Barrel PreShower cal status

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- Where we have been
- Where we are
- Where we go

Motivation

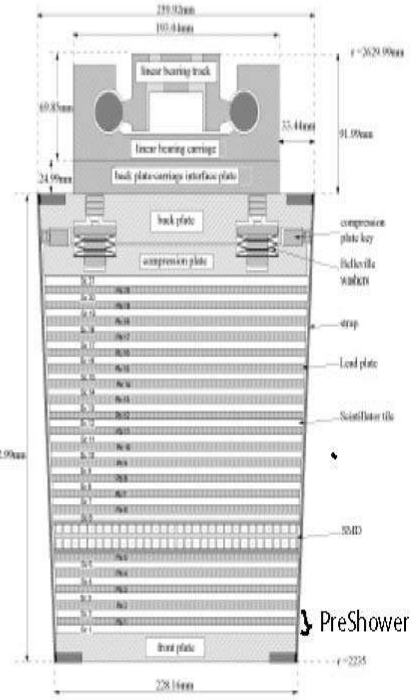


Fig. 4. Side view of a STAR EMC module showing the mechanical assembly including the compression components and the rail mounting system. Shown is the location of the two layers of shower maximum detector at a depth of approximately $5X_0$ from the front face at $\eta = 0$.

Module side view

- integrated dep .energy in first 2 emc layers
- to bemc tower we have bprs information
- 2x60 modules totaly
- 20x2 towers in module

expected:

- 84% electrons shower before layer 2
- 6% hadrons shower before layer 2
- electrons deposit larger energy

Electron Id should be improved

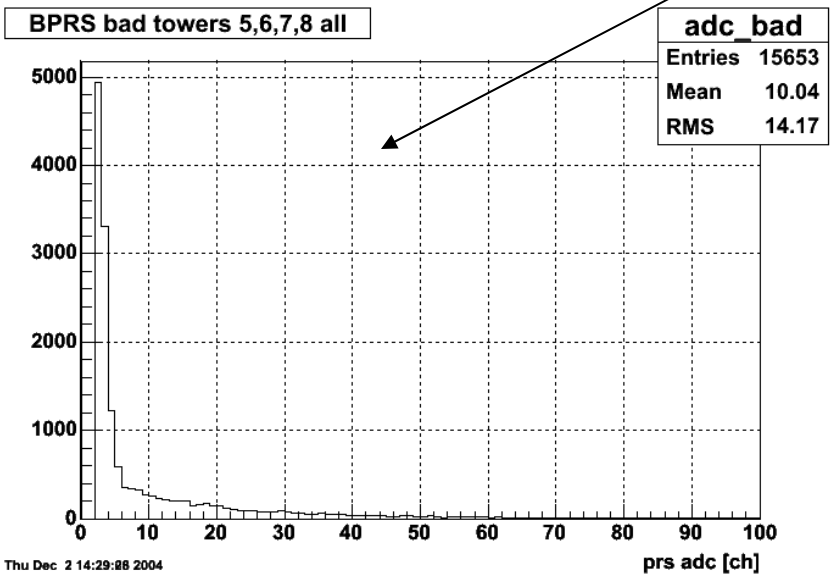
Details http://www.star.bnl.gov/protected/heavy/bielcik/prs/preshower_cal.htm

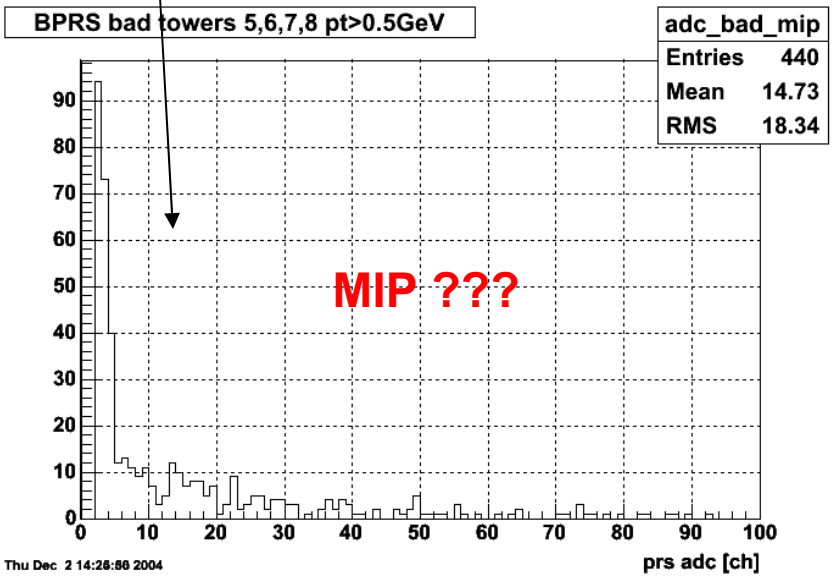
Where we have been
To do July 2004

- Check prs mapping
- Understand prs/bemc/track correlations
- Simulate deposit MIP particles ~ eta
- Complete calibration
- Determine improvement of electron Id

Problems to find MIP

- **Idea:** project TPC tracks on BPRS and for those plot ADC spectra
- Most tracks are hadrons => ADC spectrum corresponds to MIP
- We expect to see difference: **all ADC** and MIP





