Weekly Update

Arvinder Palaha

Monday, June 06, 2010

Outline

- Trigger work
  - Trigger displays
  - Current status
- Analysis work
  - Multiplicity and pileup
  - SPD response
  - Recent meetings

Trigger Work – how I left it

Created main tab showing 3 plots: L0, L2 and L2/L0 for all class in one cluster as different colours

=> “0.1 version” works ☺

=> NEW multiple axes for up to 6 classes

=> Names of classes shown on the top of screen

=> Created Twiki page for CTP shifter

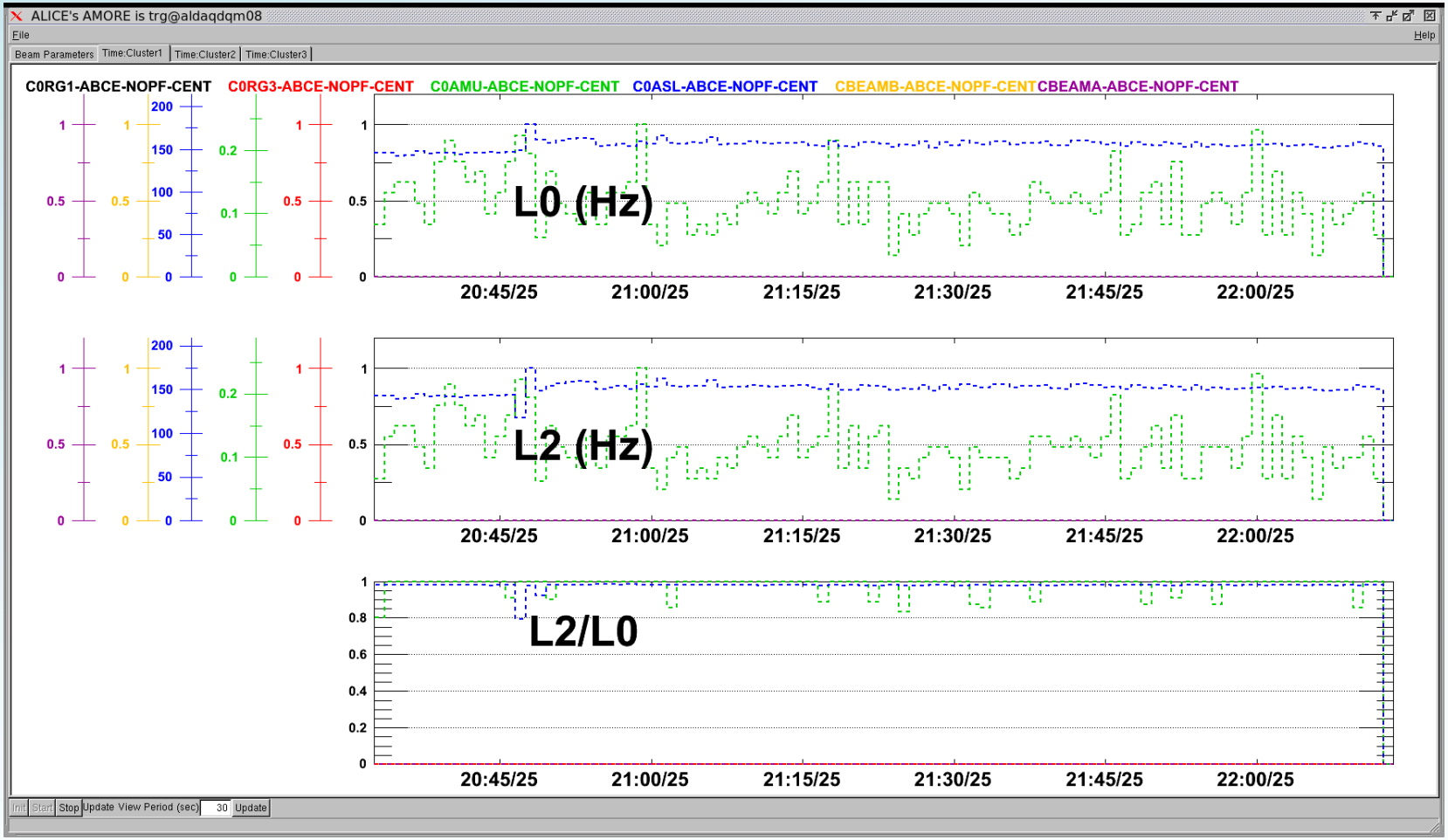
gmonscal -> graphical monscal with selectable inputs

