Unpacking issue fix (mostly work by Dana)

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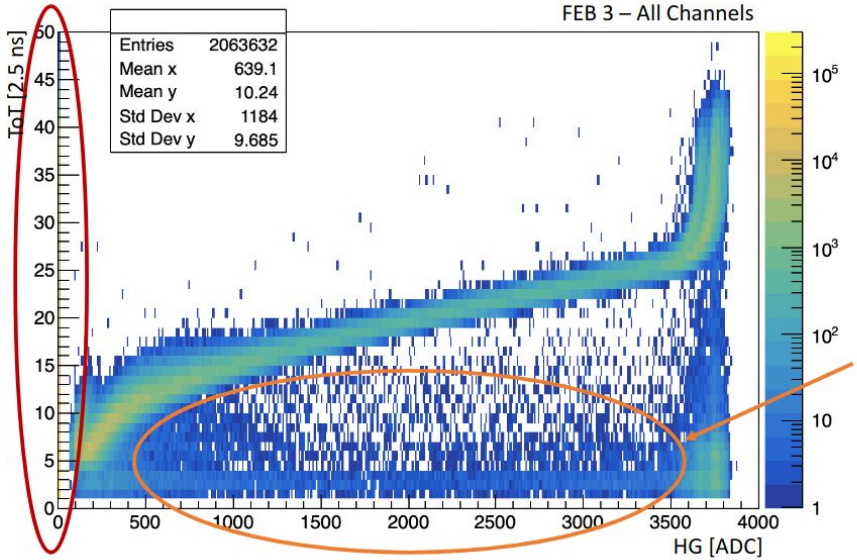
Mismatching of ADC amplitude

We assigned the hit charge with whichever is available in the order of high gain, low gain, ToT.

If you have no idea what I am talking about, check Dana's slides.

no ADC amplitude, but we have ToT…

-hit occurred during "dead time"
-hit occurred during hold, but wasn't alone



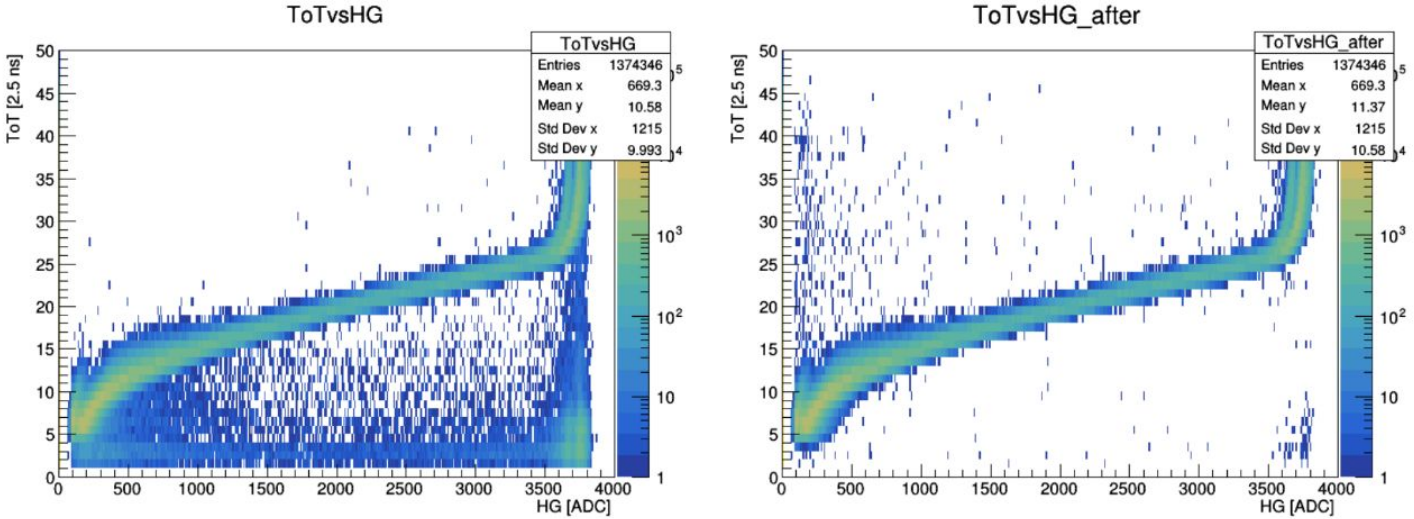
From Dana

Because of this issue, we end up with two high amplitude hits instead of one.
-One from the To T, and another from the ADC amplitude

https://indico.cern.ch/event/1024684/contributions/4304376/attachments/2220084/3759299/UnpackingIssues.pdf