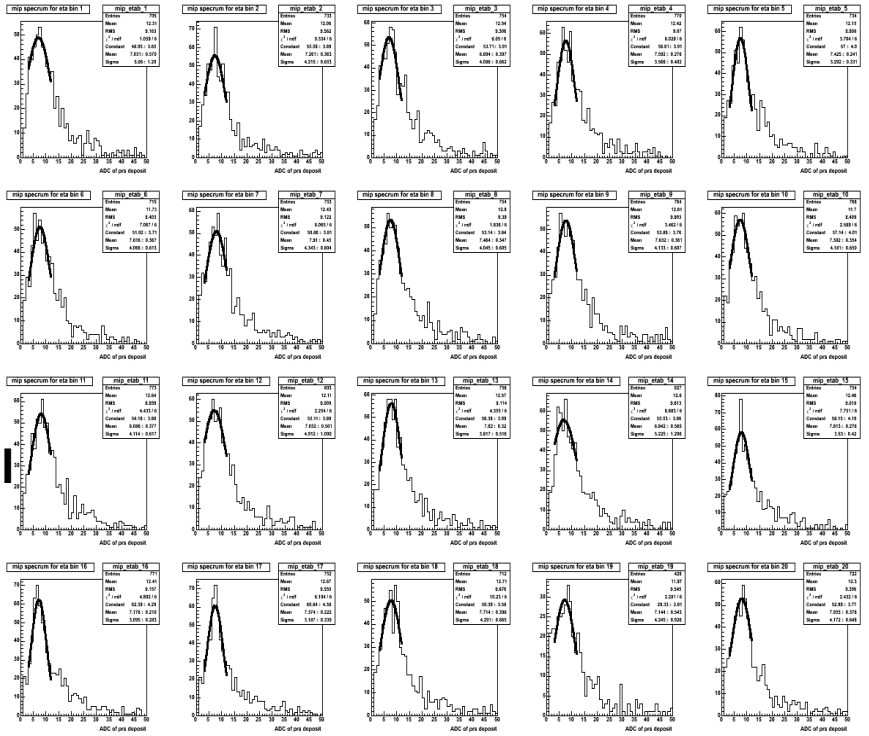
- However: no significant difference has been observed?!! **PANIC**
- **Trying a lot => no MIPs**

MIPs in simulations

- Looking in AuAu62 Hijing simulations to get a right feeling

Clear visible MIPS
position~energy

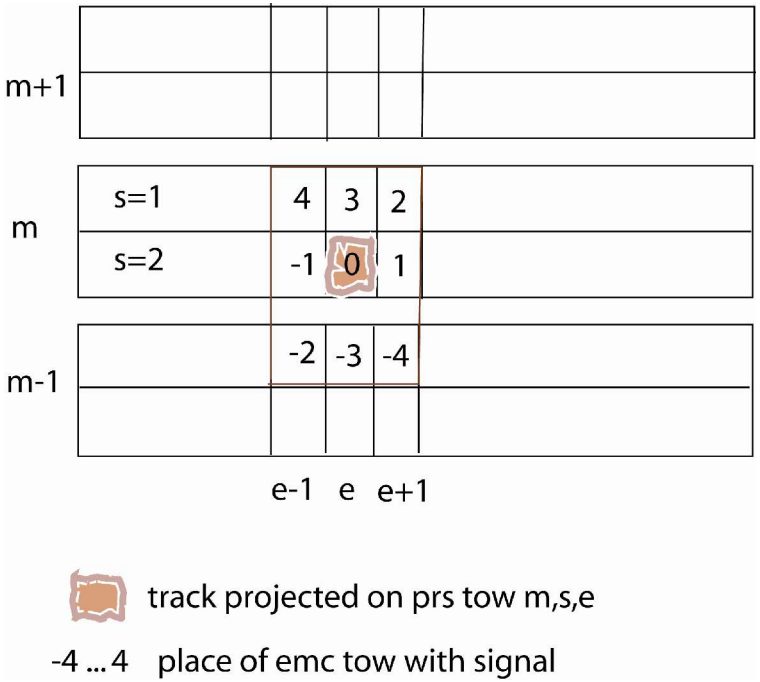
Channel: 7-8
Deposit energy: 35-50 MeV



Problem should be outside the MIP anal

maybe map, maybe map …
How to check?

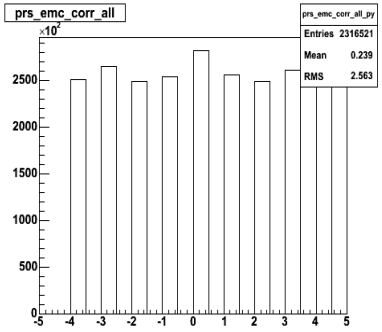
Correlating BPRS signal around projected track position

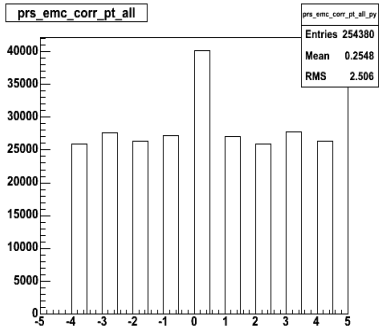


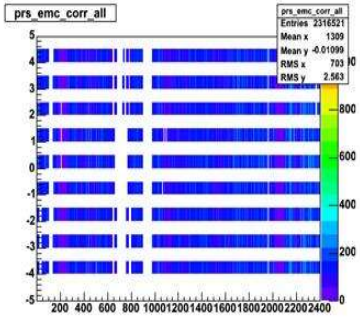
- Tpc track projected on BPRS tower (m,s,e)
- check towers ADC>0 around this place 4x4
- marking them -4-4; 0 is proper position

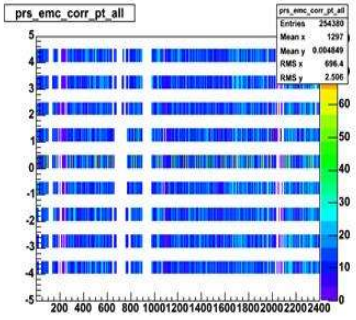
- Signal in tower 0 is expected to dominate

