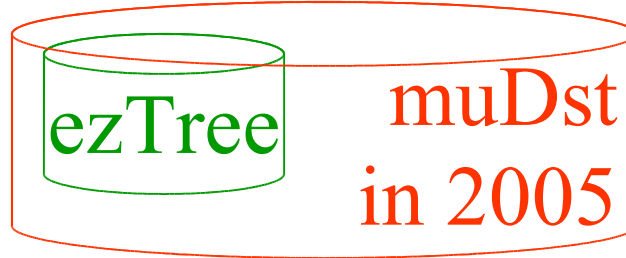


EEMC Software Overview

- ezTree – 1:1 raw data container
- Offline analysis schemes w/o tracking
- Online/fast-offline tools
- DB organization /run selection
- New EEMC algos: π^0 and MIP w/ SMD
- Summary of EEMC software meeting @ IUCF

Jan Balewski, IUCF
STAR Collaboration Meeting
July 17, 2004

branches



•EVE HEADER:

mEventNumber, mToken, mTimeStamp, mRunNumber

• EEMC ADC: ETOW, ESMD

• BEMC ADC: BTOW, pres, smd

•TRIG:

bXing: bX48hi, bX48lo, bX7bit; npre,npost;

triggered ID: daqbits, offline_id[32]

E-EMC DSM inputs : EEMC[144] , EEMC_L1[16]

B-EMC DSM inputs : BEMC[2][240] , BEMC_L1[48]

BBC and ZDC DMS level-2 inputs : VTX[8]

B+E EMC level-2 inputs: EMC[8]

level-3 (last) DSM inputs : lastDSM[8]

CTB hits: CTB[240]

•L3 tracks (if available)

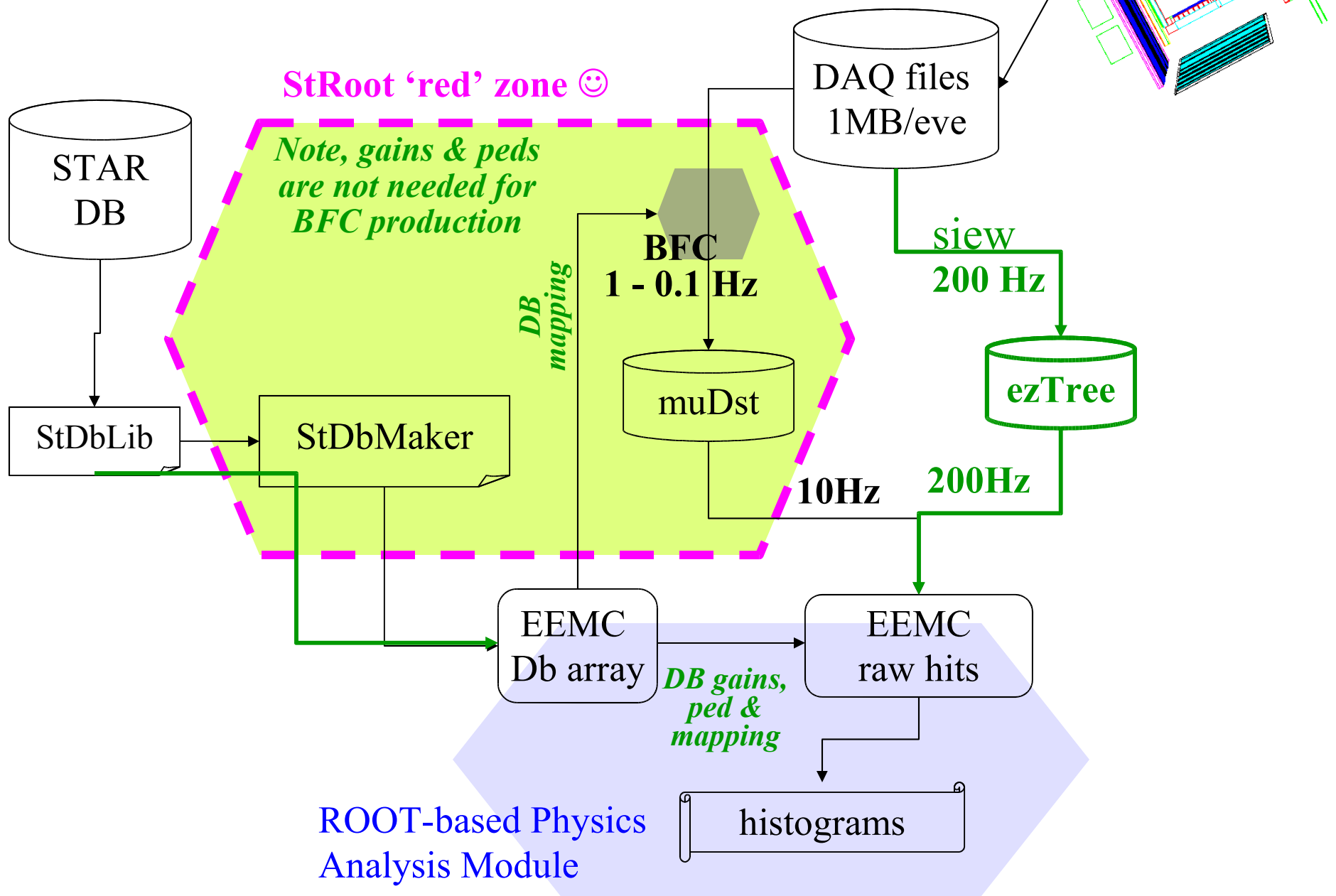
**ezTree is TTree containig
1:1 copy of DAQ files**