Solution -> implemented by Dana

From Dana



matching non-Zero HG amplitudes to the max ToT up to 10µs earlier

hitID	--	hit1,	hit2,	hit3,	hit4,	hit5
HG	--	0,	0,	**1000**,	0,	**500**
ToT	--	15,	5,	3,	10,	3

→

hitID	--	hit1,	hit2,	hit3,	hit4,	hit5
HG	--	**1000**,	0,	0,	**500**,	0
ToT	--	15,	5,	3,	10,	3

Impact of the rematching

PE> 5, no topological cuts

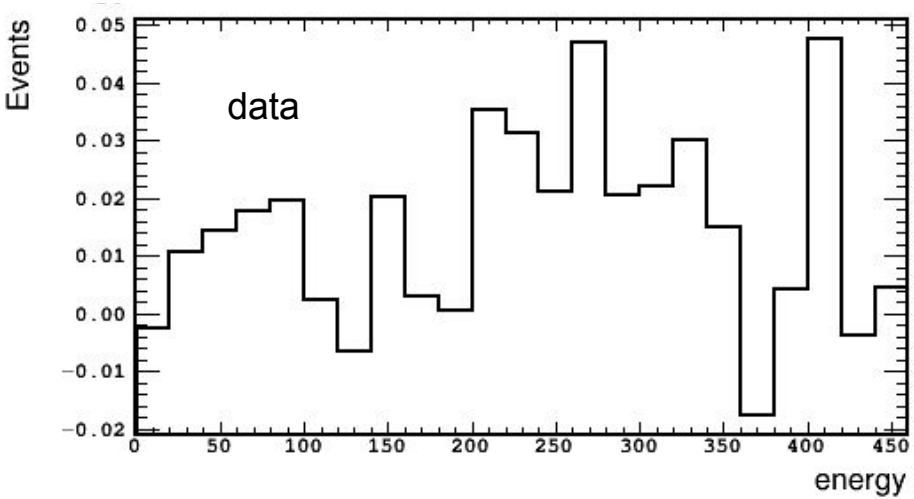
Apparently, no normalization for either.

(Before corr - after corr)/ before corr

Overall, it is a hit reduction process.

The event rate without topological requirement has a 0.6% reduction.

The event rate with single-track requirement has a 1.2% reduction.

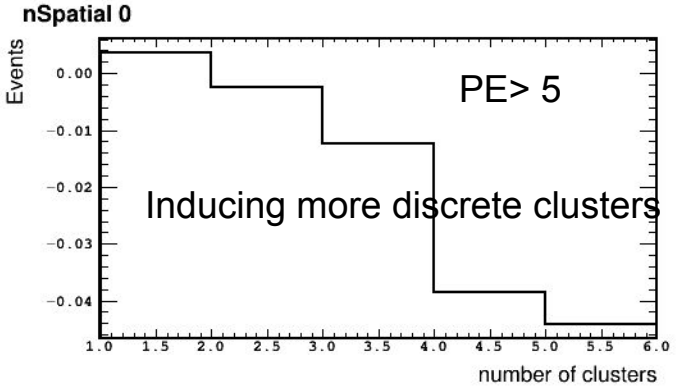


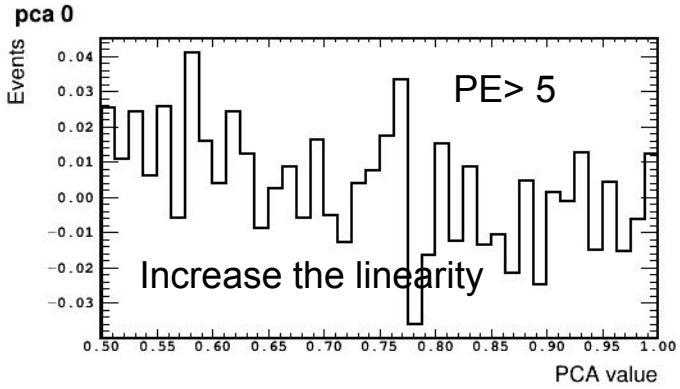
Above 0 means a reduction with rematching

