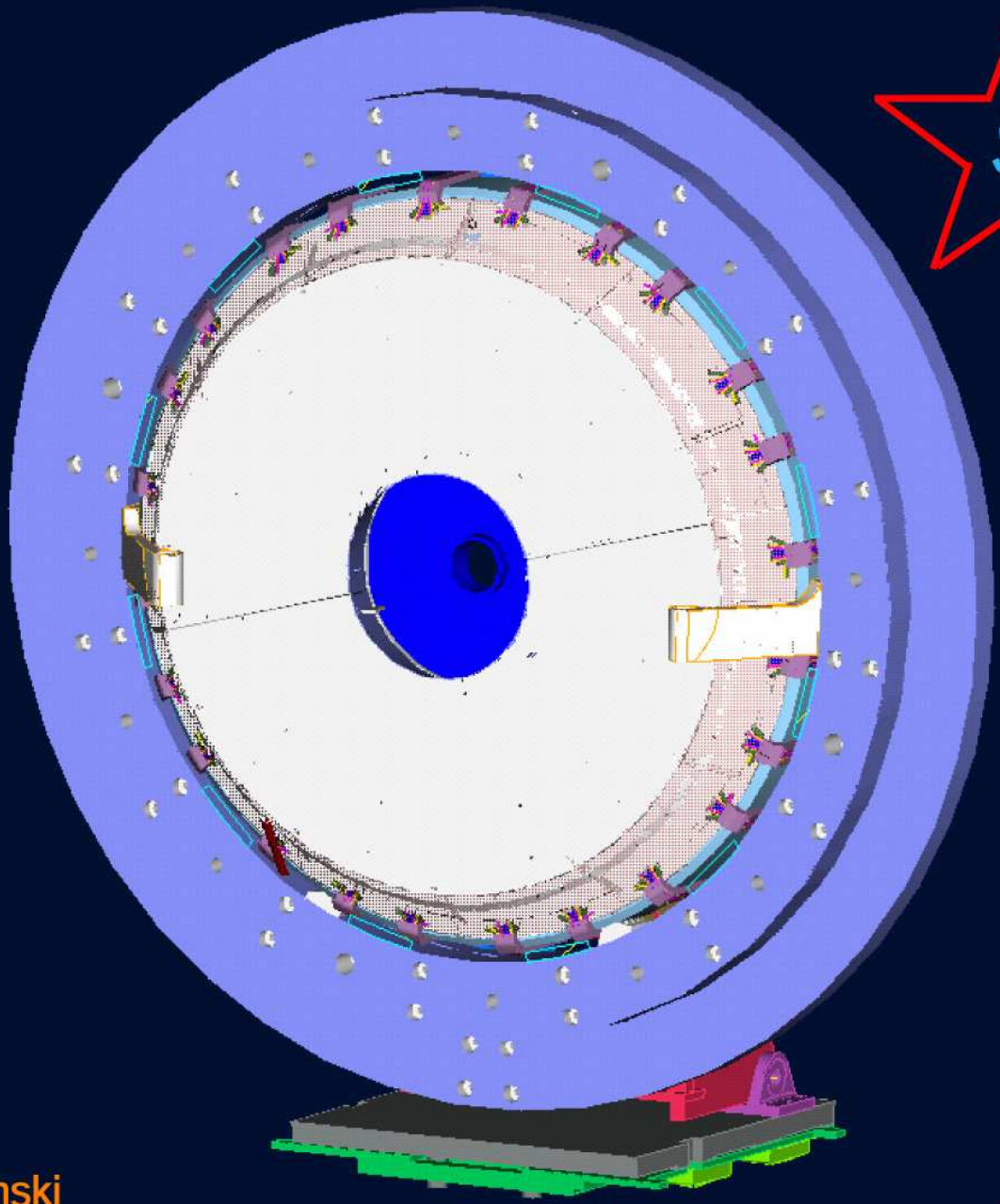


EEMC Software Progress

J. Sowinski

STAR Collab. Mtg. 2/18/04

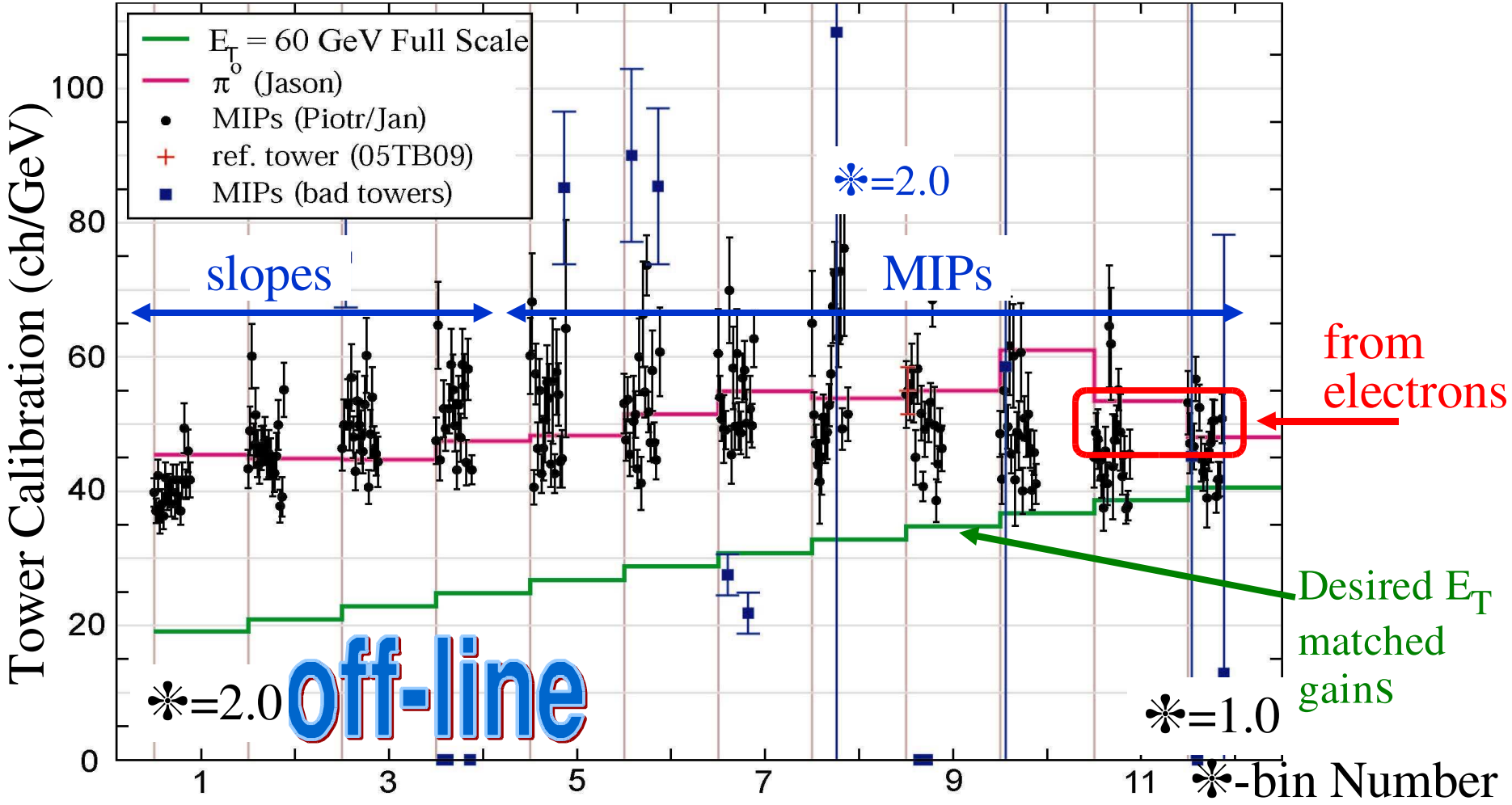
EEMC Towers Calibration Run 3 p+ p

Used 4 methods

- isolated slopes - relative
- Tracked MIPs
- 2-Tower ^{0}' s
- Electrons

Methods agree but hardware calibrated to ~constant E not E_t

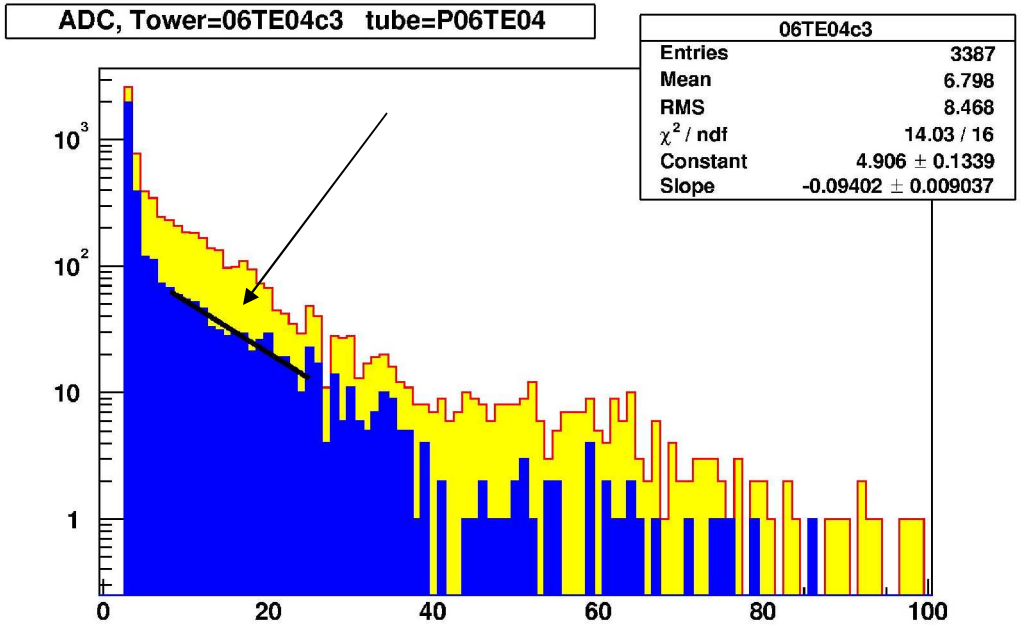
J. Balewski, P. Zolnierczuk, J. Webb