**Size: 5 or 30*) kB/eve in 2004
2-3 x more in 2005+**

*) with BSMD & BPRS

EEMC analysis is 'dual boot'

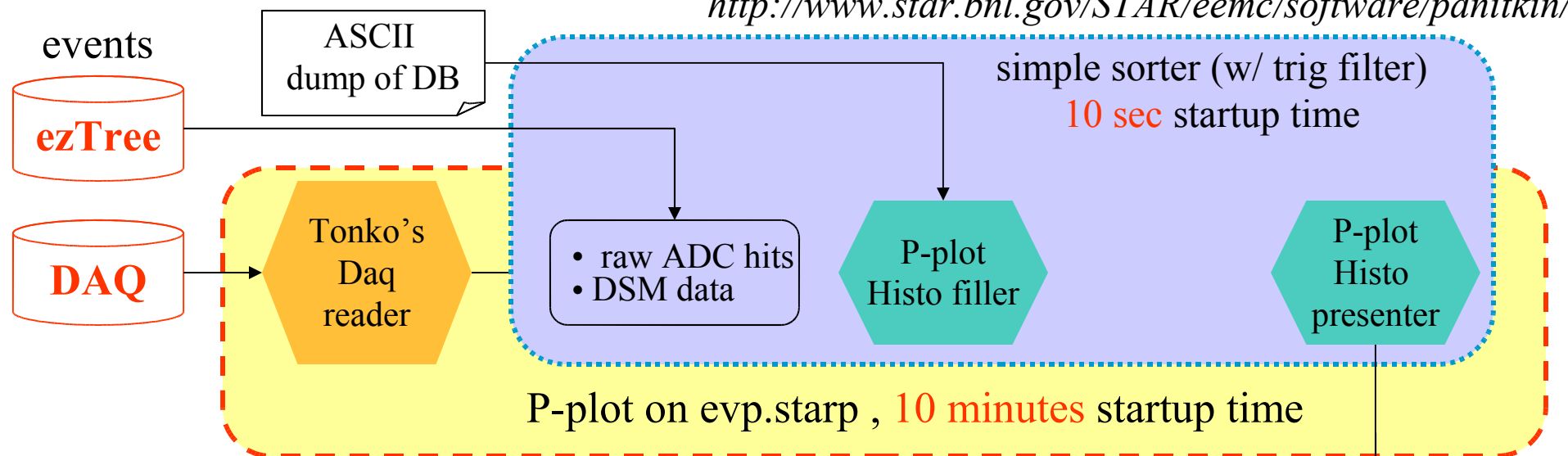
<http://www.star.bnl.gov/STAR/eemc/software/StEzExample/>



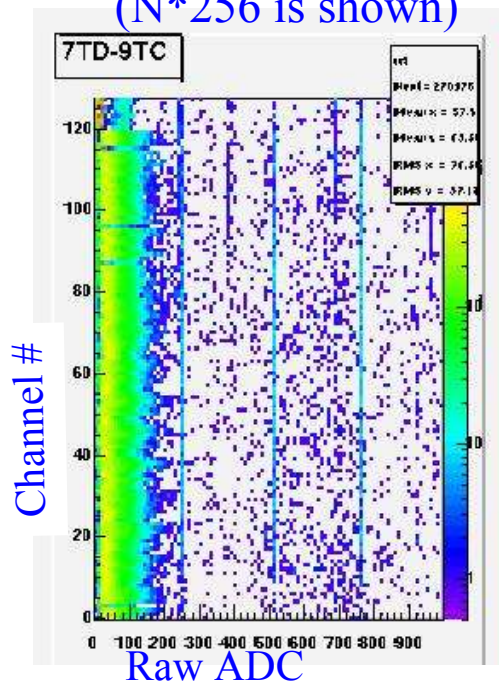
EEMC in 'Panitkin plots'

Hal Spinka, Jim Sowinski 4

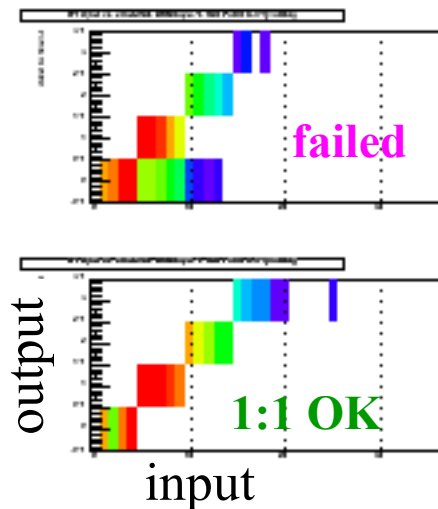
<http://www.star.bnl.gov/STAR/eemc/software/panitkin/>