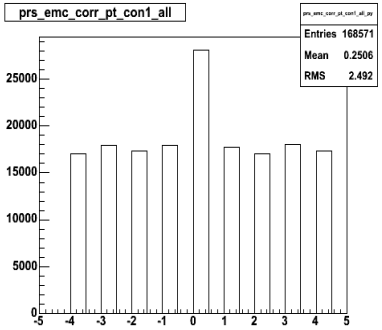
Spectra for all towers

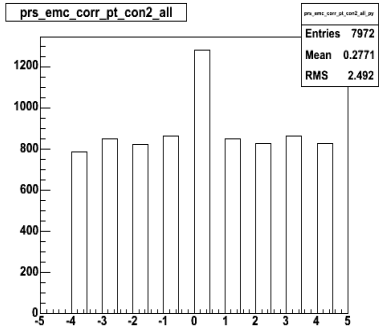


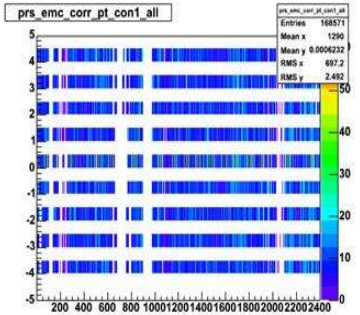


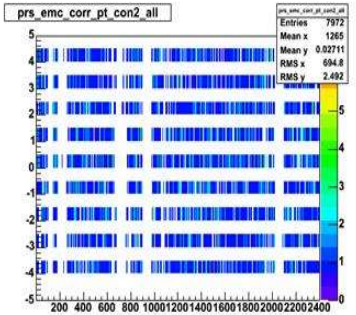










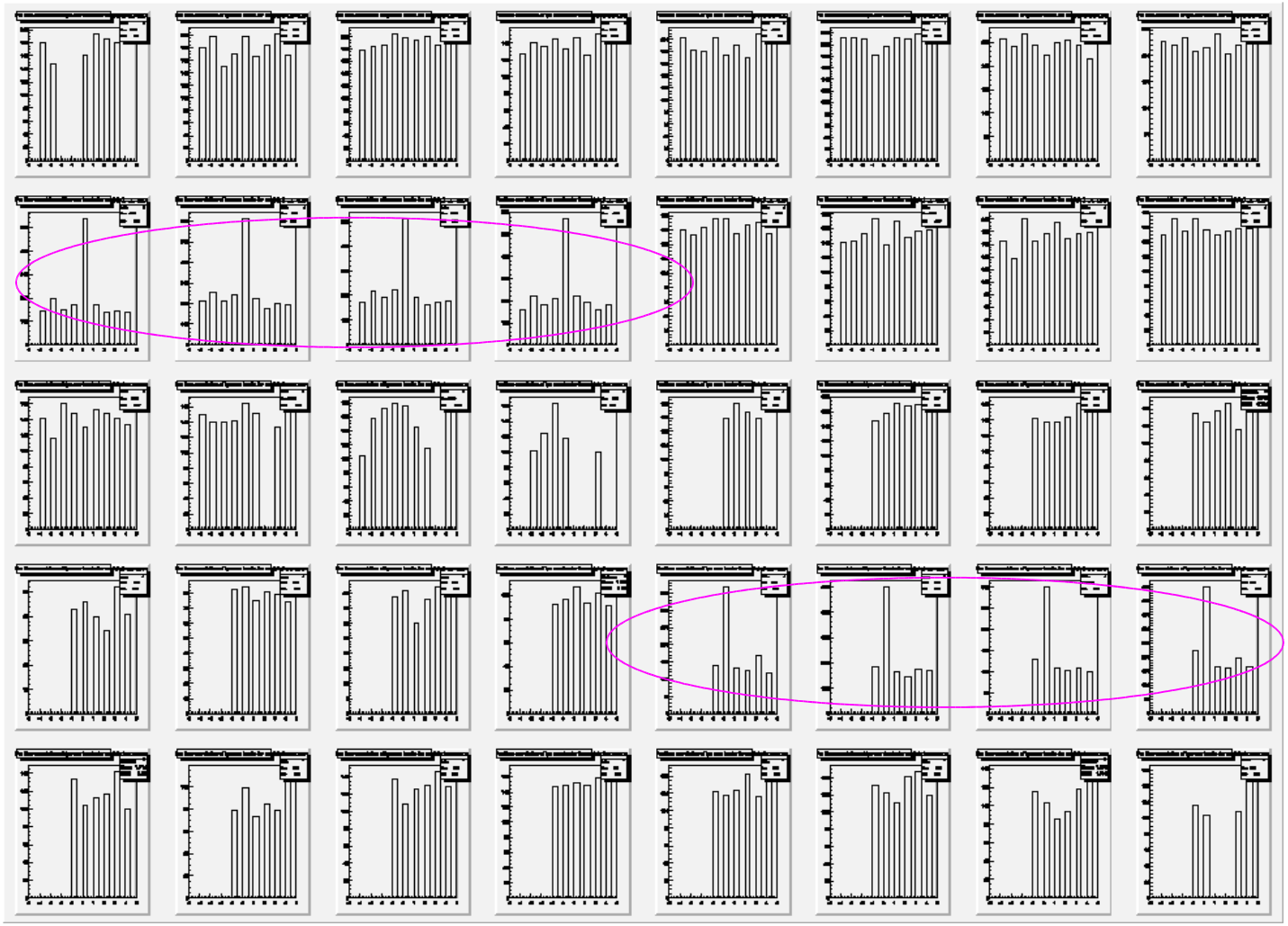