The impact of the topological cuts

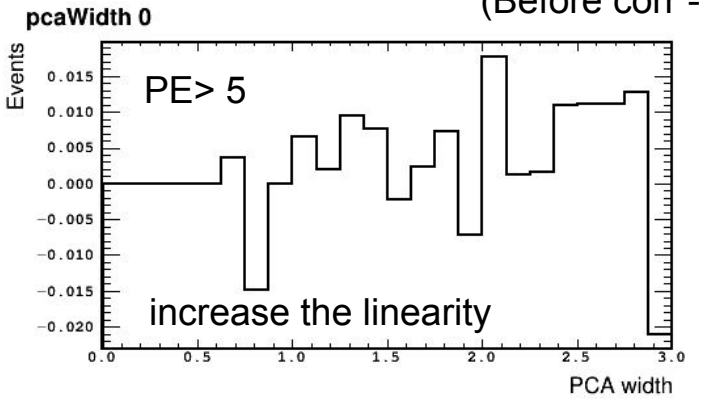
data

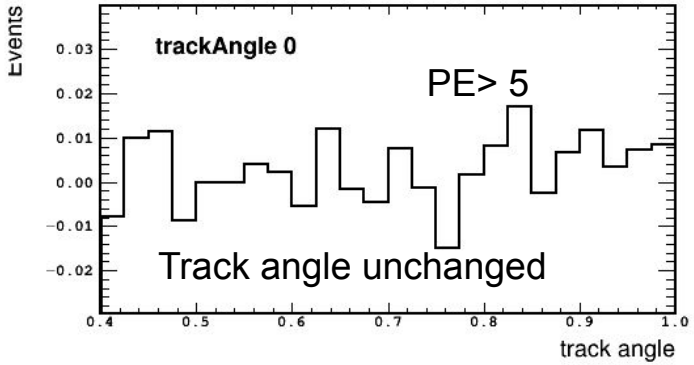
(Before corr - after corr)/ before corr





(Before corr - after corr)/ before corr

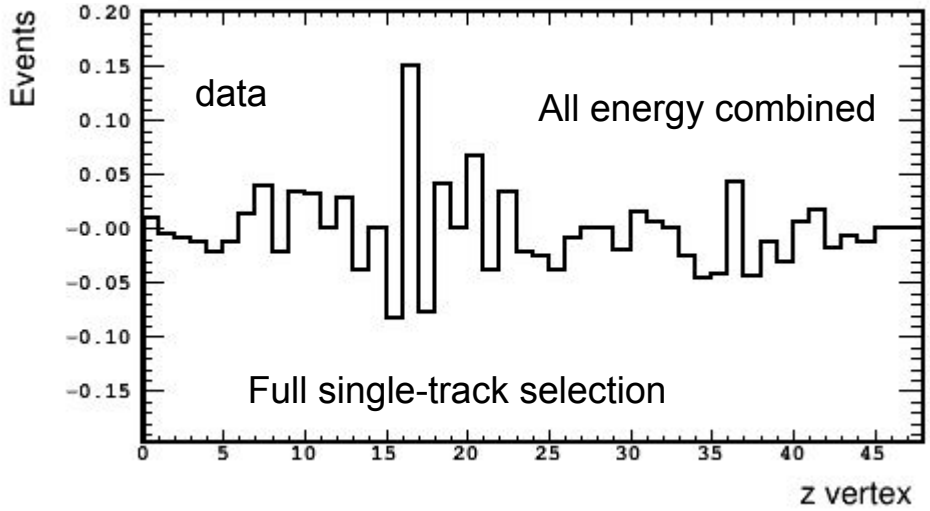




Most important impact => vertex

Across all the energy, the z vertex change is very small.