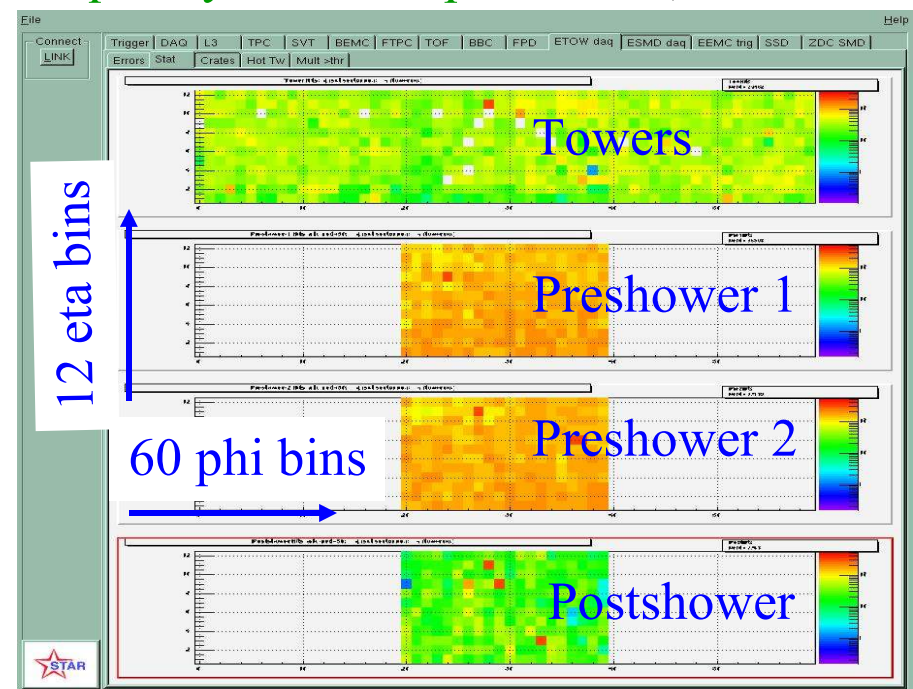
ADC data corruption
($N \times 256$ is shown)



Trigger problems
(broken DSM-1 logic)

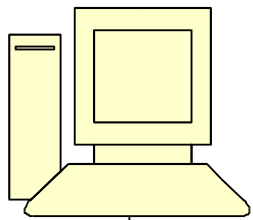


Frequency of ADC-ped > thres



watchDog – EEMC fast offline

evp01.starp



scp
3 mnts

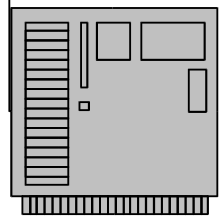


siew
5 mnts



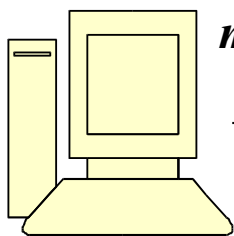
native format

Carousel
30 mnts



HPSS

miniDaq



Sorter 5 mnts

TclTk GUI calling ROOT scripts

Script

path

(nEve,file,secF,secL)

HISTO: crates-> pixels->

Script

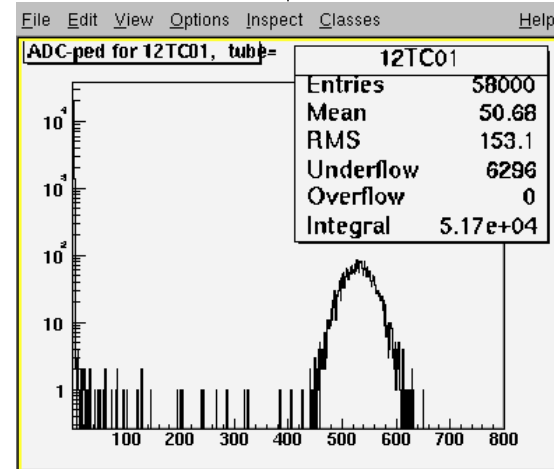
open()

plPixel(name) <-- T,P,Q,R,U,V

plRate(thres) ☒ spiral ☐ radial

presenter

$F = \text{new TFile}(..)$
 $F \rightarrow \text{Get}() \rightarrow \text{Draw}()$



