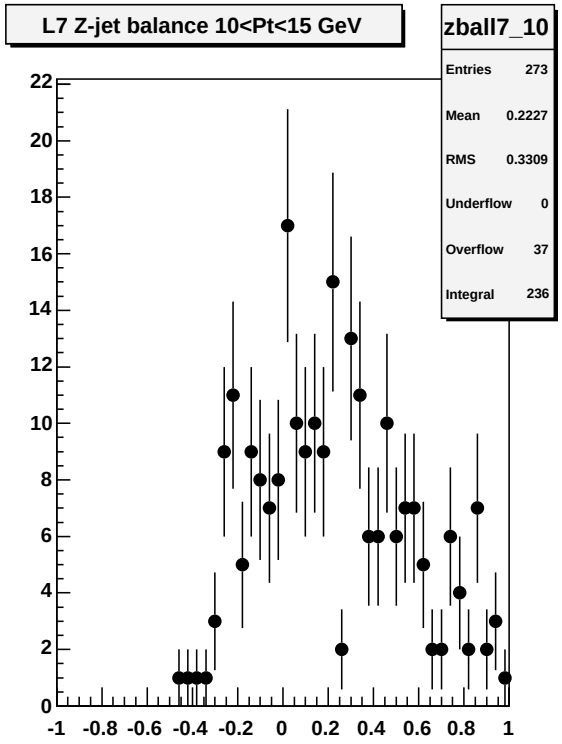
Low P_T from Z^0

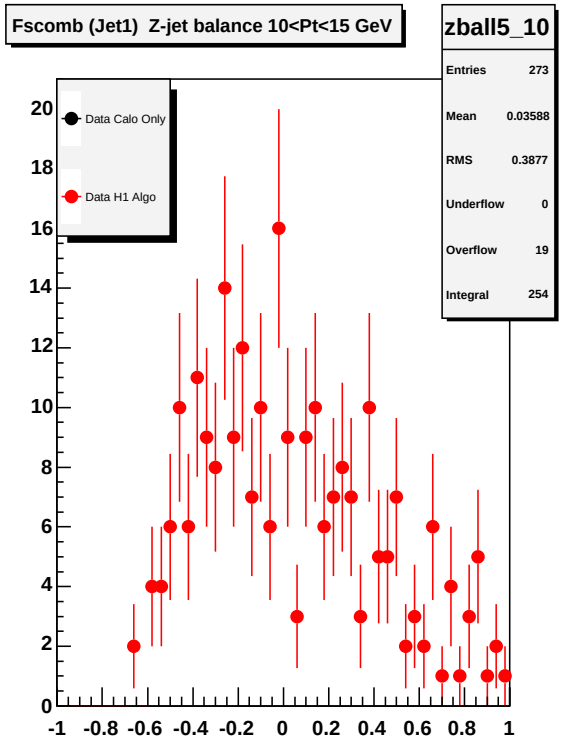




No obvious improvements from H1 Algorthm

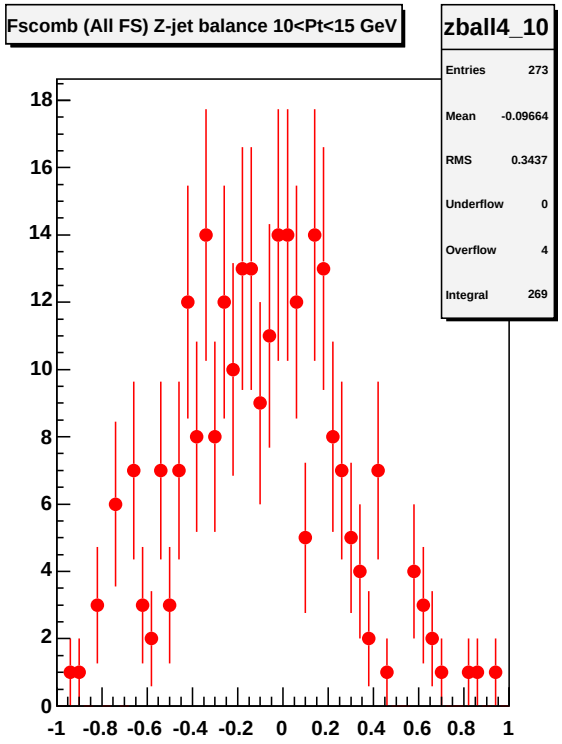
Low P_T from Z^0

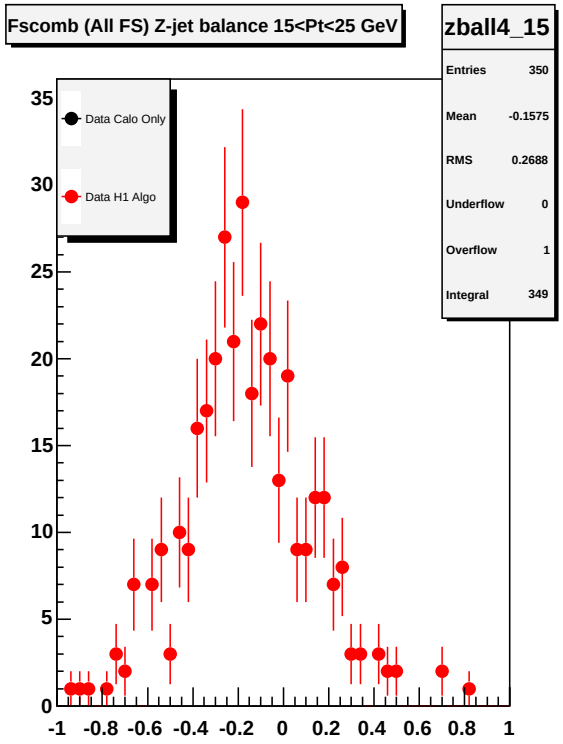




No obvious improvements from H1 Algorthm

Low P_T from Z^0 (All FS particles)





More gaussian than for jet energy alone

Summary

- Can improve H1 algorithm with η dependent calibraion
- Resolutions marginally better for H1 algorithm
- Low P_T region does not show much improvement with H1 algorithm