# To do list from last time...

- Edit the code to make the 3-in-a-row information available in TDS and in the ntuple . Done

- Rerun the MC events to generate the new ntuple information. Done for One Tower. 2 Towers are next.

- Write root macros to analyze the data and find inconsistencies. Done, but many possibilities still to explore.

- Format for the output of the hardware trigger box : (contribution from TEM)

Ongoing discussion with Eduardo and Heather...

# Contribution from the TEM(3-in-a-row logic):

- I&T will provide the following through the TkrReq variable in the svac ntuple:

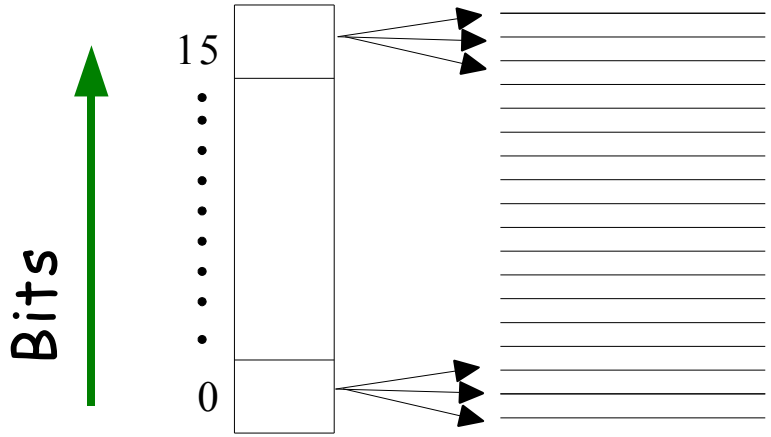
***TkrReq:*** *A 4 dimension array which describes tracker trigger request. For example: TkrReq[8][7][0][0] =1 means trigger request was sent from tower 8, layer 7, measure X and lower end of the tray. End=0 refers to low end with stripId from 0 to 768 while end=1 refers to high end with stripId from 768 to 1536.*

- Do we want a higher level quantity with 3-in-a-row information? for example a 16 bits word per every tower? For the following analysis such thing was constructed in the form of a friend tree with one branch of the type Bitword[16].

- For the MC data TkrReq is filled with 0s. Since I want to test the analysis tools(root macros) TkrReq was filled according to the information provided in TkrNumStrips (svac ntuple). Soon, spurious and missed hits will be included randomly.