http://www.star.bnl.gov/STAR/eemc/how_to/watchDog/

Alignment of Peds in FEE

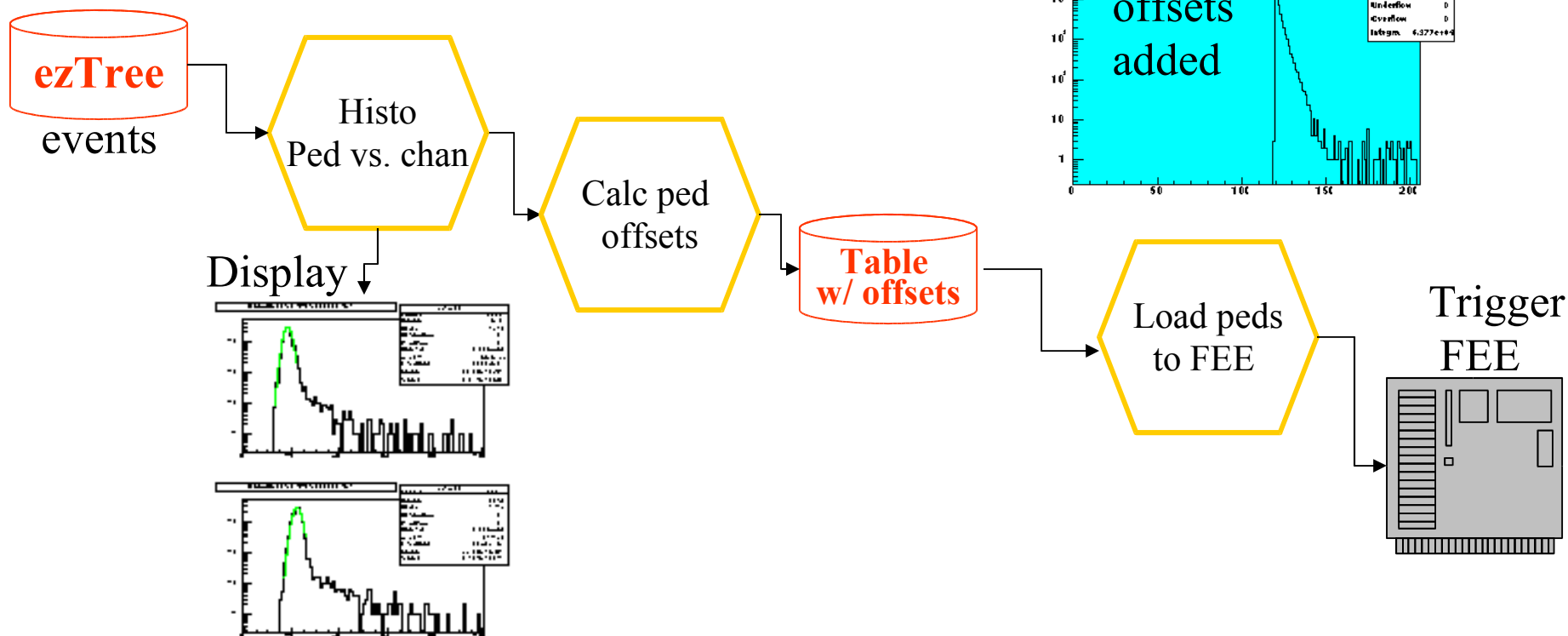
6

Comparison of DSM JP sum width before and after pedestal alignment

Problem (solved last year):

- trigger decision is based on ADC $\gg 3$
- JP sum is broad due to accumulated round-off error
- software offsets are needed to place all peds in chan 24

Continuous monitoring of tower peds is required.



http://www.star.bnl.gov/STAR/eemc/how_to/feePed/

EEMC DB tools

P.Zolnierczuk, IUCF⁷

```
rcas6007:~/ezGames/dbase/src>cat $STAR/StRoot/StEemcDbMaker/cstructs/eemcDbPMTcal.hh
```

```
struct eemcDbPMTcal {  
  char name[EEMCDBMaxPmtName]; /* PMT ID sector/box/tower */  
  float gain[EEMCDBMaxPmt]; /* pmt effective gain of the tower */  
  float egain[EEMCDBMaxPmt]; /* error of the gain */  
  float hv[EEMCDBMaxPmt]; /* pmt actual HV (V), dac=HV/HVmax*1023 */  
  char comment[EEMCDBMaxComment];  
};
```

c-struct
defining DB
record

TclTk GUI using ASCII interface

The screenshot shows the tkEemcDb GUI. The title bar reads "tkEemcDb". The menu bar includes "File", "DBase: Calibrations_eemc", "Config: Ver2004d", "Flavor: expoSlope1", "Tcl/Tk EEMC DBASE INTERFACE v1.7", "IUCF 2002-2003", and "Help". The main window is titled "Select DB Table" and displays a table of calibration data for "sector05/eemcPIXcal". The table has columns: name, gain, and egain. The data rows show various PMT IDs (e.g., 05U171, 05U172, etc.) and their corresponding gain and error values. A green arrow points to the "Flavor: expoSlope1" field with the text "Select flavor != 'ofl'". Another green arrow points to the "sector05/eemcPIXcal" table selection with the text "Select sector/table". A third green arrow points to the "Time Stamp" field at the bottom with the text "Select time stamp". The bottom status bar shows "Time Stamp 2004-07-12 12:04:25" and "Current Time".

name	gain	egain
[string]	[float]	[float]
05U171	92.0706	4.0808
05U172	42.6905	1.2462
05U173	52.6573	1.6773
05U174	53.3404	1.7044
05U175	40.9229	1.1944
05U176	42.9446	1.2588
05U177	61.7615	2.1460
05U178	41.7990	1.2481
05U179	73.5635	2.8712
05U180	46.9517	1.4871
05U181	48.3064	1.6234
05U182	37.4355	1.1620
05U183	0.0000	-5.0000
05U184	47.6448	1.5620
05U185	107.0000	5.7331
05U186	87.6622	4.0966
05U187	80.6943	3.5385
05U188	86.6755	4.0760
05U189	67.7127	2.7383
05U190	20.4624	0.9507

Database Access Log

```
#####  
eemcDb: problem with fetch for time stamp 1089651833 / Mon Jul 12 13:03:53 2004  
There is no record for this table over the time period:  
BeginDate = 20040712170353      EndDate = 20371231120000  
BeginTimeUnix = 1089651833      EndTimeUnix = 2145873600  
#####  
# DBASE READ ACCESS TO TABLE sector05/eemcPIXcal AT Mon Jul 12 12:04:25  
#####
```