Sum over all towers shows that expected tower dominates

WELL MAP seems to be OK. Let check each towers separately

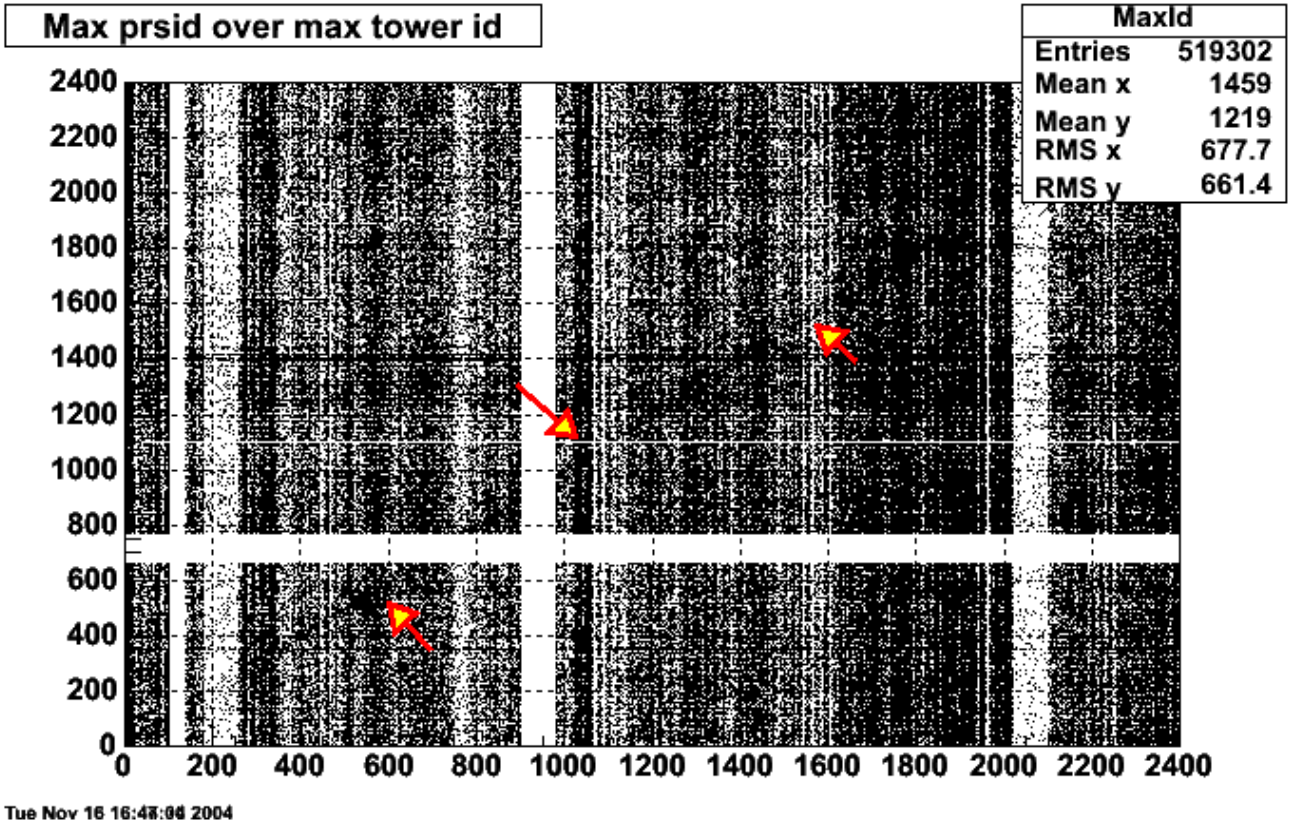
Tower “0” is not always dominating ???

Each tower separately



Few towers make good job for rest (what about rest?)