=> auto updates when L0 input switch is changed

=> time displayed in minutes on y-axis

=> only two values on x-axis, to can fit 8-digit numbers

Trigger Work amoreTRI



Trigger Work amoreTRI > TWiki

Trigger Monitoring Tool using Amore

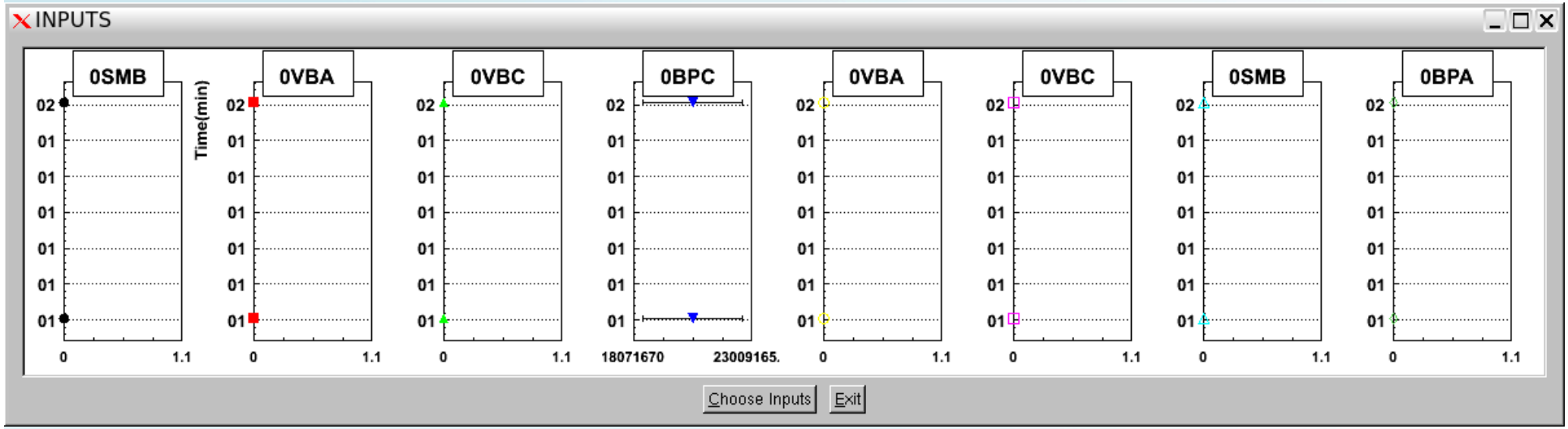
The amoreTRI monitoring tool should be started for each physics run in the Alice Control Room. The display is to be put on one of the big screens at the front of the main ACR room, specifically the second one from the right, next to the busy window. This screen along with the one to its left, and the keyboard and mouse underneath, are part of the computer called aldaqacrs4. To start the amoreTRI module, do the following:

- on the machine aldaqacrs4, go to the 2nd virtual desktop, making sure the run partition webpage is displayed on the left hand screen
- open a terminal and log on to trg@aldaqdqm08 using the normal password for username "trg"
- go to the home directory by typing 'cd', which should take you to /ocal/home/trg
- run the shell script for the corresponding run partition, for example ./PHYSICS_1.sh
- two consoles will open which act as the logs for the amoreAgent and the amoreGui, and the amoreTRI gui window will open
- in the amoreTRI gui window, click on start, and select from the top row the tab titled Cluster:X, where X is the number of the cluster that is to be displayed
- if the run has not started yet, the cluster tab will display the message "Waiting Data", or "No Cluster"

Once the amoreAgent receives a start of run signal, it will start publishing data, which the amore gui can then read and display.