ASCII
interface
to DB
(StDbLib)

```
balewski@rcas6007  
usage: eemcDb --path <path> [EXTRA_OPTIONS]  
-Dl--database <name> : data base to use (default Calibrations_eemc)  
-pl--path <path> : full path to the table  
-tl--time <time> : sets query time (default: now)  
-xl--expire <time> : sets query expiration time (default: forever)  
-fl--flavor : set database flavor (default ofl)  
-fl--file <file> : set file name for I/O (default: stdin/stdout)  
-gl--getl--read : get (read) data from database (default)  
-sl--wl--setl--write : set (write) data to database  
-cl--comment <txt> : set db comment (default user id)  
-Tl--tree : print config tree  
-Hl--history : print time line for node  
-Cl--config : print available config versions  
-dl--dataonly : don't write #node/table line, just the data  
-vl--verbose : set verbose mode on  
-ql--quiet : set quiet mode on  
-hl--help : this short help  
supported time formats (cf. man date):  
%Y-%m-%d %H:%M:%S e.g.: 2004-07-12 15:44:35  
%Y-%m-%d %H:%M e.g.: 2004-07-12 15:44  
%Y-%m-%d e.g.: 2004-07-12  
%s e.g.: 1089665075
```

EEMC calibration for 2004

8

STAR Endcap Software WebLog

Topic: Run 2004 **Entry:**#605

Author: Jan Balewski

Keyword: 2004 DB tables in use (Jan)

Created: 2004/02/05 09:47:36

Modified: 2004/07/12 12:55:01

[< Previous](#)

[Edit](#)

[Index](#)

[Delete](#)

[Next >](#)

Status of DB records valid for 2004 data processing, updated June 2004

Loaded records

table	sec 1	sec 2	sec 3	sec 4	sec 5	sec 6	sec 7	sec 8	sec 9	sec 10	sec 11	sec 12	sec 13
eemcADCconf	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	dum
eemcPMTname	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	ok	dum
	dum	dum	dum	dum	AA-dum 62-F	AA-dum 62-F	AA-dum 62-F	AA-dum 62-F	dum	dum	dum	dum	dum
eemcPMTcal	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	slope1 AA	dum
eemcPMTped	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	AA-F 62-ok pp-ok	dum
eemcPMTstat	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	AA-dum 62-ok pp-ok	dum

Mapping=OK {

Pre/Post/SMD calibration
prelim, use flavors!=‘ofl’

Tower calibration
prelim, default

Peds: AuAu200 —online
AuAU62, pp200 —final

Dead channels:
as for peds

Monitoring of Peds/Broken Channels

9

Offline analysis of all pedestal runs (ezTree) , Murad Sarsour, IUCF

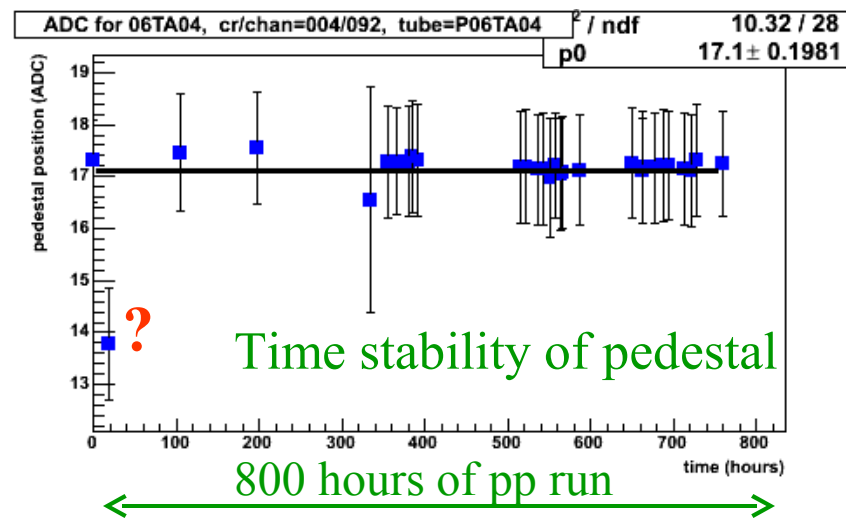
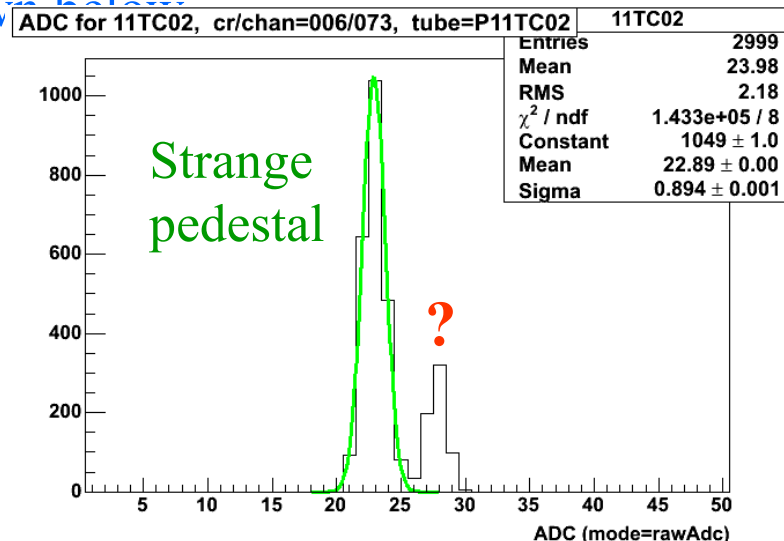
- width/position/time stability for every tower/pre/post/smd strips (4000 chan)
- 2D (time and channel #) error report table shown below