Correlating BPRS and BTOW with maximum signal in event

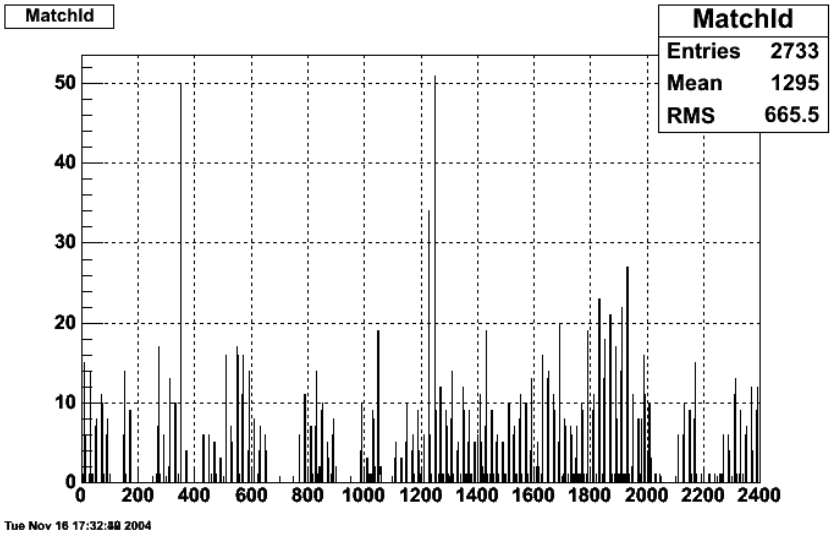


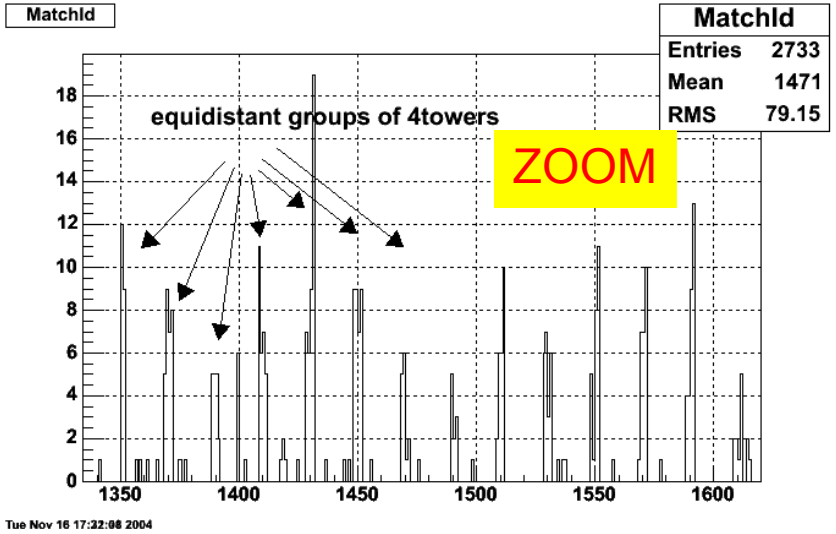
This is not a face of Holly Mary on toust but **weak correlation**

Subhasis Method

How to interpret this? GOOD/BAD?

Contributing towers to correlation





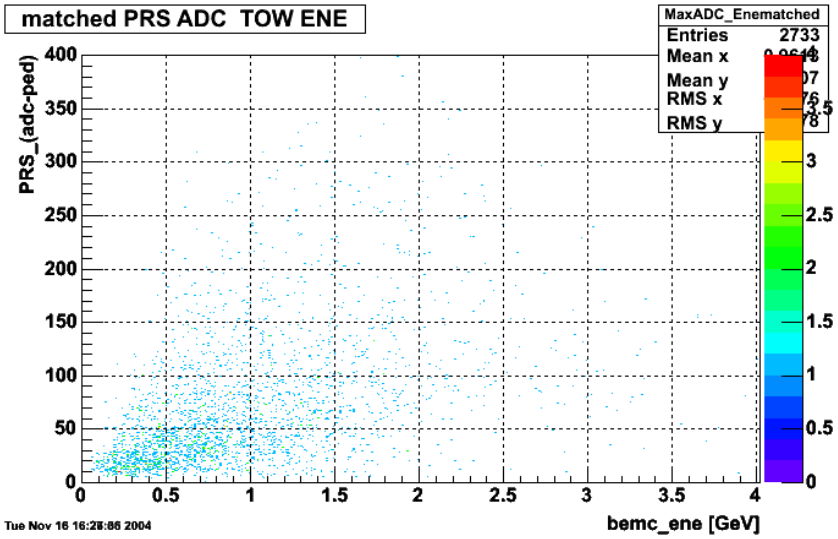
here we see something like grass => **here rather like trees**

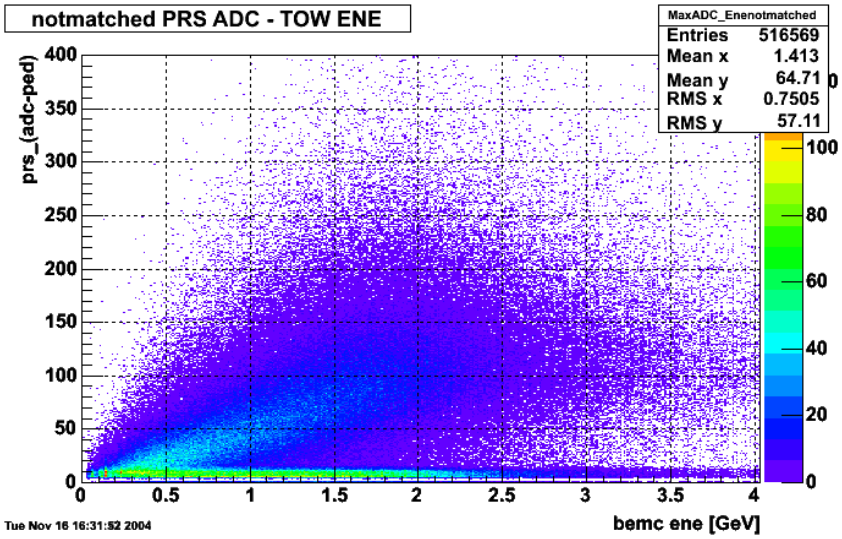
Contributing towers are groups of 4 towers => rest do not contribute

Here we come to the core of the problem: **BPRS map is not OK (the most probably)**

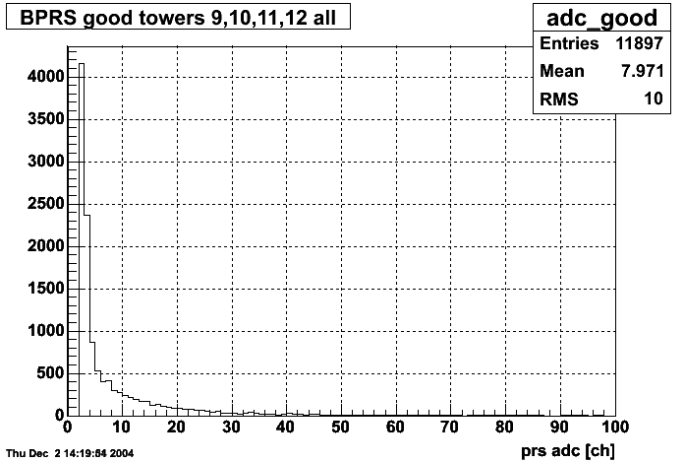
GOOD TOWERS: **Id=9(10,11,12)+20*i** .