Relative Gains from MIP' s – ' 03

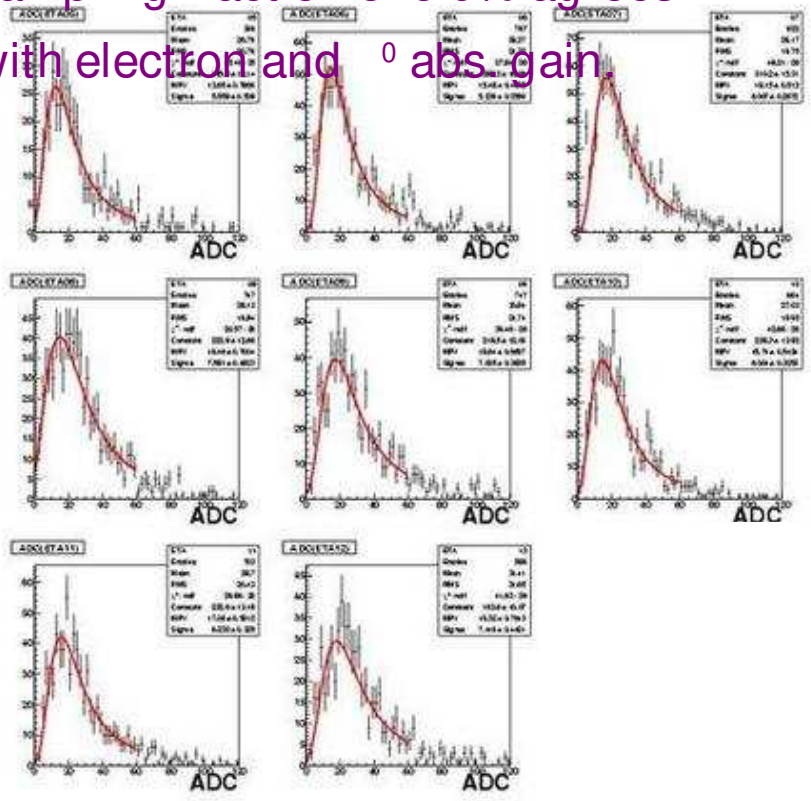
Slopes

- Set HV by matching slopes
- Require no signal in adjacent towers
- Requires 200 kevts
- Furnishes relative gain of each tower
- Have performed 4 iterations this year
- HVs should not change in Au-Au

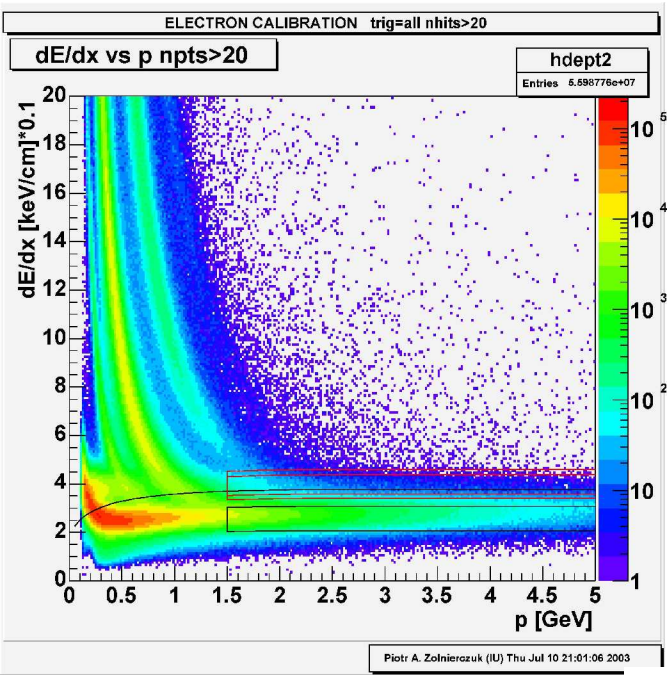


Use tracked MIPs for 1.1 1.4

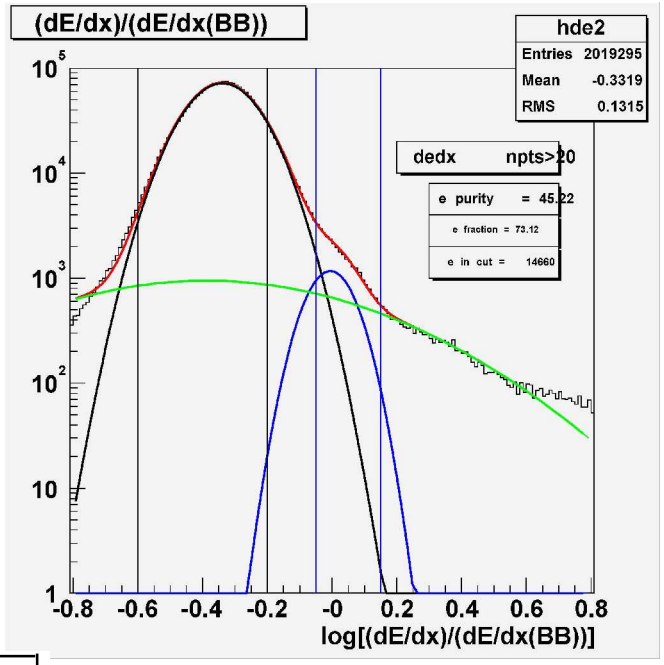
- Used L3 tracks – '04?