Address <http://www.star.bnl.gov/STAR/eemc/calibration/run4/pedpp200gev/>

timeScan log

List of bad/suspicious channels. # are runs. Pixels are sorted by crate/
Each file has 2 values: the report from given run (W=warning, F=fatal)
MAPMT & below 3 ch fr ETOW).

i	crate/chan	name	#1	#2	#3	#4	?#5	#6	#7	#8	#9
1	001/022	12TA11	..	..	..	..	F	..	..	..	..
2	001/030	12TB11	..	..	..	..	..	..	..	..	..
3	001/099	12TC07	..	..	..	..	F	..	..	..	..
4	002/042	02TD03	..	..	..	..	F	..	..	..	..
5	002/045	02TD10	..	..	..	..	F	..	..	..	..
6	002/055	02TE12	..	..	..	..	F	..	..	..	..
7	002/062	03TA11	..	..	..	..	F	..	..	..	..
8	002/081	01TD05	..	..	..	..	W	..	..	..	..
9	003/001	03TD02	..	..	..	W	..	..	..	..	..
10	003/013	03TE10	..	..	..	..	F	..	..	..	..
11	003/020	04TA09	..	..	..	..	F	..	..	..	..
12	003/024	04TB01	..	..	..	..	F	..	..	..	..
13	003/029	04TB10	..	..	..	..	F	..	..	..	..
14	003/030	04TB11	..	..	..	..	F	..	..	..	..
15	003/034	04TC03	..	..	..	..	F	..	..	..	..
16	003/060	05TA09	..	..	..	..	W	..	..	..	..
17	003/095	04TB07	W	W	W	W	W	W	W	W	W
18	004/018	06TA03	F	F	F	F	F	F	F	F	F
19	004/060	07TA09	..	..	..	..	F	..	..	..	..



- Comma Separated Values (CSV) format simplifies automatization & visualisation.

- pp200: **pp200-ver4A.csv** , EEMC run QA is done
- AuAu 62: **auau62-ver2.csv** , EEMC run QA is done
- AuAu 200: **auau200-ver0x.csv** , no run QA

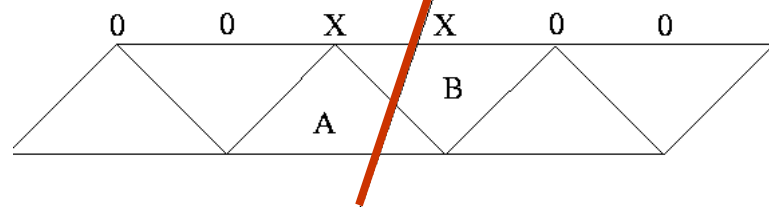
Address http://www.star.bnl.gov/protected/spin/balewski/2004/summary/pp200-ver4a.csv															
D655		= 15381													
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	
3	rhicFill	run	eeStatus	events	fileSeq	unixStart	trigMix	detectors	completion	Start	totSeconds	Stop	Remarks+	axion	mint
629	-----	new F5336													
630	bluePol	44.1	+/- 9.1												
631	yellPol	38.8	+/- 8.2												
632		onlPol			B=48	Y=55									
633		onlPol			B=48	Y=39	hour later								
634	all runs in this store have Jet Patch problems. (051 is the first good one).														
635	F5336	R5134021	E	45808	8	1.08E+09	emcCalPP	emc eemc	Success	Thu May 1	282	Thu May 1	Jet Patch problems + Jan		
636	F5336	R5134022	E	49578	33	1.08E+09	prodPP	tpc emc ft	Success	Thu May 1	483	Thu May 1	no SVT; Jet Patch problem		
637	F5336	R5134023	E	49619	43	1.08E+09	prodPP	tpc svt emc	Success	Thu May 1	551	Thu May 1	no SVT; Jet Patch problem		
638	F5336	R5134024	E	49590	43	1.08E+09	prodPP	tpc svt emc	Success	Thu May 1	660	Thu May 1	Jet Patch problems + Jan		
639	F5336	R5134025	E	49668	40	1.08E+09	prodPP	tpc svt emc	Success	Thu May 1	582	Thu May 1	Jet Patch problems + Jan		
640	F5336	R5134026	E	49657	42	1.08E+09	prodPP	tpc svt emc	Success	Thu May 1	600	Thu May 1	Jet Patch problems + Jan		
641	F5336	R5134027	E	49672	45	1.08E+09	prodPP	tpc svt emc	Success	Thu May 1	508	Thu May 1	no record; Jet Patch problem		