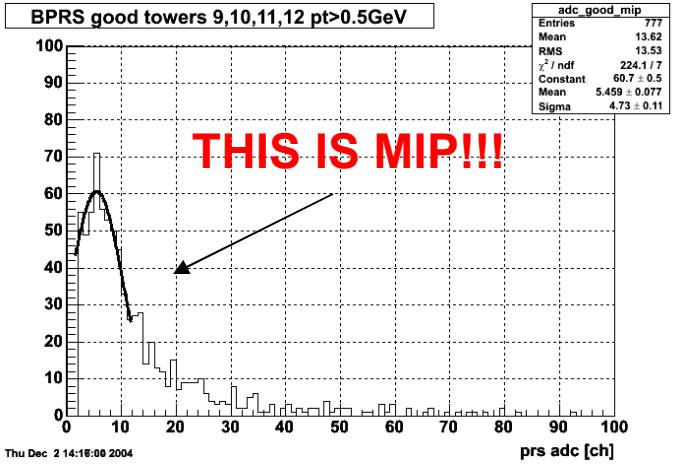
Energy correlation

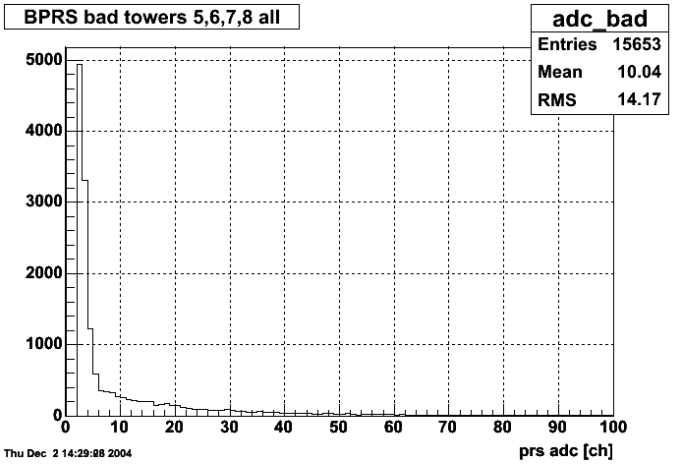


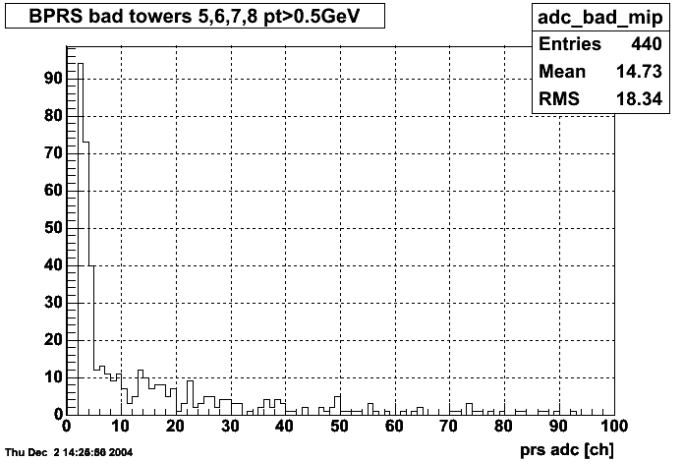


MIPs with bad and good towers









GOOD TOWERS shows MIPs => that is very good news

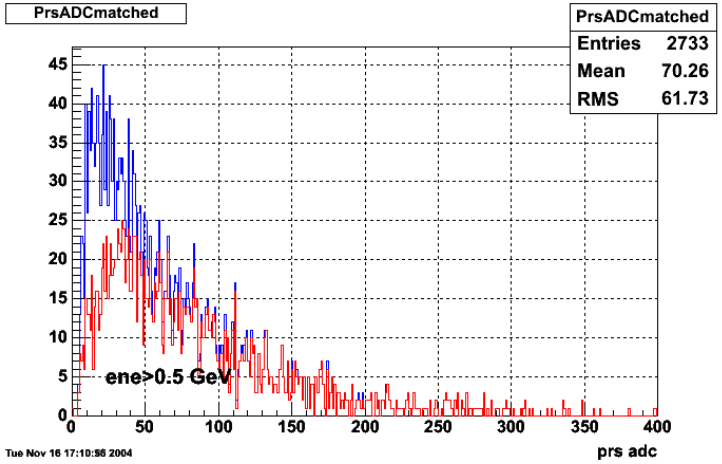
To do

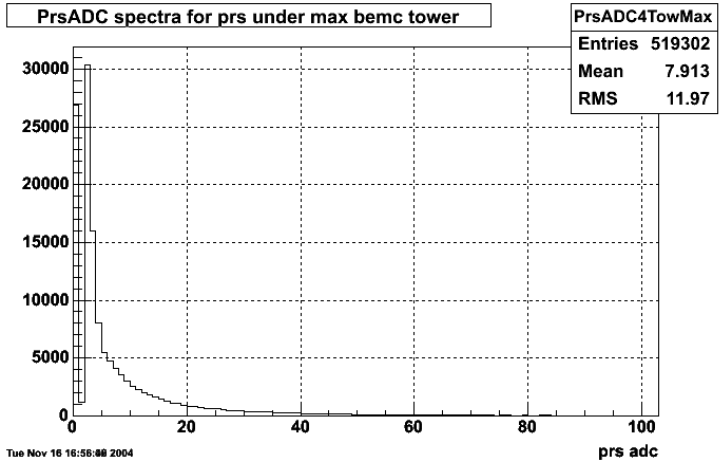
Subhasis talk : shows that this was problem with MAP
possible solution

