# LBL-High $p_T$ meeting

http://www-cdf.lbl.gov/∼currat/talks/

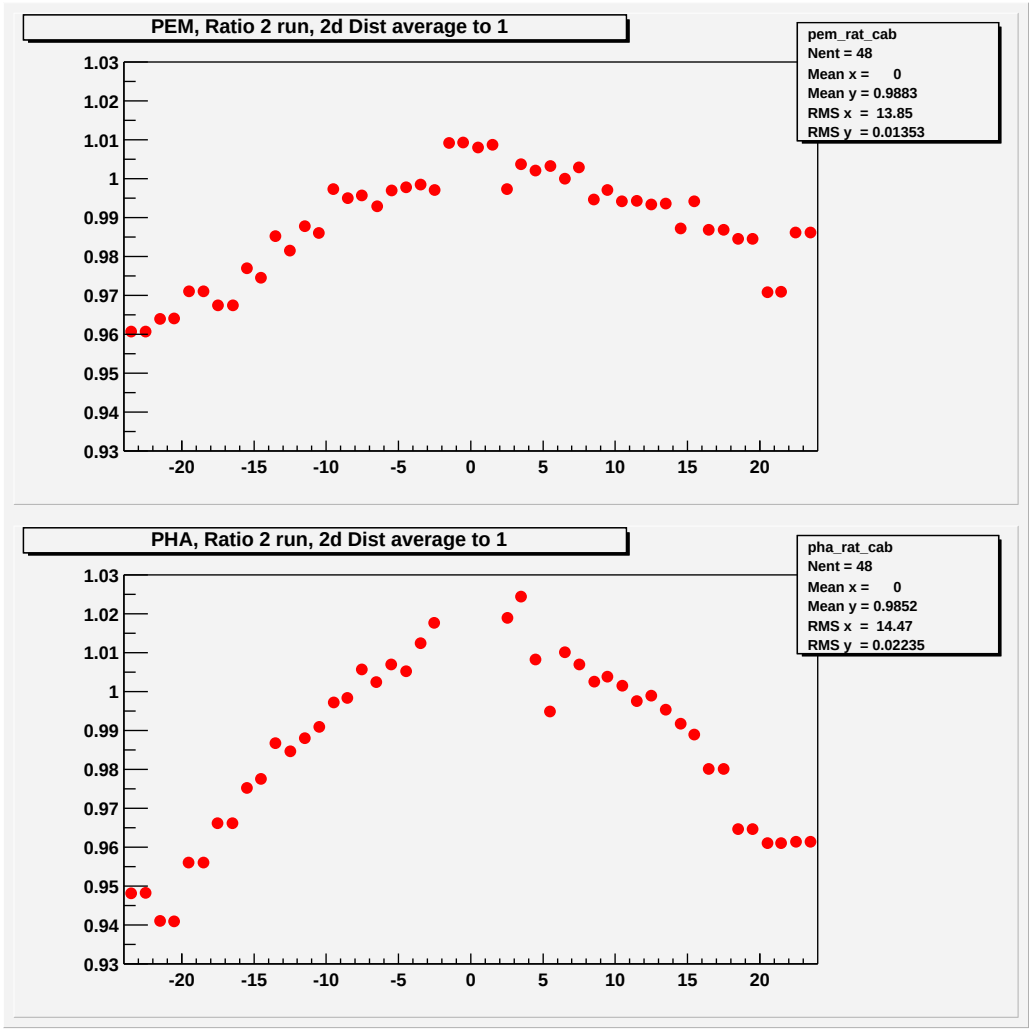
**Charles Currat**
LBNL

**October 29, 2002**

- Correction for time dependence in the plug calorimeters using dijet balance

# Laser runs 1/2

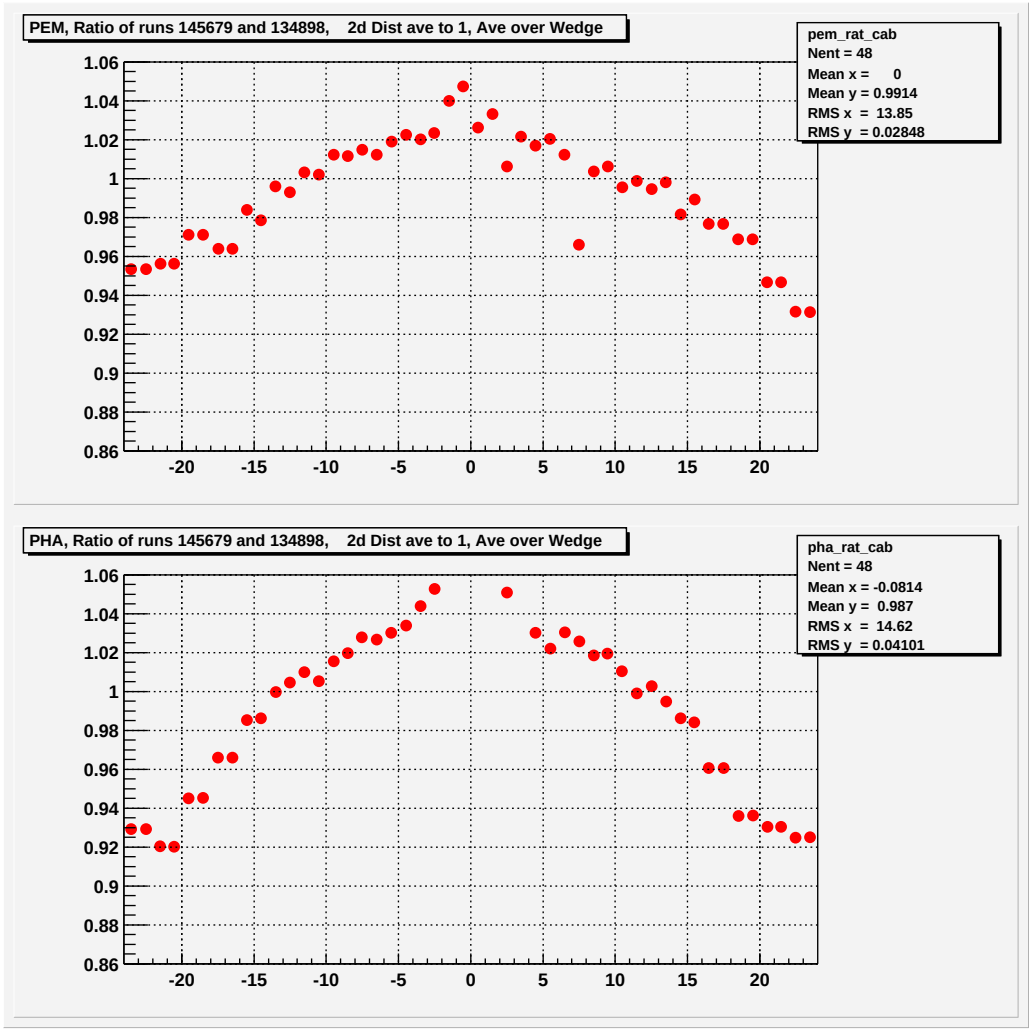
Ratio of laser runs #145631 (Jun 1st) over #139524 (Feb 21st)