- Require track to stay in tower
- Full '03 p-p data set gives gain for individual towers (14 Mevt)
- Sampling fraction of 5.0% agrees with electron and ^{0} abs. gain.



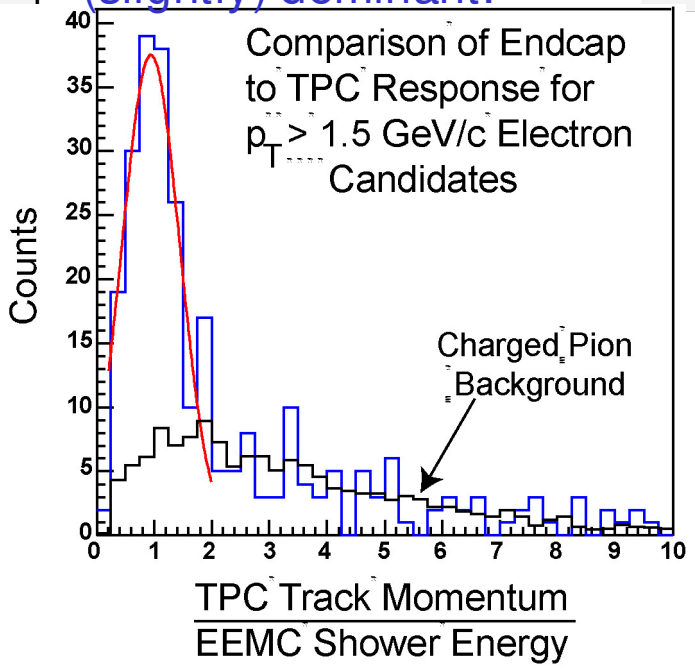
EEMC Response to Tracked Electrons – ‘ 03



- Use window on pions over same p range to estimate background EEMC response
- Use TPC dE/dx vs. p to select track region where electrons are (slightly) dominant.