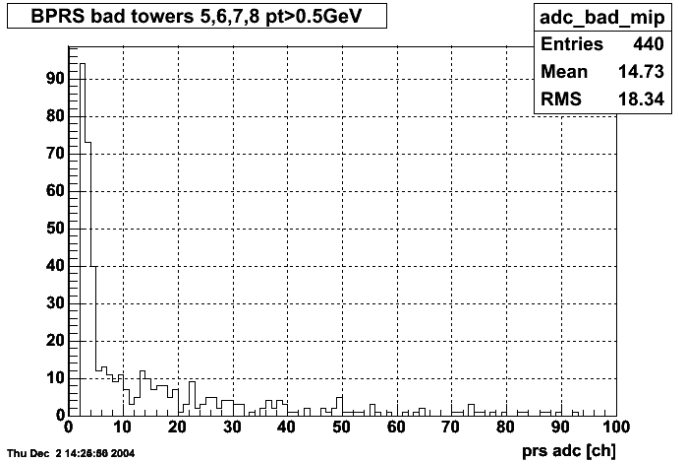
We can finnaly calibrate it **NOW it is just peanuts!**

Study lepton ID improvement

Adc spectra

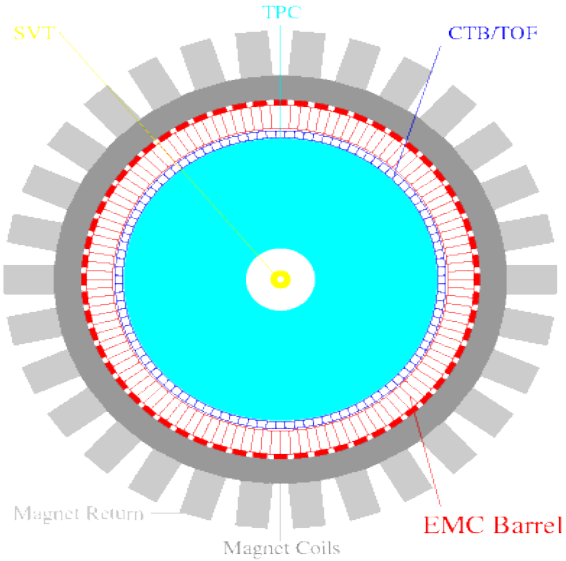

PrsADCmatched
PrsADCmatched
Entries 2733
Mean 70.26
RMS 61.73
ene>0.5 GeV
prs adc
Tue Nov 16 17:10:58 2004

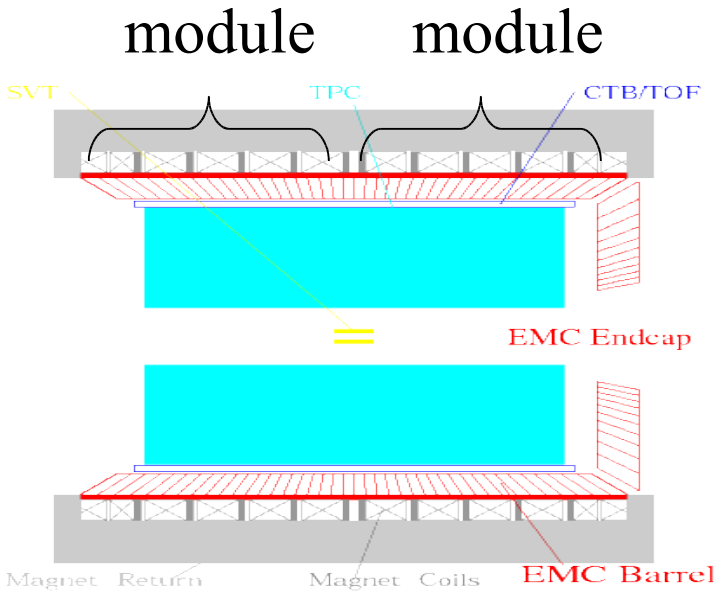

PrsADC spectra for prs under max bemc tower
PrsADC4TowMax
Entries 519302
Mean 7.913
RMS 11.97
prs adc
Tue Nov 16 16:58:58 2004

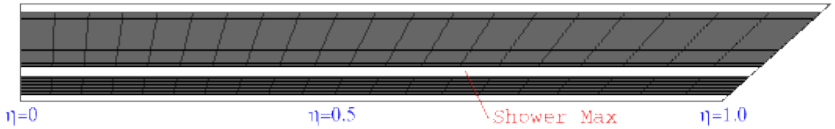

BPRS bad towers 5,6,7,8 pt>0.5GeV
adc_bad_mip
Entries 440
Mean 14.73
RMS 18.34
prs adc [ch]
Thu Dec 2 14:28:58 2004