☞ Note: East less affected than West

# Laser runs 2/2

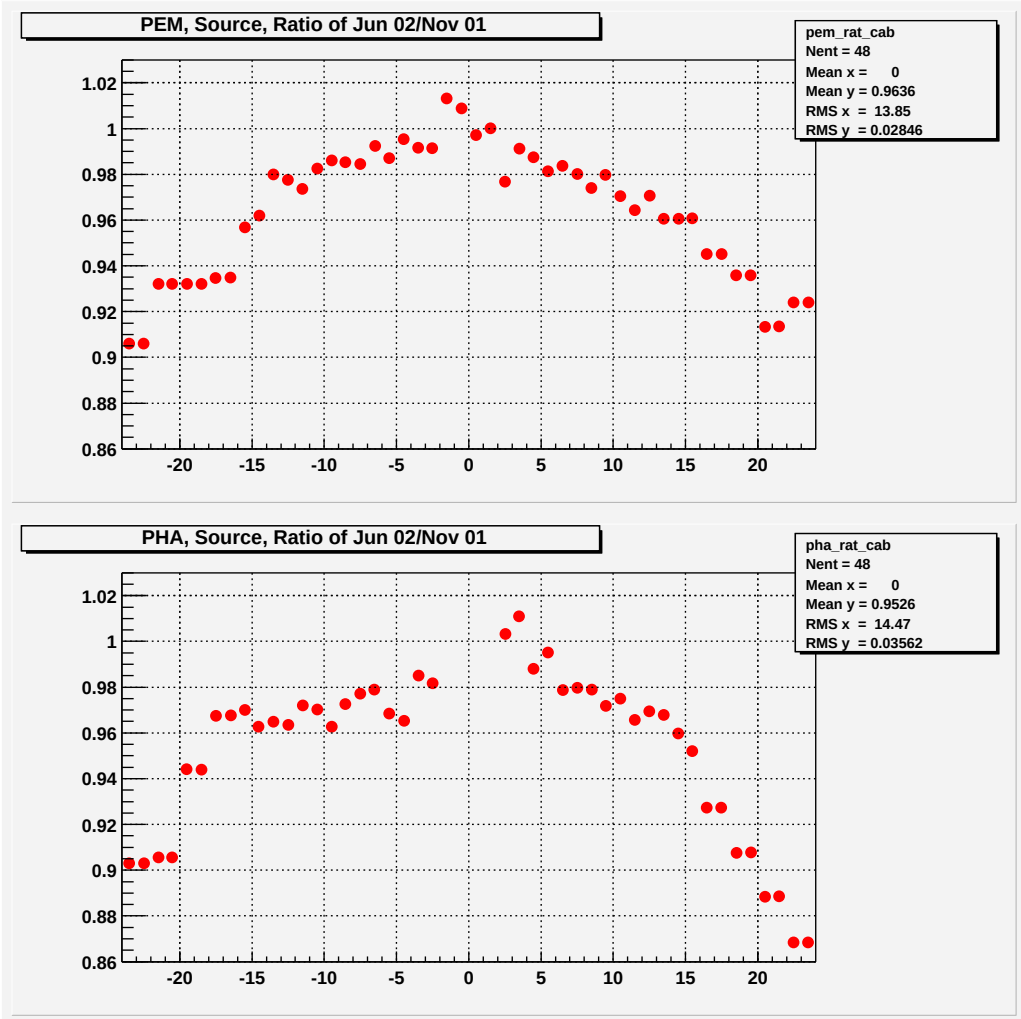
Ratio of laser runs #145679 (Jun 2nd) over #134898 (Nov'01 shutdown)