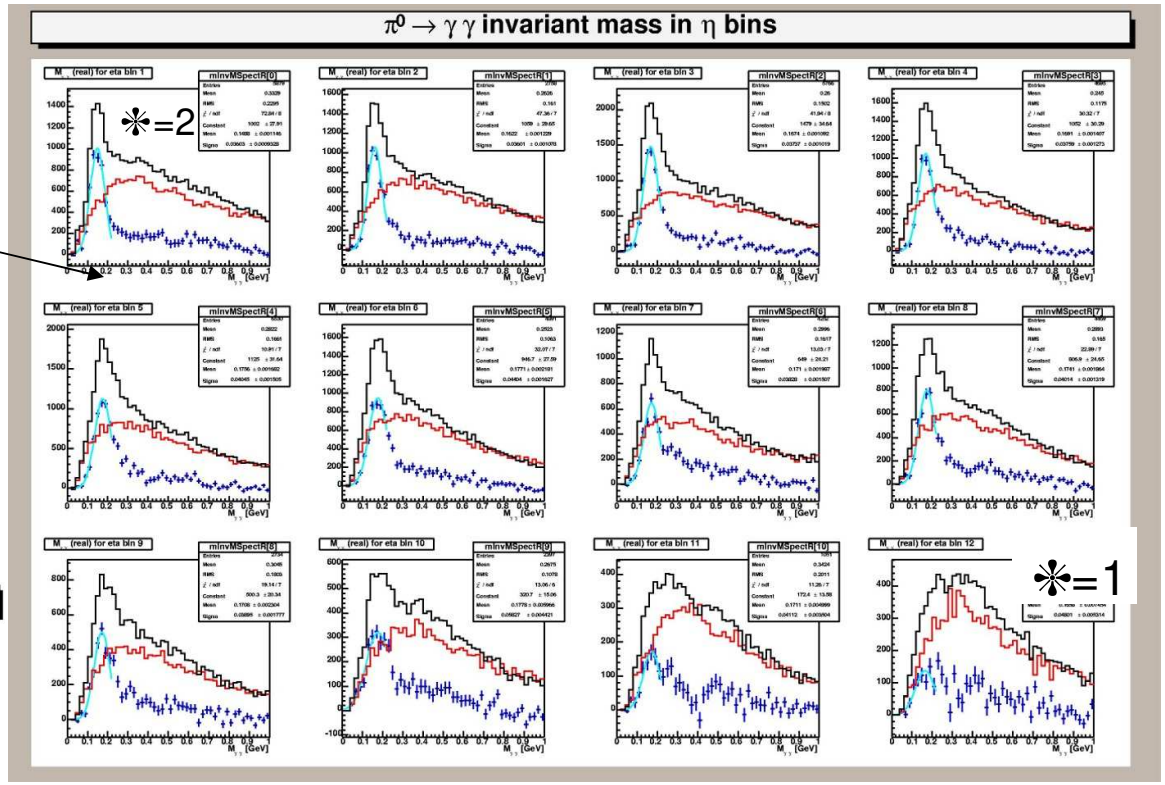
- Requires full p-p data set to get ❄ averaged absolute gains for each ✻
- Does not work at large ✻
- With presently available statistics, this gives (55 ± 5) channels/ GeV on ‘calibration’ tower 5TB09.

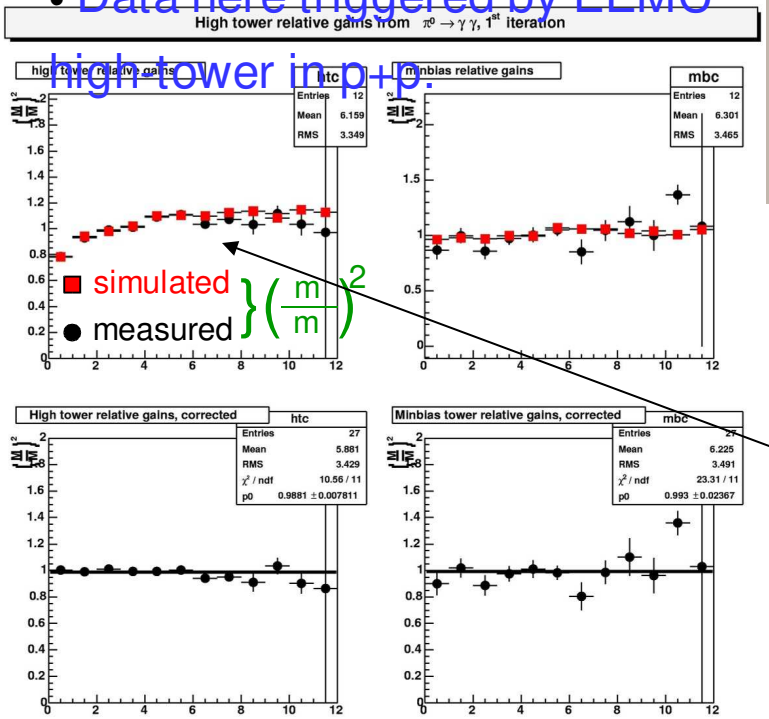


- This compares well with 52 channels/GeV determined from MIP peak location for 5TB09, and with (58 ± 2) channels/GeV determined from reconstructed ^{0} invariant mass.