Should the run stop and then start again without changing the partition configuration, the amoreTRI module can be left running. However, if the partition is changed, then the gui and agent should both be closed and reopened, so it loads the new configuration.

Trigger Work gMonScal



Y axis is time in MIN, x axis is rate (Hz)

Shows maximum 20 points, old points move off the plot

Shows 8 inputs like monscal, can select which ones to show

Displayed in ACR, as part of the BUSY screen html page

Auto updates when L0 input switch changed

Trigger Display now…..

Currently showing monscal on left and gmonscal on the busy screen.

Federico A. asked Evgeny Kryshen (he's here until Sep/Oct) to take over this project, in order for the amoreTRI to publish plots to the logbook for each run

Orlando spoke to an American student about taking it over in the long term

Have discussed already with EK about amoreTRI code

Jet Analysis (still needs doing)

Soft/Hard Event selection -> Sketch!

CDF numbers

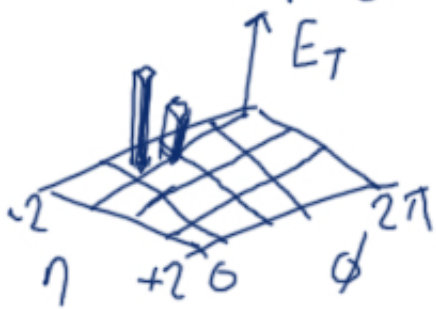
Hard event -> cluster of 1GeV with 0.1GeV in next "tower"
Soft event -> no cluster of Et > 1.1GeV

Simple start: Peak of 1GeV and above, check for large Et nearby

Give hard and soft events label
- use TTree
- fill three histograms: soft/hard/both

Plot for soft/hard/both $E\frac{d^3\sigma}{dp_T^2}$ or $\frac{1}{2\pi}\frac{d^2N_{ch}}{p_T\,dp_T\,dy}$

η and ϕ grid



NOTE: CDF used calorimetry to find Et, also used tracks for areas of low calorimetry coverage

CDF (2002) used cone radius $R = \sqrt{\Delta\phi^2 + \Delta\eta^2} = 0.7$

Reference: D. Acosta et al, CDF Collaboration, Soft and hard interactions in ppbar collisions at sqrt(s)=1800 and 630 GeV. Phys. Rev. D 65 (2002)

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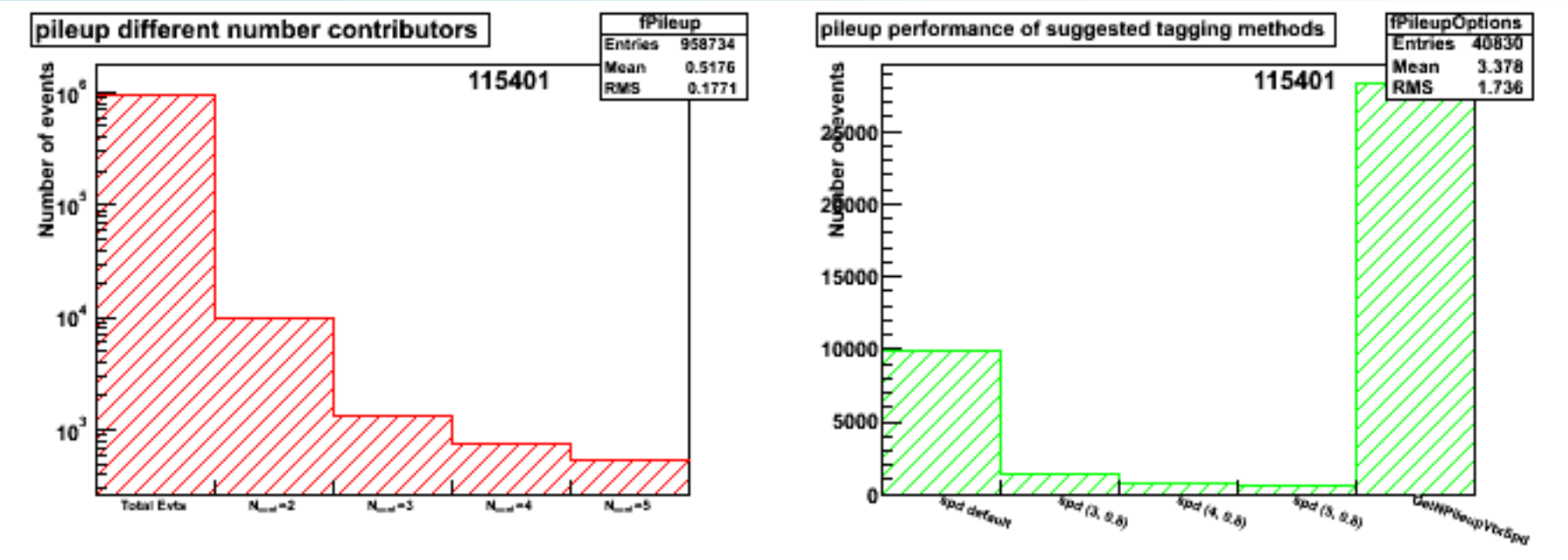
Pileup tagging types – 10/06/10