☞ Note: East more affected than West

# Source runs 1/2

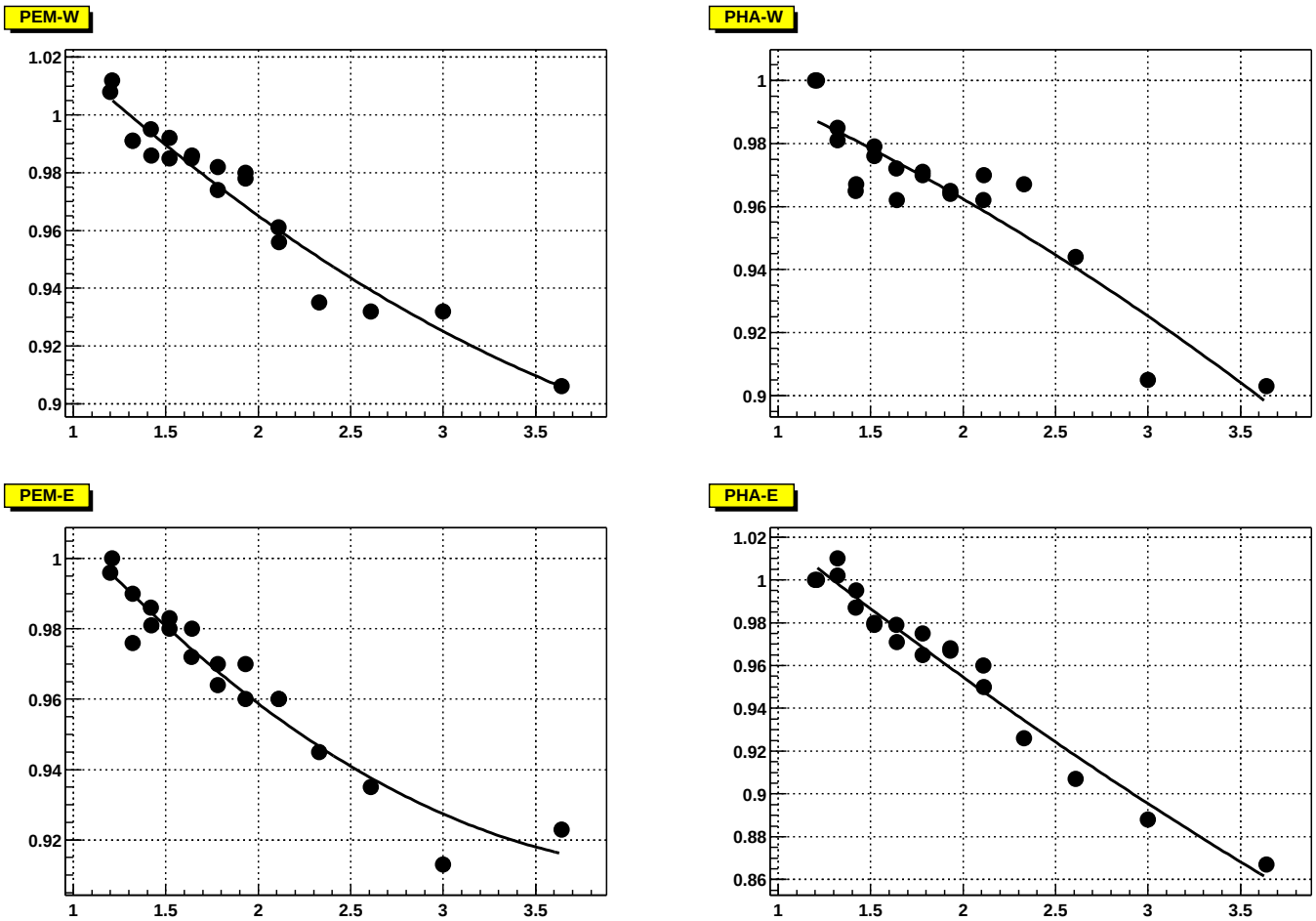
Ratio of source runs Jun'02 over Nov'01




☞ Note: East more affected than West

# Source runs 2/2

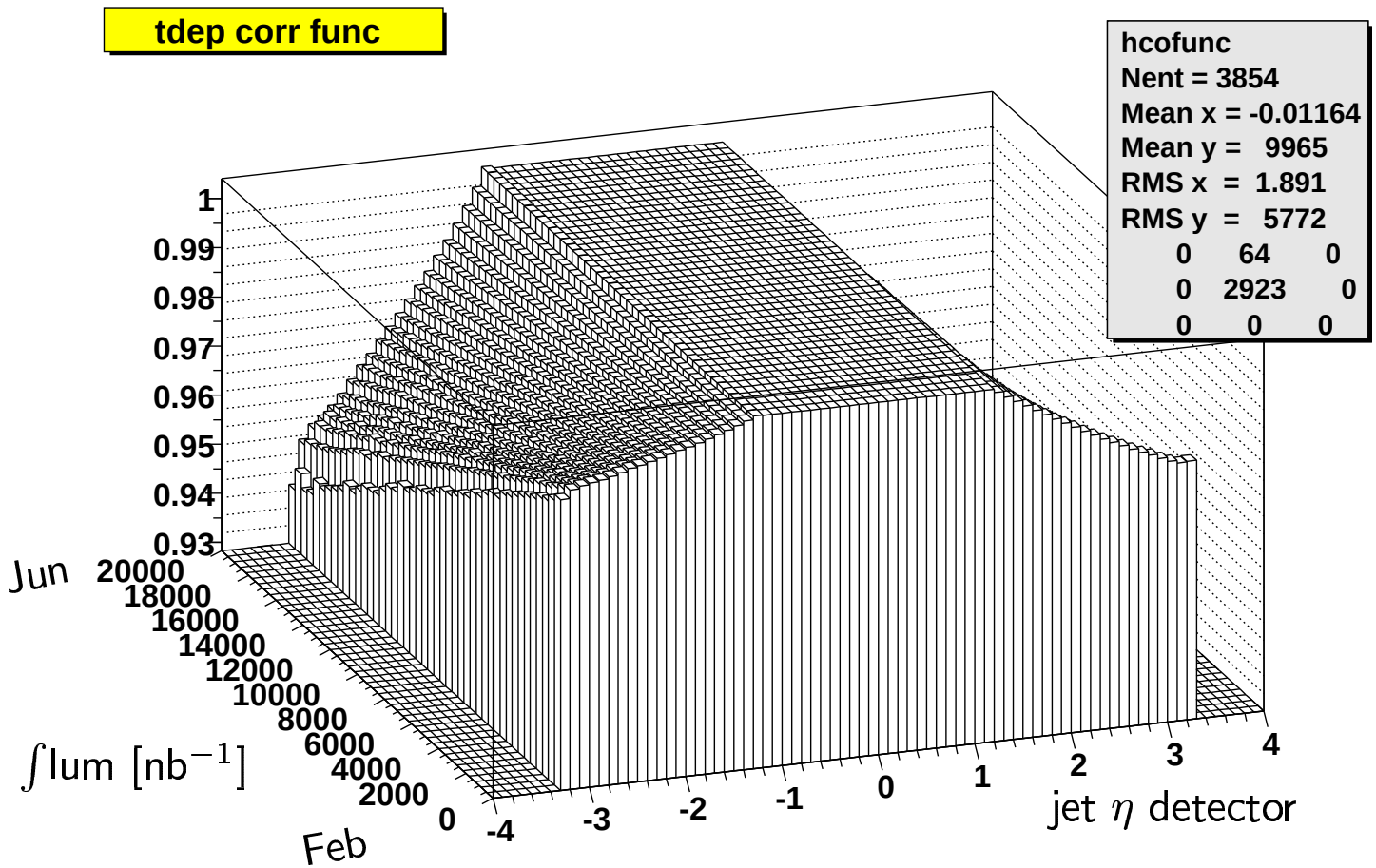
- Idea: derive time dependence function to be applied at jet level out of source runs (so, tower level). No reclustering.
- Correct $jet(E_T)$ separately in PEM and PHA according to jet's `emFraction`