EEMC (Tower Only) ^{0} Reconstruction – ’ 03

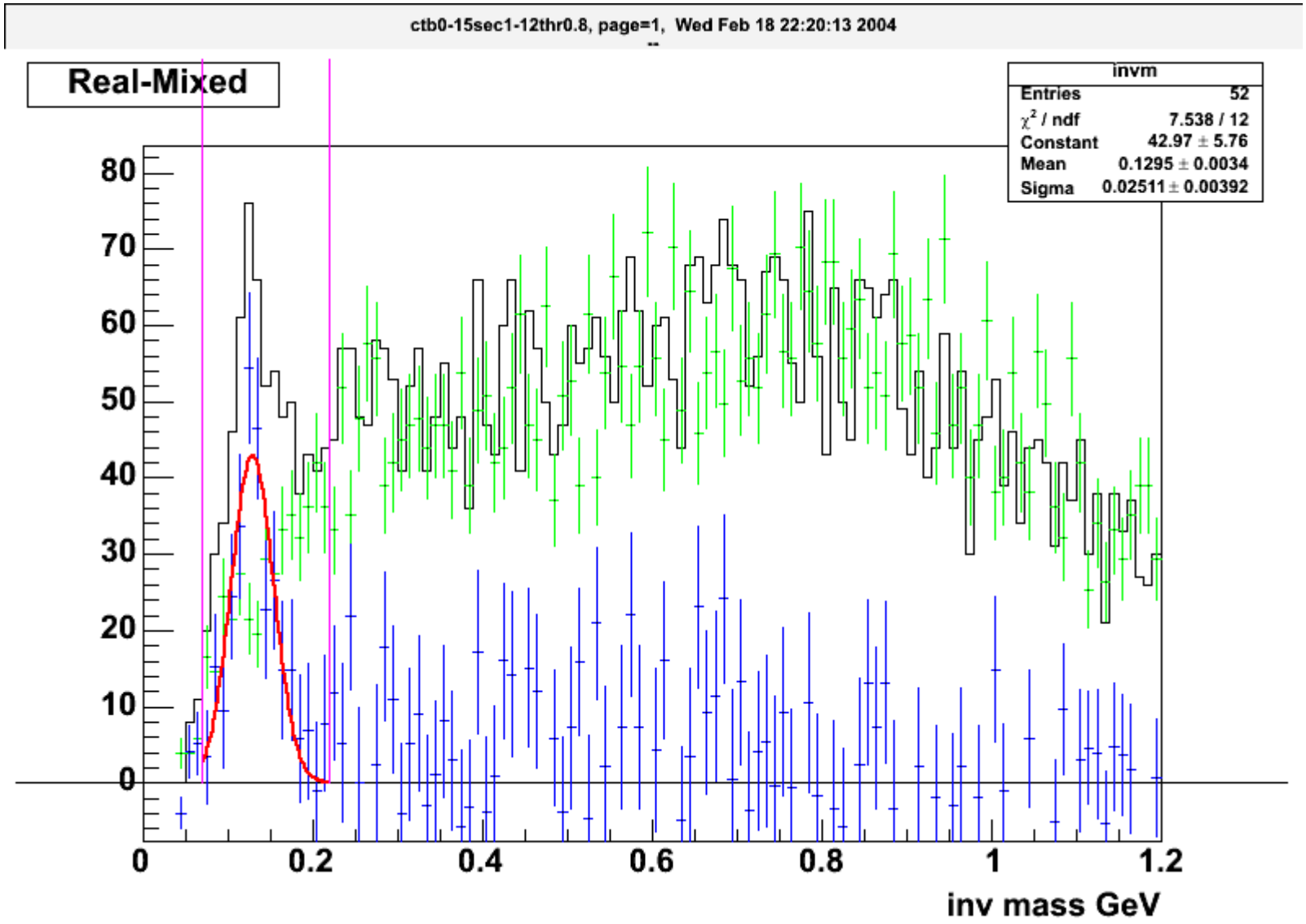
- Two-cluster invariant mass spectra show clear ^{0} peak after subtraction of mixed-event background.
- Events sorted according to ✻ bin of the higher-energy cluster.
- Data here triggered by EEMC high-tower in p+p.





- Relative gains within each ✻ bin taken from MIP response. Absolute gains adjusted to place reconstructed ^{0} peak at “correct” mass.
- “Correct” mass determined from simulations.
- Requires full p-p data set to get ❄ averaged gains
- Occupancy in Au-Au may give lower fraction of useful events than p-p
- Underway for ’04 data