Run 115328 sample size = 1.4 million events



Using AliESDEvent::IsPileupFromSPD(a,b,c)
"a" = number of contributors to pileup vertex,
"b" = distZ, in centimetres
"c" = nSigmaDeltaZ
So then, "b" is threshold distance between vertices in cm

Using AliESDEvent::IsPileupFromSPD(a,b,c), with suggested parameters from Francesco Prino:
(2,3,2) is default
(3,0.8) suggested for high efficiency
(4,0.8) suggested for high purity (fewer false positives)
(5,0.8) suggested for high multiplicity
Final bin uses GetNumberOfPileupVerticesSPD(), giving a number. Bin entry if number is non-zero

Vertex Separation

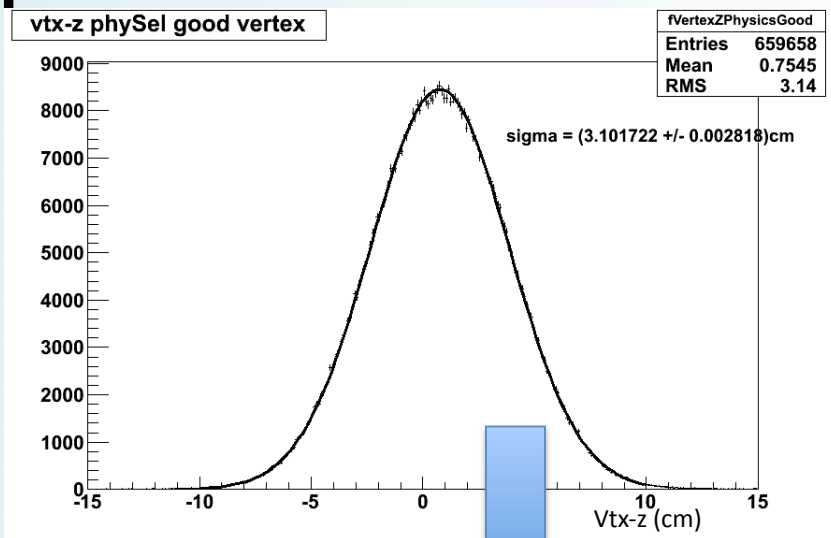
Second argument used in IsPileupFromSPD: distZ in cm.