At the end, two results (w/ rematching and w/o rematching) can be produced. The one with rematching should be one we use and the difference should be small to be negligible.

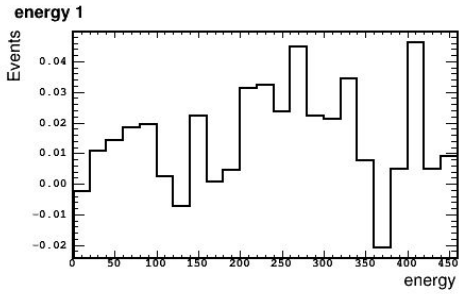


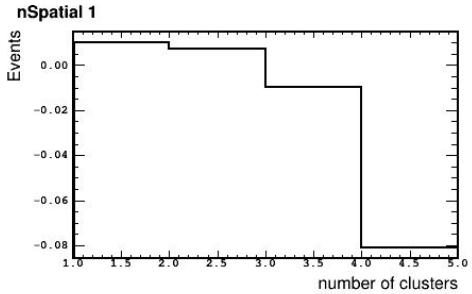
Conclusion

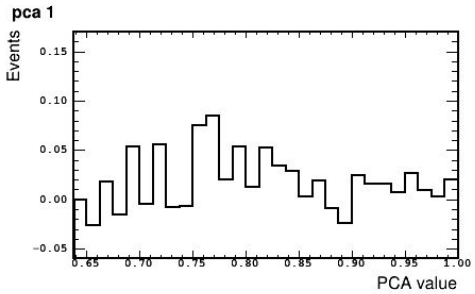
ToT - HG rematching has been implemented by Dana.

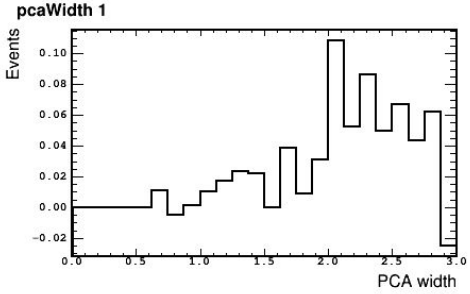
A quick check does not trigger big alarms.

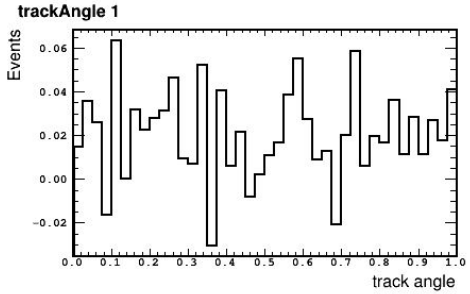
Backups

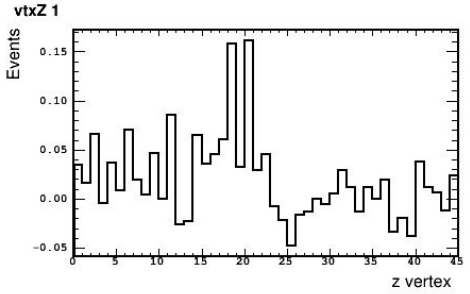

energy 1
Events
energy

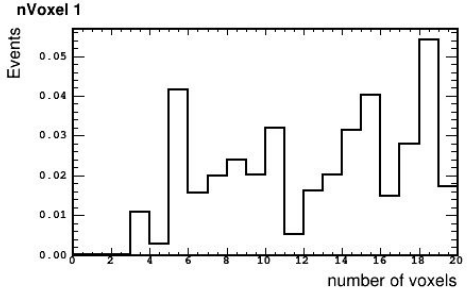

nSpatial 1
Events
number of clusters


pca 1
Events
PCA value


pcaWidth 1
Events
PCA width


trackAngle 1
Events
track angle


vtxZ 1
Events
z vertex


nVoxel 1
Events
number of voxels