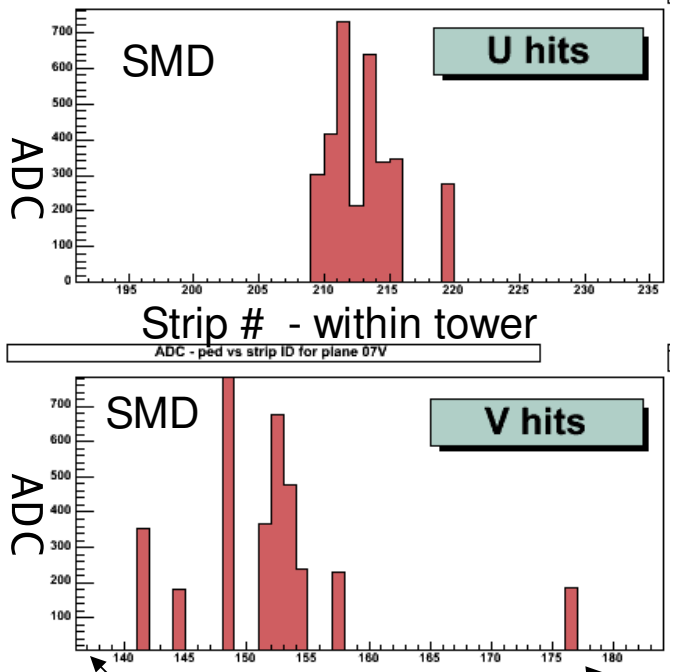
1st ^{0}s in EEMC from ' 04 Data!