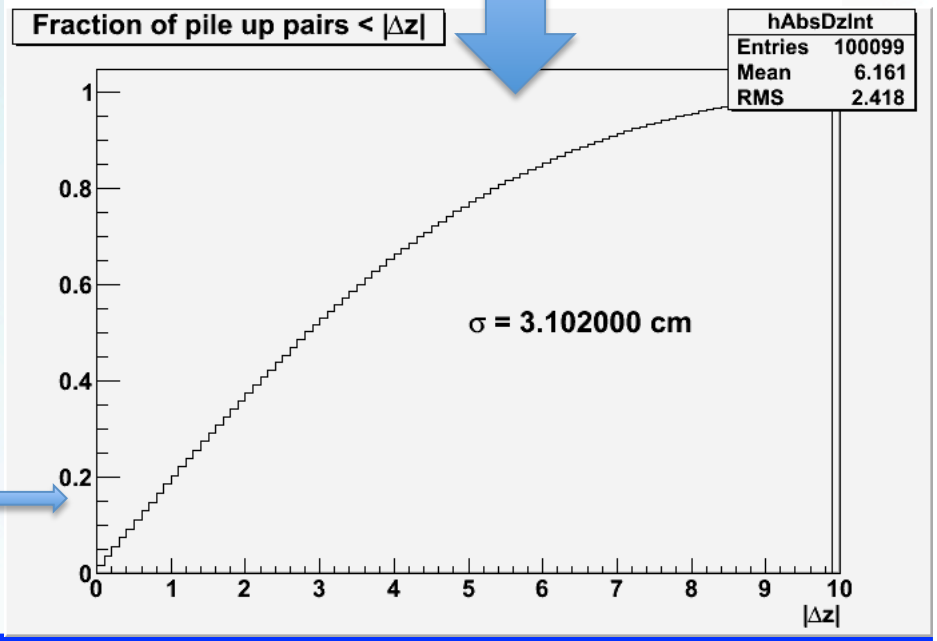
The vertex-z distribution from 115401 was fitted with a Gaussian.

This can be used to create a distribution of the separation between vertex pairs, taken at random from the Gaussian.

Can see the fraction of vertex pairs that have a smaller separation than the threshold used in the function.

Below 0.8cm, ~15% pileup events remain, which will not be findable





Calculating Expected Pileup 23.07.10

Take a single distribution:

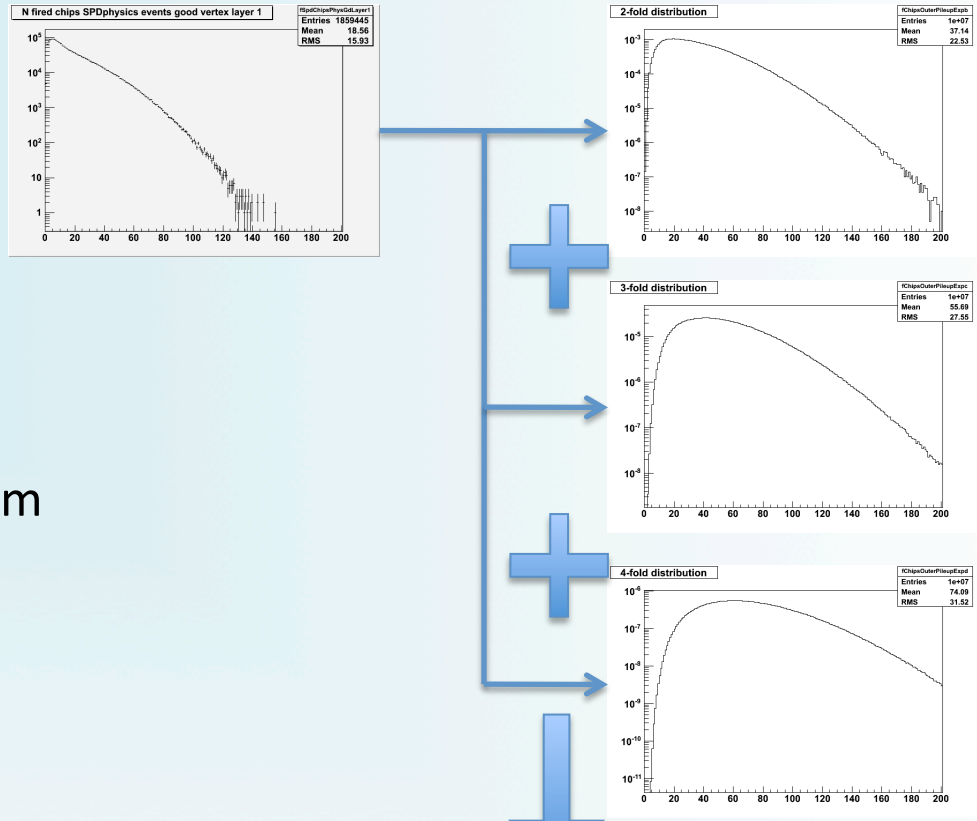
To create a double interaction distribution, take the sum of 2 random samples from the single

