# 10/6/24

Determining the effect of TDC offset, where bad TDC data taking could miss an event that caused the entire data to be shifted by 1 event.

Michael Metric:

Using two different RPCs across different TDCs, absolute value of minimum time channels for both RPCs were obtained. If they are the same location, they are doing great, if not, they are bad. s

Eta1 and eta 2 phi0 phi1 used to compare TDC 0 and 1

Alignment is done using trial and error.

Goal is to generalize this method into other TDCs

Current TDC mapping

TDC0 : rpc0 eta, rpc0 phi, rpc1 eta

TDC1: rpc1phi, rpc2 eta, rpc2 phi

TDC2: rpc2 phi, rpc3 eta, rpc3 phi

TDC3: rpc4 eta, rpc3 phi, rpc 5 eta

TDC4: rpc5 phi

For TDC0 and 1, the metric was calculated using

Rpc1 eta, rpc2 eta, rpc0 phi, rpc1 phi

However for all other TDCs this doesn’t seem to work. Because RPC 3 is too far away from the rest that one needs path reconstruction to make it work.

TDC1 and 2

RPC2 eta, rpc3 eta, rpc2 phi, rpc3 phi

Boths beam on using cross chamber conditions and lifting the cross chamber conditions yielded the exact same angular distribution graph. This is strange, could it be the trigger is different? What is more worrying is the cosmic didn’t change as well when lifting the cross chamber condition. This suggest the trigger has been set on cross chamber?

The idea is that using Michael’s alignment, we can do the reconstruction just using the bottom triplet plate. This since it only uses TDC0 TDC1 and TDC2. So lets try it

TDC0 and TDC1 aligned using eta 1 eta2, phi0, phi1

tDC2 can be aligned with TDC1 using 2 areas of phi2

Working with cosmic at the moment  
A graph of a number of lines

Description automatically generated with medium confidence

The first alignment was good between TDC 1 and TDC0. In order to align TDC2 with TDC1 and TDC0, we need to find on rpc3 with phi strip < 32

For cosmic

A graph of a number of lines

Description automatically generated with medium confidence

A graph of a number of lines

Description automatically generated with medium confidence

For Beam data

A graph of a graph

Description automatically generated with medium confidence

Aligned well right now, YEAHEYAHEYAEHAEYH  
Don’t understand the weir shape of the beam graph,

Cosmic graph didn’t change, because no alignment was needed for them

See other page for more

Need to fix the eta and phi sides, this could imply a intrinsic bug within the system.

Weird chi2 values saw, this overfitting not reasonable, so need to look deeper into the cause.

The angular distribution of the beam on is weird, and could imply an intrinsic bug within the code.

Sanity check between all TDC systems.

Relook at the code for degrees of freedom, this could be wrong degree of freedom in the middle. Also find the mean chi2 of the all reconstructions.