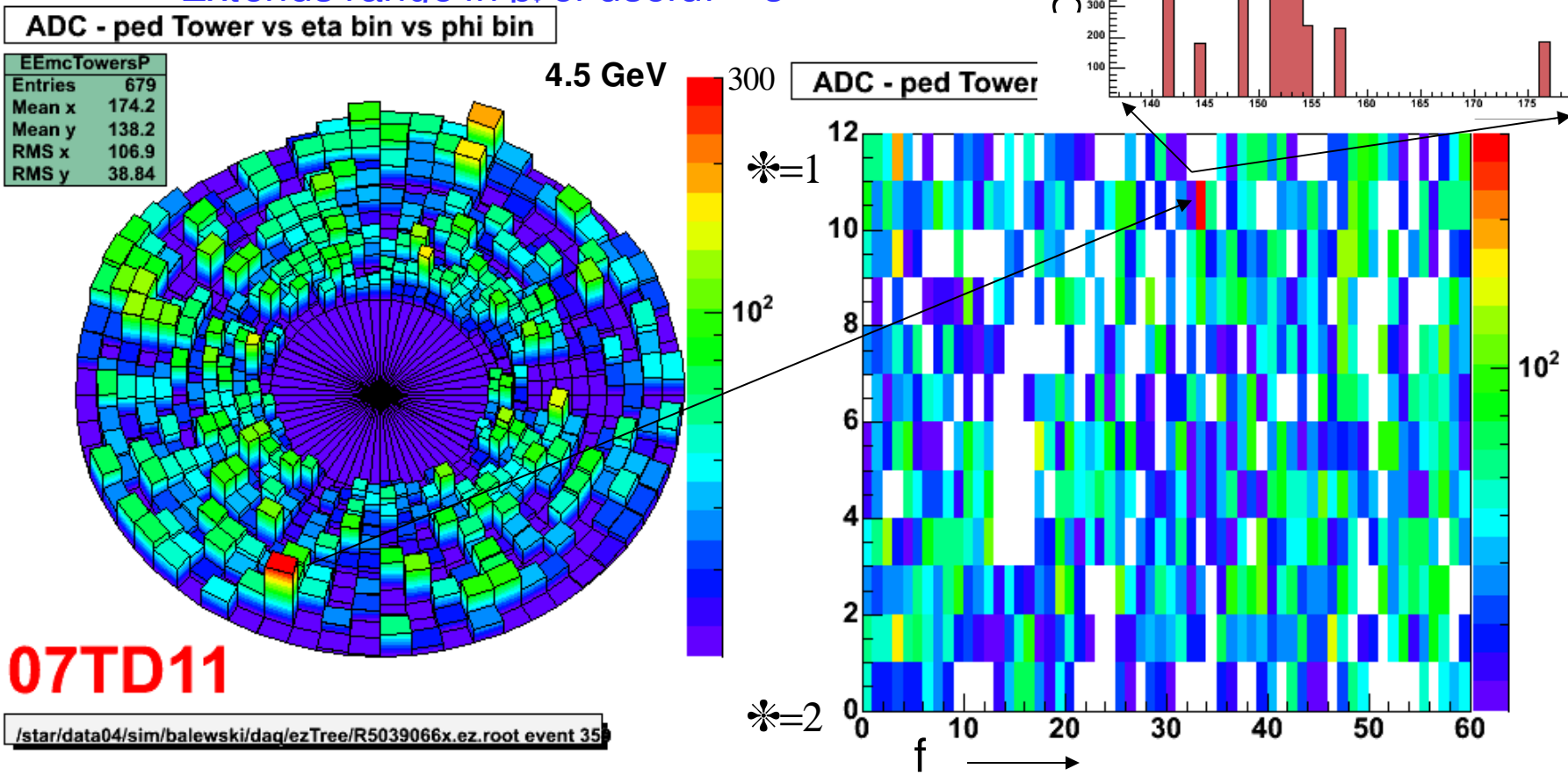


Cluster Finder under Development

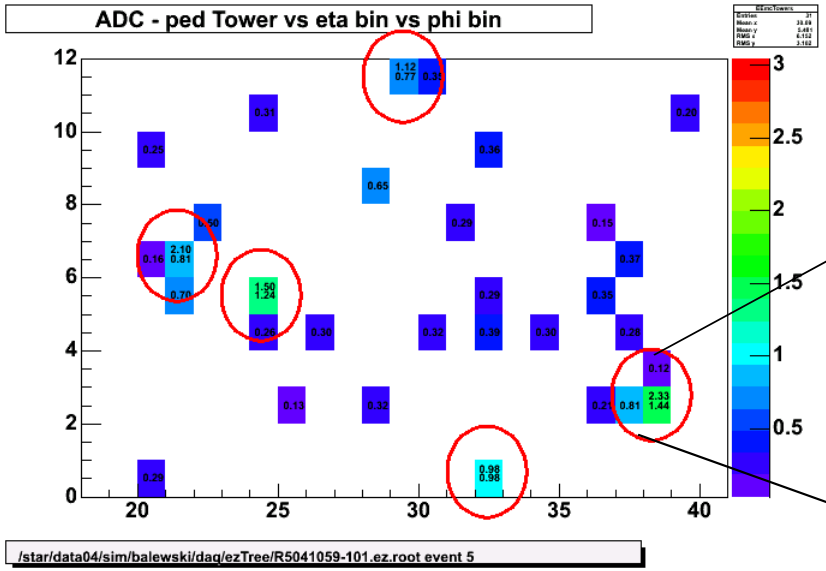
Au-Au event from '04 – HT triggered

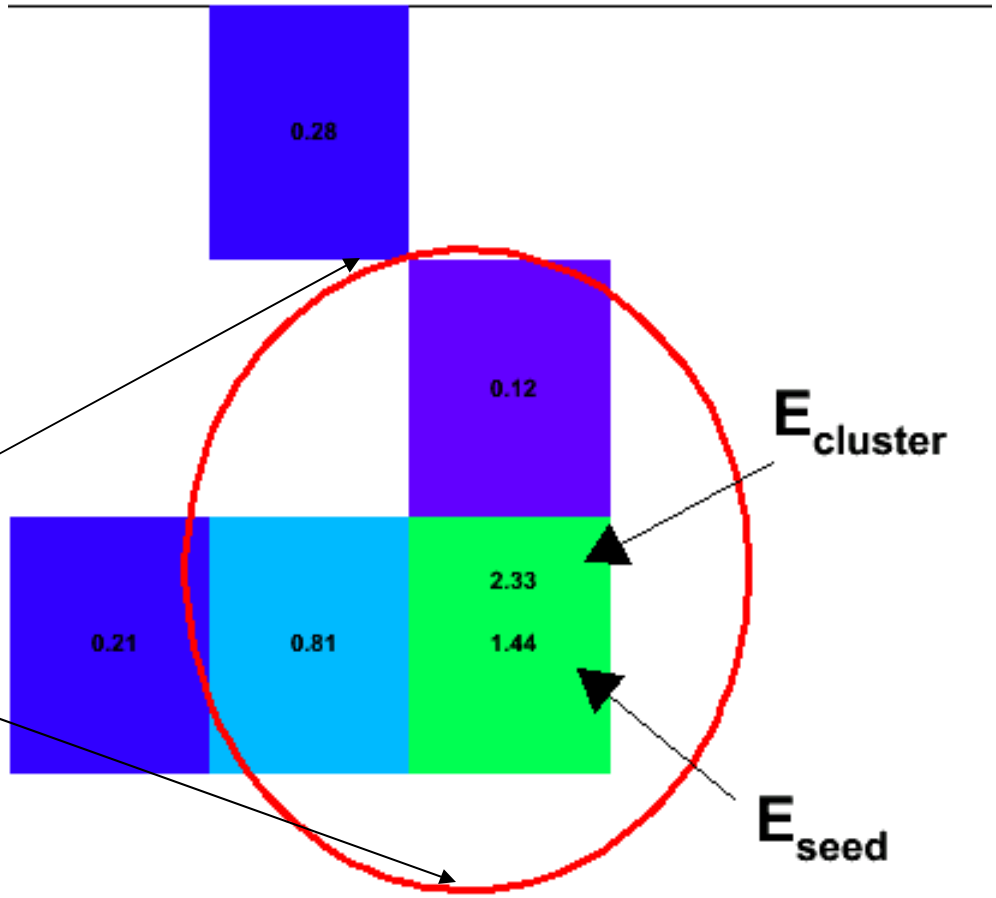
- Enhanced ^{0} reconst. in 4 sectors with SMD
  - Better position resolution
  - Better understood energy sharing
  - Extends range in p_t of useful ^{0}s





Tower Cluster Finder on a recent Au-Au event



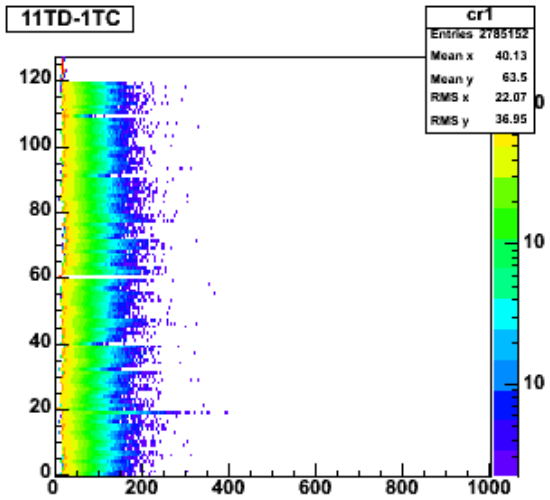


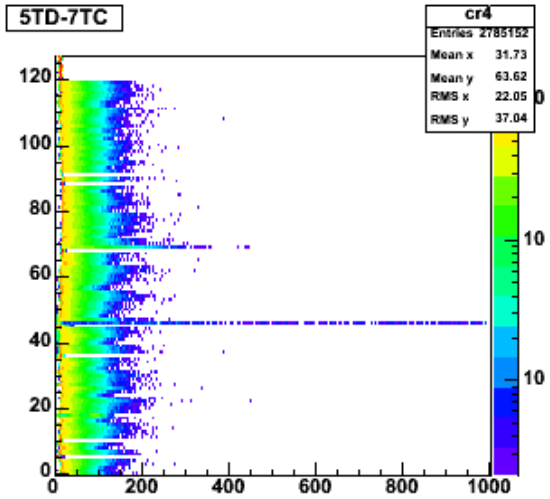
EEMC in database

- Mapping from channel and crate to detector element name
- Geometry hard coded since unlikely to change
- Pedestals loaded and in use
- Gains – structure exists
- 32 bit status word
- Sector based
- Flavors implemented
- GUI or program to edit or load