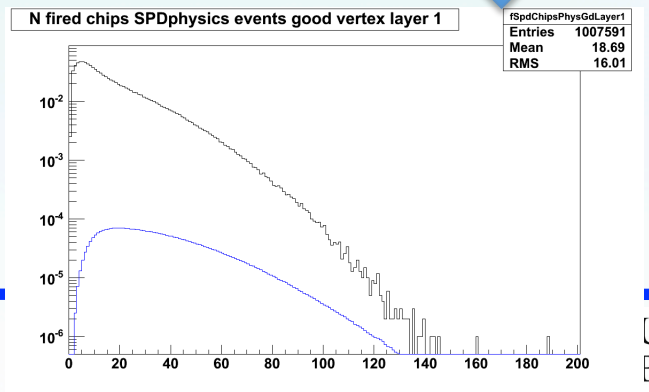
To create a triple, quadruple…n-fold etc, take the sum of 3,4…n etc random samples, repeat N times.

Scale each distribution according to mu and number of events:

$$\text{scale factor} = \frac{1}{N}\frac{P(n)}{P(1)} = \frac{1}{N}\frac{\mu^{n-1}}{n!}$$

Sum together these (normalised) n-fold to create pileup distribution for a given μ





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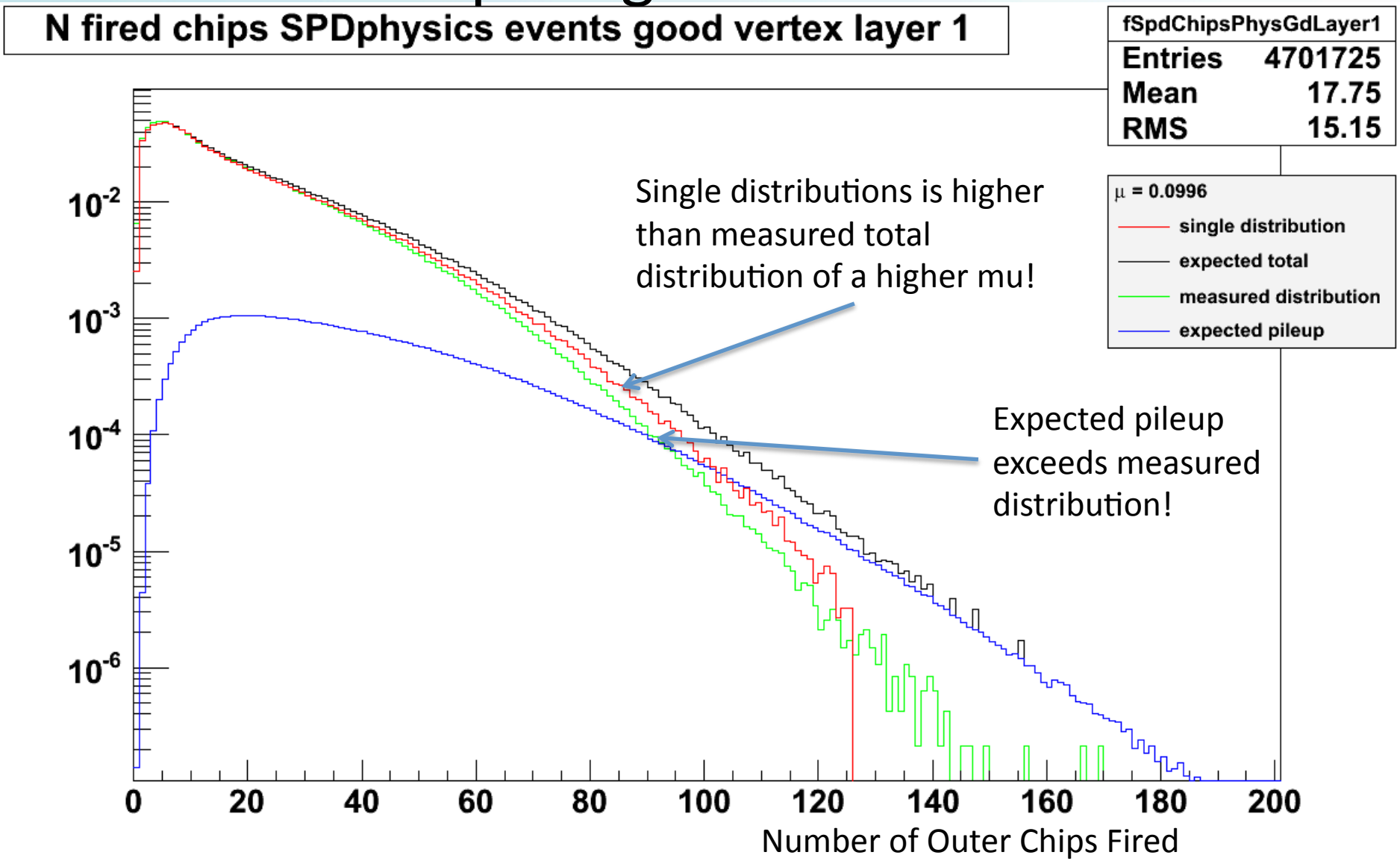
Problem comparing different runs 23.07.10