BEMC geometry

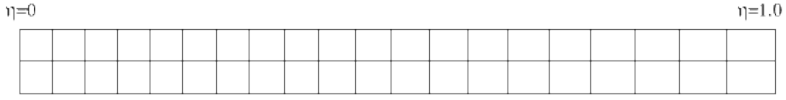
front view 60 emc modules





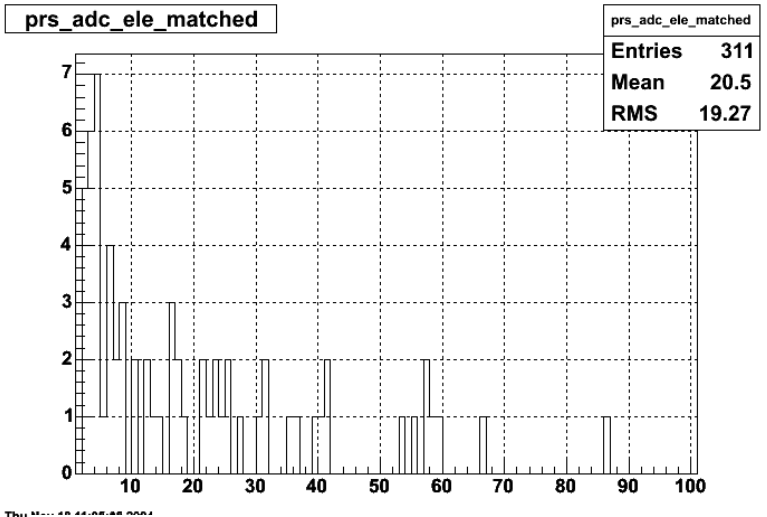


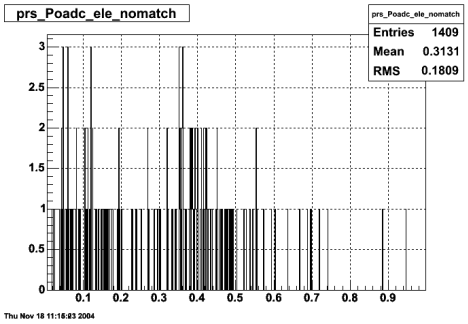
module side view

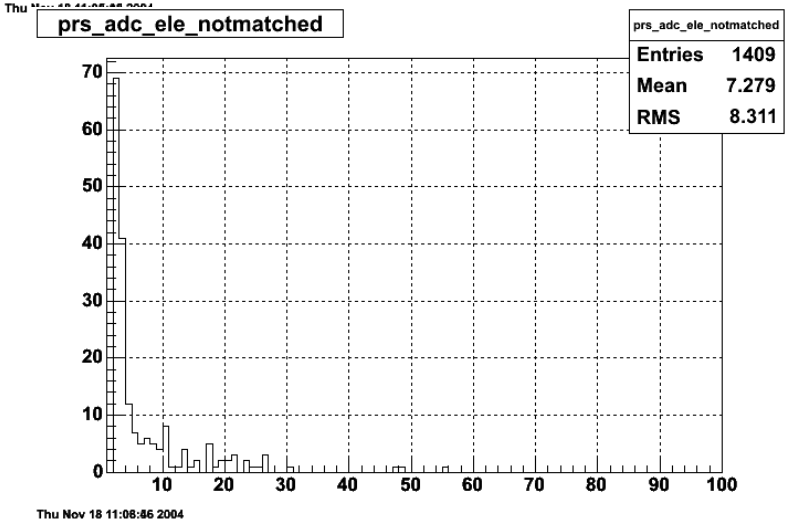


module top view

ETA	MIP ADC	MIP ENERGY (GeV)
e= 1	7.0305	0.0355 (+/- 0.0240)
e= 2	7.2614	0.0332 (+/- 0.0213)
e= 3	6.8939	0.0349 (+/- 0.0235)
e= 4	7.5919	0.0369 (+/- 0.0262)
e= 5	7.4255	0.0338 (+/- 0.0252)
e= 6	7.6160	0.0348 (+/- 0.0265)
e= 7	7.9097	0.0350 (+/- 0.0278)
e= 8	7.4636	0.0351 (+/- 0.0253)
e= 9	7.6321	0.0412 (+/- 0.0224)
e= 10	7.3018	0.0413 (+/- 0.0220)
e= 11	8.0859	0.0435 (+/- 0.0216)
e= 12	7.0524	0.0387 (+/- 0.0242)
e= 13	7.8205	0.0463 (+/- 0.0271)
e= 14	6.8425	0.0426 (+/- 0.0235)
e= 15	7.8134	0.0433 (+/- 0.0245)
e= 16	7.1765	0.0415 (+/- 0.0206)
e= 17	7.3744	0.0446 (+/- 0.0247)
e= 18	7.7141	0.0494 (+/- 0.0293)
e= 19	7.1439	0.0424 (+/- 0.0297)
e= 20	7.9555	0.0350 (+/- 0.0238)


prs_adc_ele_matched
prs_adc_ele_matched
Entries 311
Mean 20.5
RMS 19.27


prs_Poadc_ele_nomatch
prs_Poadc_ele_nomatch
Entries 1409
Mean 0.3131
RMS 0.1809
Thu Nov 18 11:16:23 2004


prs_adc_ele_notmatched
prs_adc_ele_notmatched
Entries 1409
Mean 7.279
RMS 8.311
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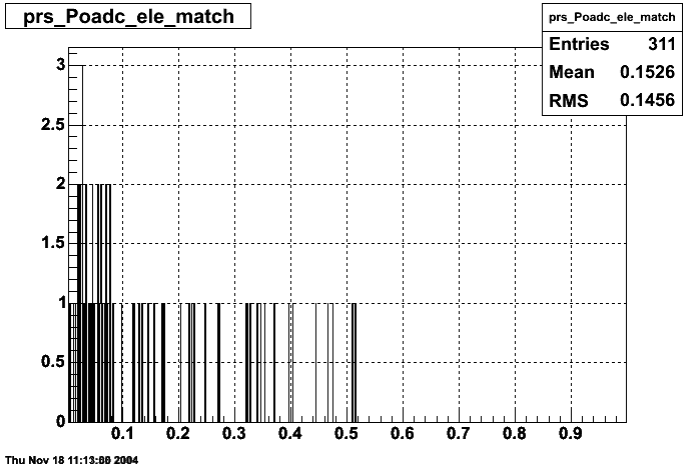
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prs_Poadc_ele_match
Entries 311
Mean 0.1526
RMS 0.1456
Thu Nov 18 11:13:88 2004