MIPs from Isolated Pairs of SMD Strips

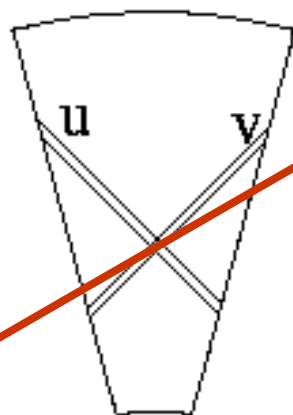
11

Murad Sarsour +JB, IUCF

SMD cross section



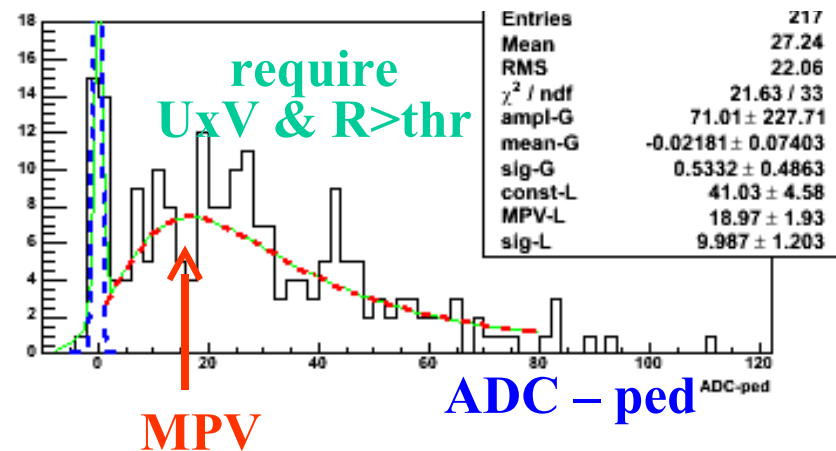
U & V planes
are orthogonal
in each sector



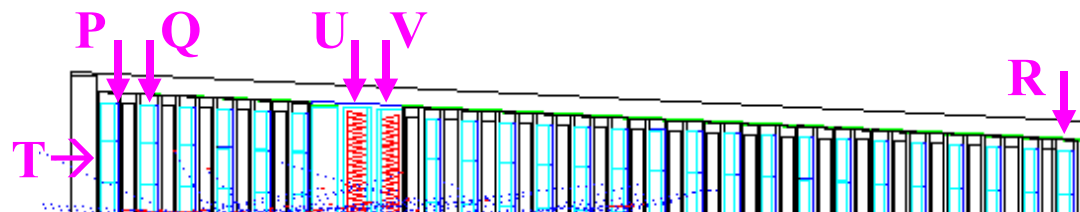
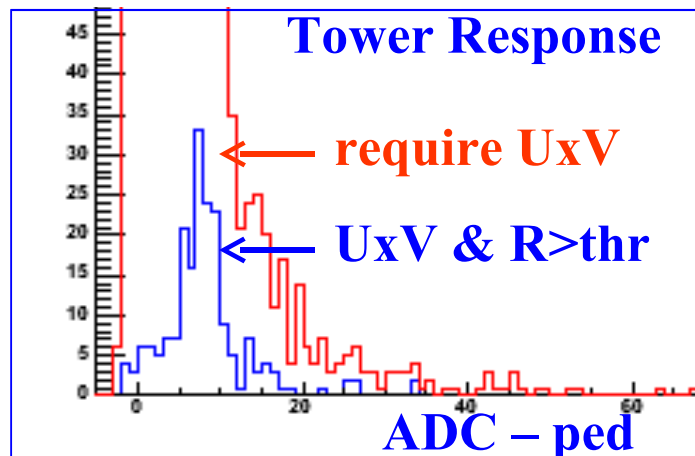
MIP