SPD response: plot Φ of tracklets 23.07.10

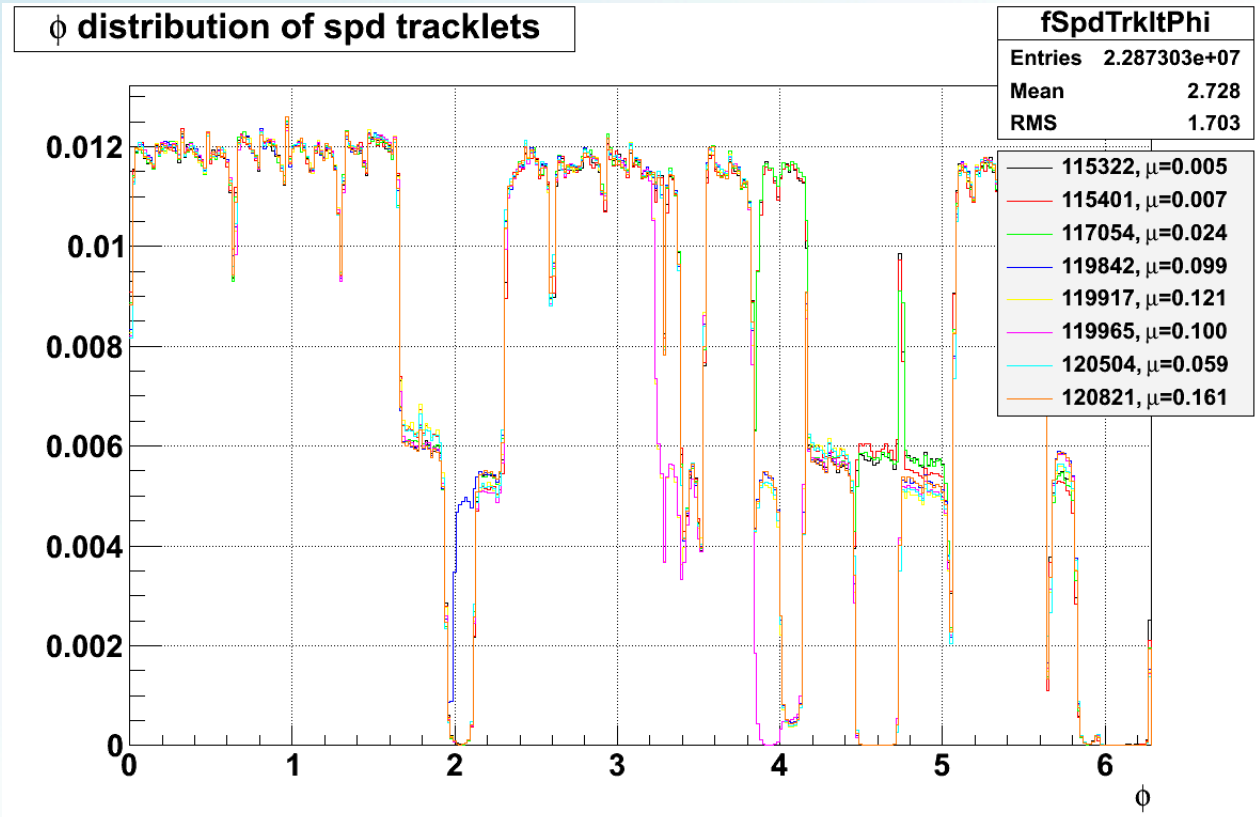
Compare phi of tracklets for all the runs used to the "single distribution run"