Significant effort into online QA plots for EEMC has proven essential to bringing detector online and debugging problems

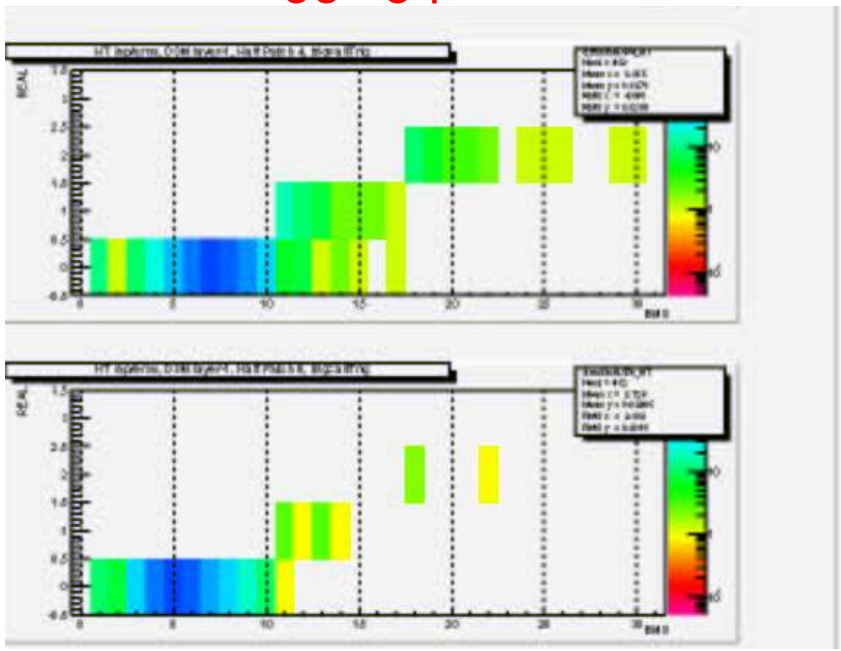
H. Spinka

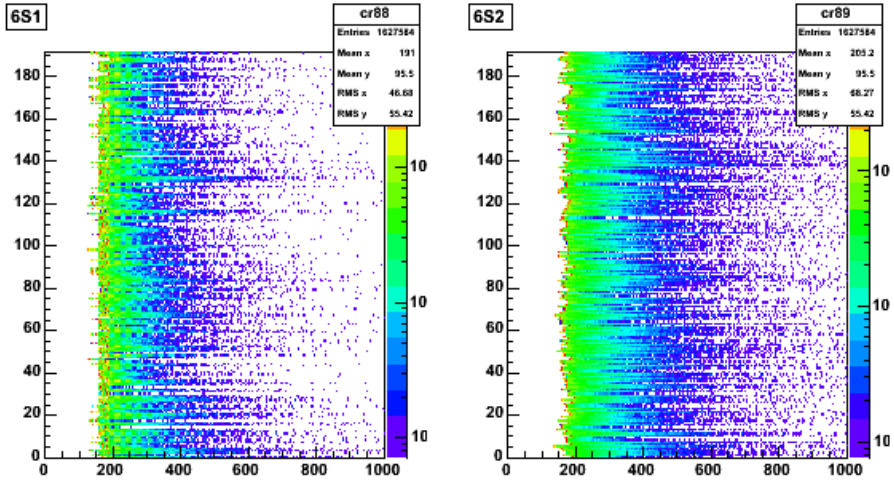




ADC spectra for 2 crates

DSM input vs. output





ADC spectra for 2 MAPMT boxes

EEMC Software Jobs and Workers*

*I am bound to leave someone out: My apologies

IUCF

- Jan Balewski[a] (Coordinator)
- Renee Fatemi[b]
- Jason Webb[c]
- 1 more post-doc?
- 2-3 students by summer[d]

EEMC Infrastucture

- Note: -Piotr Zolnierczuk[e]
- Clustering for towers and SMD[c]
- Correlation of TOW, SMD, PPS & tracking[ckm]
- Extend tracking to ✻ > 1.4[g]
- e/h discrimination for sectors w/ SMD
- Noise rejection in clustering
- ^{0} reconstruction & inv. mass[ac]
- L3 Display[k]
- Adapt recent software to Root4Star[ac]
- Fill database[abc]
- Determine neutral energy in EEMC

ANL

- Bob Cadman[f]

MIT[g]

- Post-doc
- Students

CalTech

- Dave Relyea[h]

Valparaiso U

- Gopika Sood[j]
- Paul Nord[k]

Kent State

- Wei-Ming Zhang[m]

Phys. Analysis & Simul.

- High-p_t ^{0}, ✻ spectra in EEMC
- High-p_t e spectra in EEMC
- Inclusive High-p_t ✻'s
- Jet trigger bias in p-p[b]
- Forward tracking upgr. sims.[g]
- '04 p-p analysis
- Slow simulator
- Simple EEMC response for sims.[bg]
- Pileup in p-p

Commiss./Calibration

- Online QA[a,Spinka]
- Status of towers and strips
- Tower gains: MIPS, e, ^{0}[ace]
- SMD strip gains[fm]
- PPS gains
- Jet trigger during p-p[b]