Fit with pol. 2nd degree

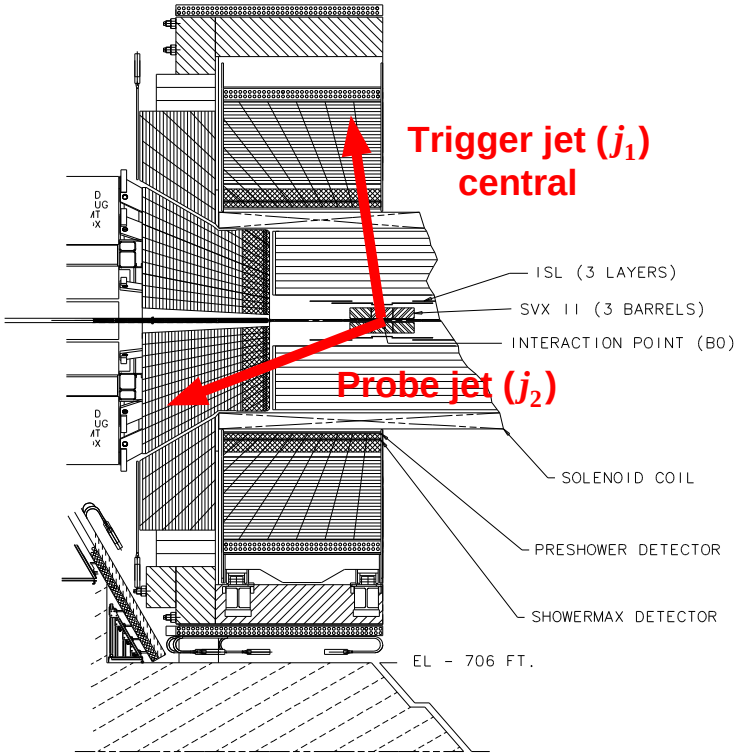
# Correction function

- Add linear time dependence (i.e. integrated luminosity) between Nov'01 – June'02 (shutdown, run #145200).
- Apply (time,$\eta$)-dependent function to jet $E_T$ according to run # and jet($\eta_{centroid}$). Jets have R=0.7.



# Dijet balancing technique

- Using JET_20 events. $R_{cone} = 0.7$. Vertex from Beate's ZVertexColl.