By comparing integrals of the plots, one can show the percentage difference of the spd response between each run and the "single" run: (115322)

115322:	100% *
115401:	99.9%
117054:	100%
119842:	93.6%
119917:	90.8%
119965:	89.2%
120504:	92.5%
120821:	92.4%

The active area of the SPD has changed between these runs!

*By definition



Conclusion 23.07.10

- The SPD response has indeed changed, what to do?

- First, one can analyse runs with the same SPD response -> same fill

- Second, one can mask the the phi sectors of the SPD which show less than full response and apply a correction -> good for statistical analysis (lots of events)

- For the future, after this correction one can compare runs and calculate the expected pileup

- From here, go on to calculate pileup tagging efficiency (I will present this soon)

Recent meetings

HM 23.07.10

- Meeting + presentation went well
- Will tackle SPD changes in between runs, then present pileup efficiency in HM meeting, as asked for -> CURRENTLY SORTING OUT GRID PROBLEMS
- JPR asked for people to do analysis on HM, I volunteered. Will meet with Michele sometime in August. List of people released in FP 02.08.10, includes lots of Bham peeps and the GSI "gang"
- It seems HM trigger is setup and ready for testing/use
- General discussion on strategy, including creating of merged MC events to test tagging

FP 02.08.10

- Mentioned list of people interested in analysis for HM, as there will be overlap, i.e. the new tracklet system (use 4 layers instead of 2)
- Wants global definition of multiplicity
- Wants me to present end of this week / next Monday on pileup efficiency
- Wants to get analysis done by end of September(!) ready for HI, so needs people to be available at CERN, especially in the beginning.
- Somebody mentioned the importance of tagging soft and hard events (told to take it to a PWG)

Analysis – the future…

Apply corrections to SPD response or use Zoe's extrapolation code to create comparable singles for different mu value runs

Analyse the pileup efficiency for the latest HM data sample (between 4 and 10 runs)

Create pileup efficiency as a function of pileup-vertex-tagger threshold separation distance (distZ parameter in the IsPileupFromSPD method, see slide on Pileup Tagging Types)

Fix the grid problem I have been getting (my output.root file is not created causing each subjob to go to EV status)

Meet with Michele about analysis plans for HM

Later on…. Start pushing event shape analysis (cones, sphericity)

Analysis – future…

Correct SPD changes between runs by either examining runs from the same fill, or masking SPD response to unchanging chips

Meet with Michele about HM analysis

Create method to extract event-by-event tag of soft/hard
- cone method (tweak CDF approach)
- sphericity (isotropic-ness of event, like topological shape in phi)

~~Send email to A.Morsch (contact was made)~~
Meet with Andreas Morsch with supervisorial backing (David)

Comments…?

Calendar

4th – 10th August	Travel to the UK (birthday on the weekend)
15th – 27th August	Fermilab Summer School
27th Aug – 6th Sept	Holidays (also in America!)