# Contribution from the Digis:

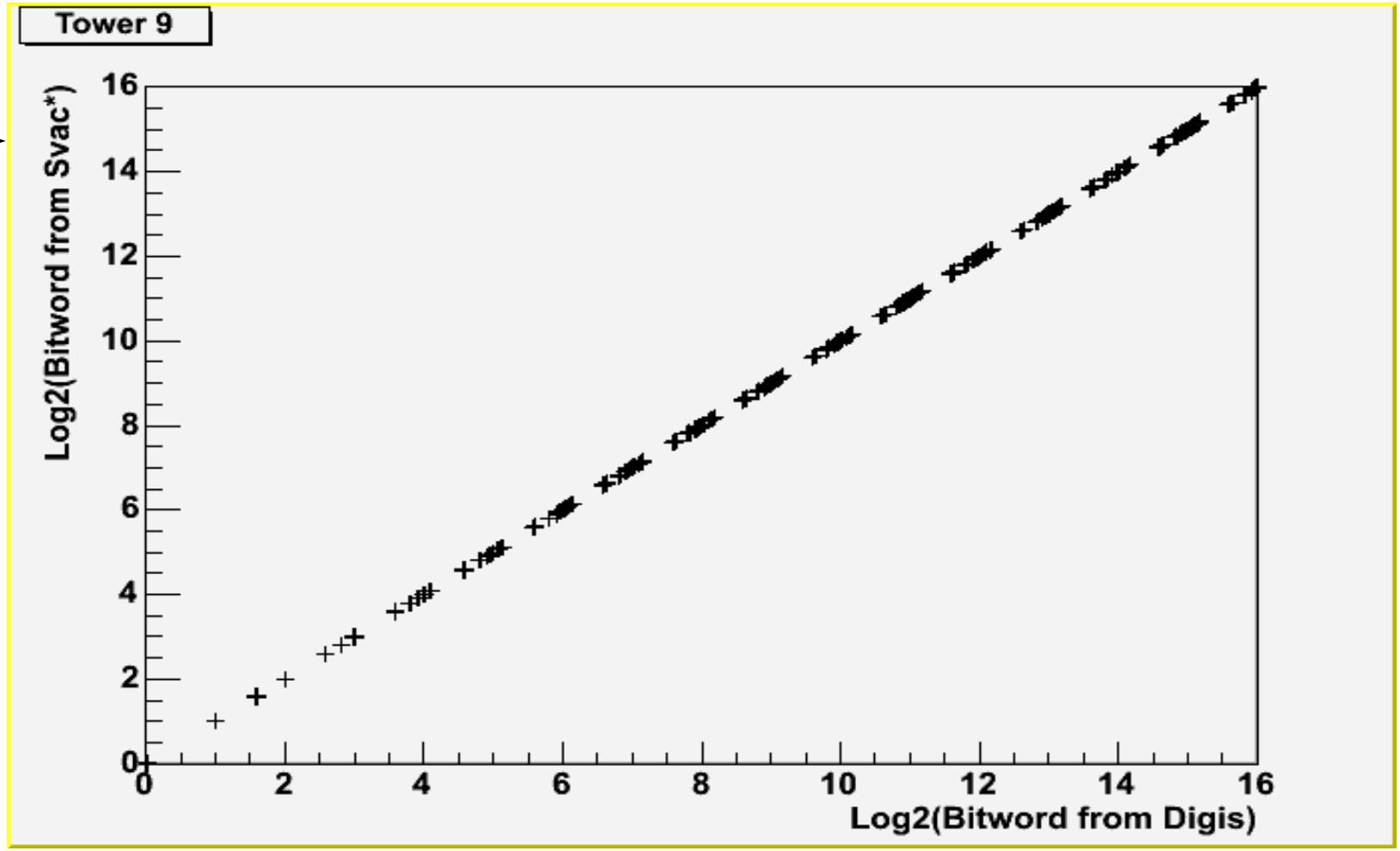
My modified version of TriggerAlg reads the digis and calculates bitwords that are made available in the merit tuple via “TkrHitValsTool”




16 bit word per every tower.

Now we are ready to compare event by event...

* Data from the modified svac ntuple as described before. When real data becomes available this will be the TEM contribution.




As expected the agreement is perfect. Any inconsistency will appear as an off-diagonal element. In case the disagreement is to small to be “seen” the root macro reports such inconsistency.

# Are all the 3-in-a-row combinations equally efficient?

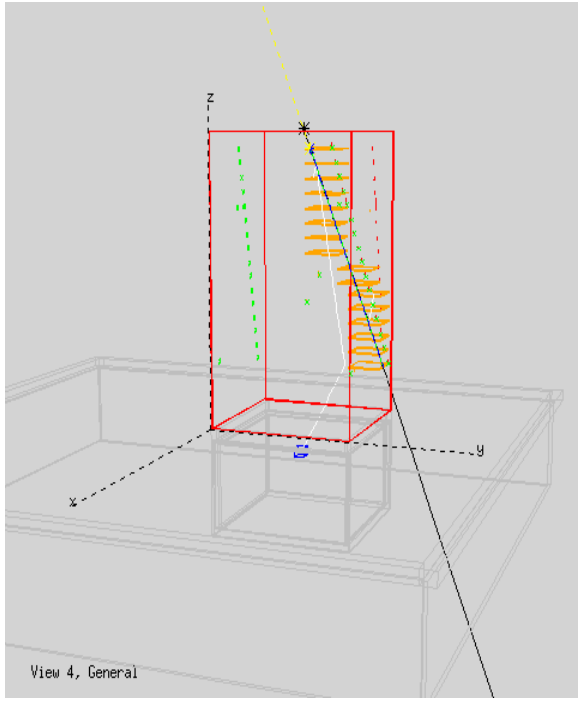
(Still in progress... )

Assuming an homogeneous flux and identical layers, one expects every combination to trigger the same number of times.