Vertex

Preshower 1



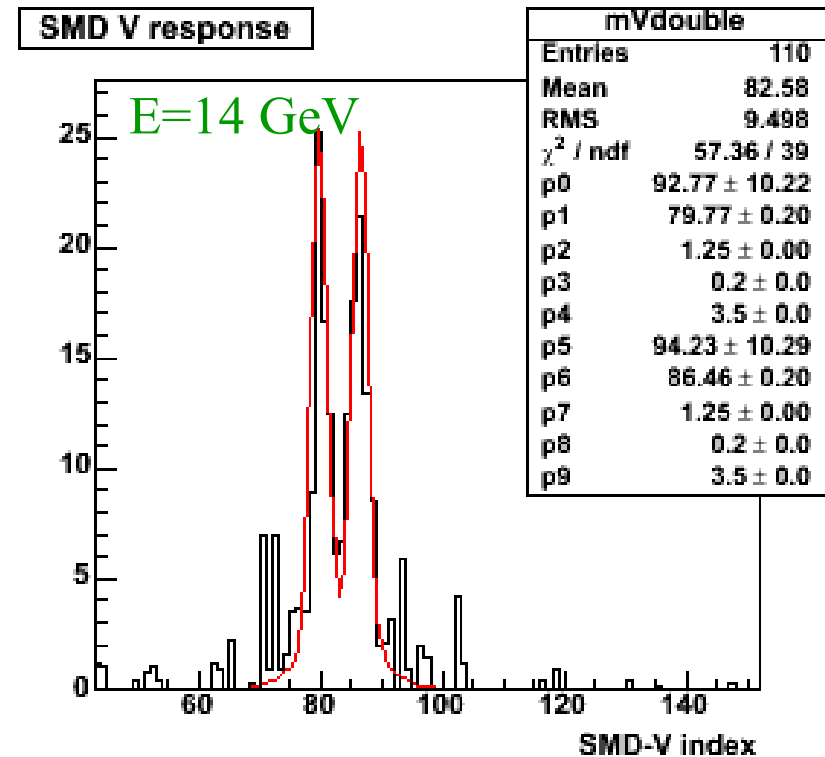
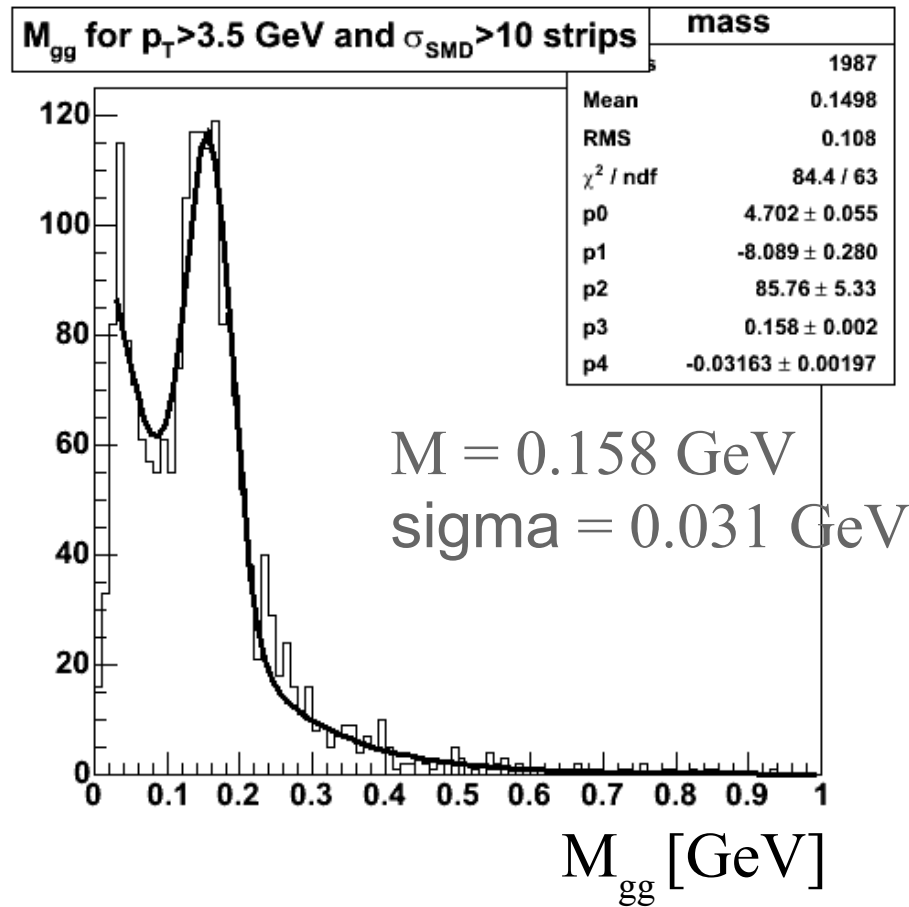
Used 1,600,000 minB pp200 events.



<http://www.star.bnl.gov/STAR/eemc/calibration/run4/smdMip00xx00/>

Pi0 reco with SMD & Towers

Jason Webb, IUCF

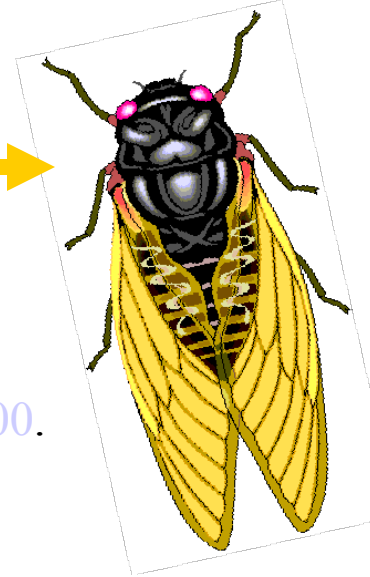


EEMC Software Meeting Summary

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EEMC software Meeting at IUCF Indiana, May 22, 2004

- Draft agenda
- Jan: Status of EEMC software .ppt
- Renee Fatemi: Tower calibration .ppt
- Jason Webb : SMD calibration .ppt .pdf
- Robert Cadman: tracking MIP's to SMD, events with nPrimTracks below 300.
- David Relyea: Pre/Post calibration with tracks .ppt)
- Steve Vigdor: physics/analysis goals .ppt)
- Will Jacobs: task assignment.doc or .pdf



<http://www.star.bnl.gov/protected/spin/eemc/>

- calibration: final pre/post/smd using MIP's /slopes
- software : include BSMD in ezTree (done)
- convert bulk of pp200 from 2004 → ezTree (full B+E EMC data & Trig)
- analysis:
 - π^0 , eta from pp200, AuAu62
 - Jets reco from pp200
- new algorithms:
 - π^0 /gamma discrimination
 - M-C: slow simulator of SMD response (photon stat)
 - Tracking
 - extension to eta ~ 1.6 w/ vertex & SMD point
 - use E_T from EMC as constrain ($W^{+/-}$)
 - reco electromagnetic energy in EEMC
 - embedding



EEMC Wish List

- Receive continuous support from STAR software team, THANKS !
- materialize plan:
 - ezTree with raw DAQ data is branch of muDst
 - improve muDst I/O from 10 Hz $\rightarrow$ 200Hz
 - add missing fast detectors
 - run muDst production on all events during data taking
 - adopt E- & B-EMC code to feed on muDst
- Work towards 1TB disk space for E+B EMC ezTree's for 2004 data
- **Help needed with EEMC embedding machinery**

---- run 2005 operation -----

- Take pedestals before every fill (better performance monitoring)
- Save P-plots for every run, please !