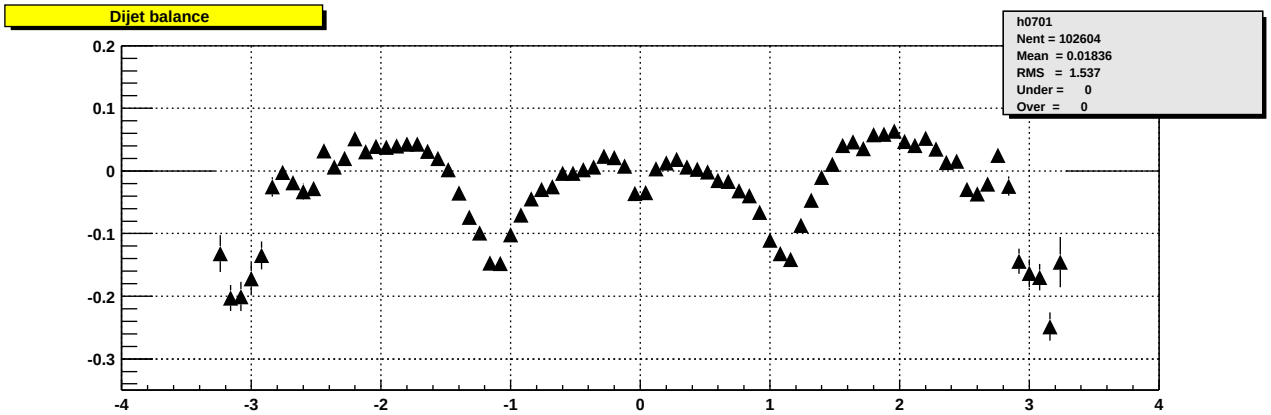

- |z-vertex| $< 40$ cm
- $E_T$ trigger jet $j_1 > 21$ GeV
- $0.2 < |\eta(j_1)| < 0.8$
- $E_T(j_1) + E_T(j_2) > 42$ GeV
- $\Delta\phi(j_1, j_2) > 2.7$
- $E_T$ $3^{rd}$ jet $< 15$ GeV
- $\frac{E_T(j_3)}{\frac{1}{2}[E_T(j_1)+E_T(j_2)]} < 0.25$

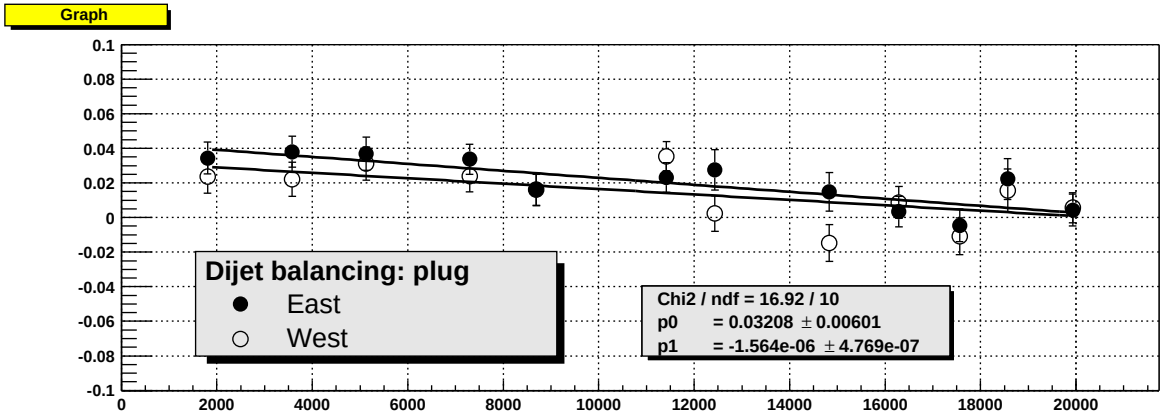
$$B = \frac{p_T^{probe} - p_T^{trigger}}{\frac{1}{2}(p_T^{probe} + p_T^{trigger})}$$

- Bottom line: for initial sample of size 1 $\longrightarrow$ dijet events with probe in plug $<< 1\%$
- Event reduction is severe ... time dependence studies, $\sim \frac{sample}{\Delta t}$, cost a lot!

# *Dijet balance, before*

- Plug calorimeter. High $\eta$ region, $|\eta| > 2.0$. Nov'01 – June'02. Uncorrected.
- Each point is 1200 nb$^{-1}$ chunk of `good runs` data. Abcissa is function of live luminosity (ageing ...!)