*Entries are not individual events. An event that has a hit in every layer will contribute with an entry in every bin.

Svac MC events
cosmic rays – 1 Tower

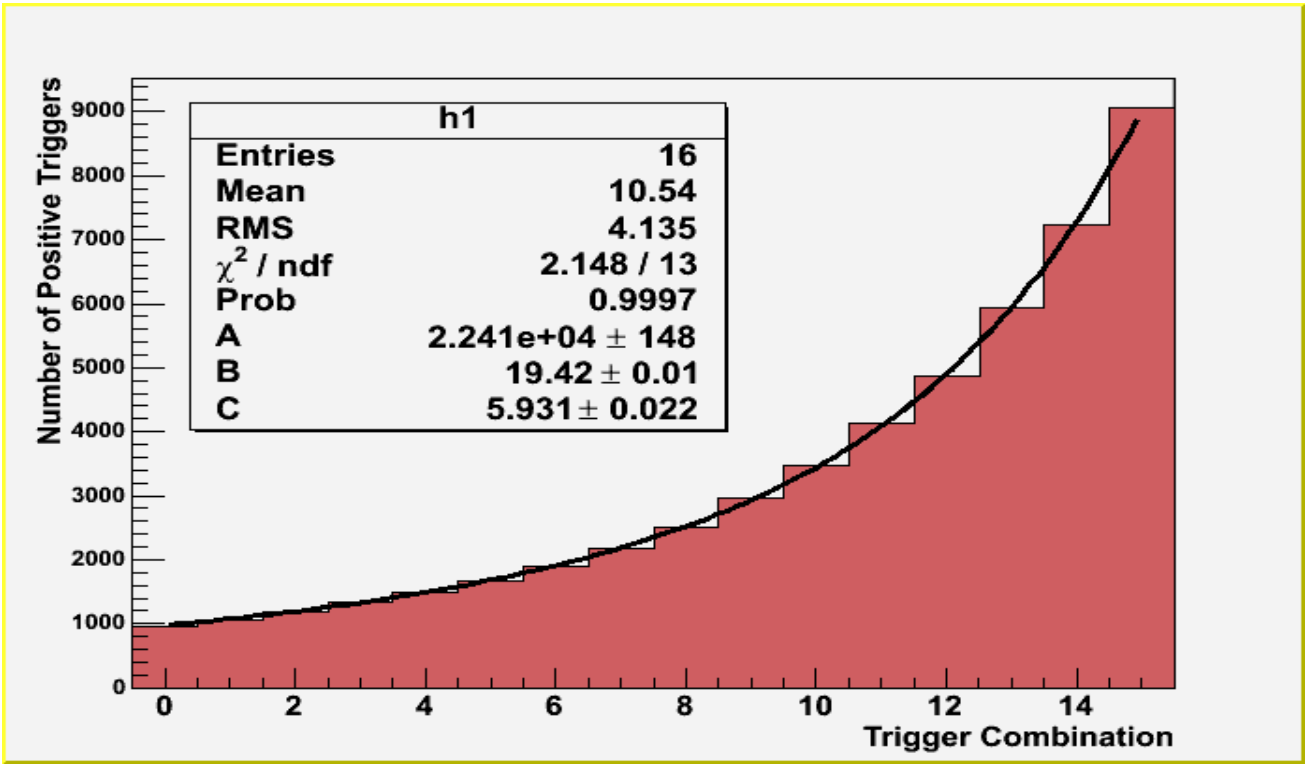
There is a slight minimum at combinations 3 and 4. Still investigating...
Non constant energy doesn't help.




# A nonphysical model...

- Muon source at the top of the tower
- Isotropic
- Monoenergetic (10 Gev)
- 20K events

*For such an ideal model the number of triggers can be calculated for each combination n:*




$$f(n) = A\left(1 - \frac{(B-n)}{\sqrt{C^2 + (B-x)^2}}\right)$$

B=Distance from the source to the bottom layer in units of tray thickness ≈ 18
C=half width of tower divided by tray thickness ≈ 5.2

*Seems like all combinations are equally efficient...*