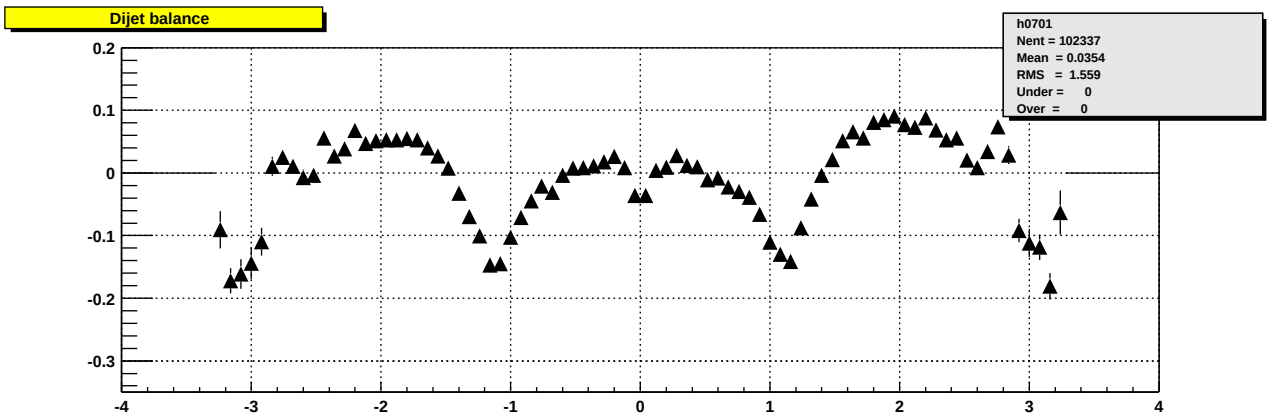


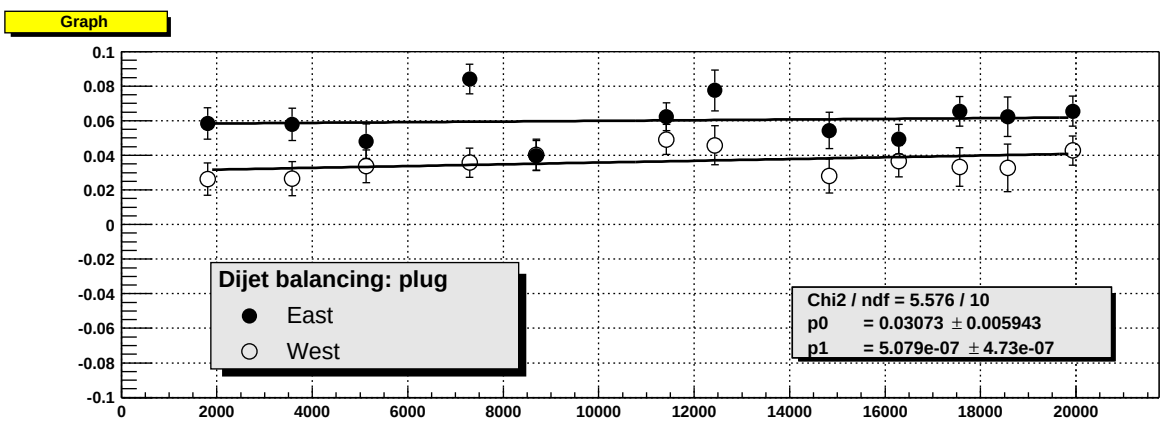




- East slope: $-2.02 \times 10^{-6} \pm 4.66 \times 10^{-7}$ ... significant
- West slope: $-1.56 \times 10^{-6} \pm 4.77 \times 10^{-7}$ ... significant

# *Dijet balance, after*

- Plug calorimeter. High $\eta$ region, $|\eta| > 2.0$. Nov'01 – June'02. Corrected.
- Slopes are compatible with 'flat' ... although jittering points still not quite understood yet ...




- East slope: $1.93 \times 10^{-7} \pm 4.53 \times 10^{-7}$ ... flat
- West slope: $5.08 \times 10^{-7} \pm 4.73 \times 10^{-7}$ ... flat

## Comments

- It is possible to correct for time dependence in the plug even though the method is coarse!
- Source vs laser runs choice as basis to build correction function is still a bit arbitrary (laser: DAQ reliability)?
- $R_{jet} = 0.7$ ... apply correction at tower level (inside jet, no need to reclusterize)?

☞ Big step forward! Still need to play a bit ...