

Status of the Tracker Reconstruction

C Hunt

MICE VC

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A Todo List

- Tracker MC Noise model,
- Tracker recon efficiency
- Modelling the tracker density and Z ,
- Improving the momentum systematics.



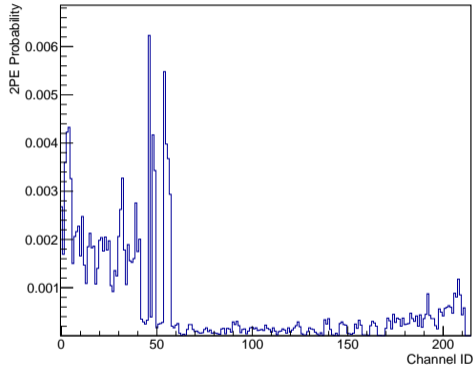
Modelling the Tracker Noise

- Current release there is no default noise model,
- Using the current implementation produces negligible noise rates,
- Implemented a data-driven model using the calibration data,
- Still a lot of tweaking to do, but first iteration basically ready.

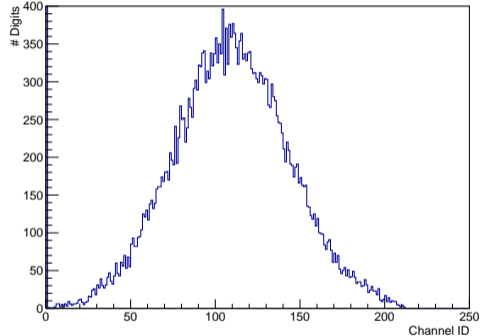
Thanks to Tom and Durga for their help,
The noise rate should be well modelled,
however the NPE distributions require more work.



Modelling the Tracker Noise

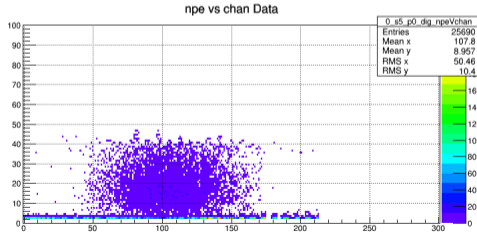
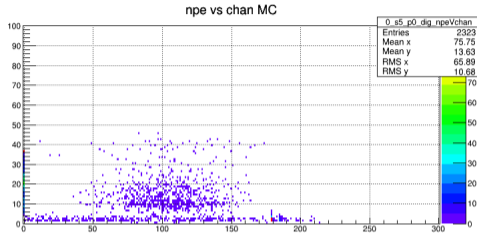


2PE Noise Rate from Calibration



MC Simulated Digits

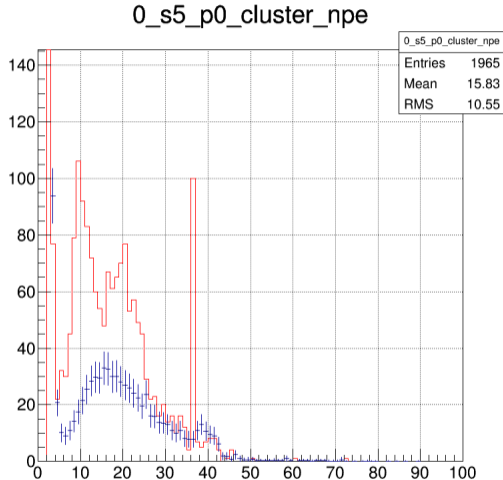
Modelling the Tracker Noise



- The rates of noise digits now agree with the calibration data,
- Structure in the NPE distributions is comparable to data,
- Some interesting features in the existing MC digitization routines,
- NPE noise distribution needs improving.



Modelling the Tracker Noise



- Rates are pretty good, the structures in the NPE distributions do not yet agree with data,
- A rough model is used in the MC digitization - needs a review,
- The noise model is just an approximate formula - also needs improvement,
- Probably sufficient for the current state of the analysis. Would like to have better by next year.



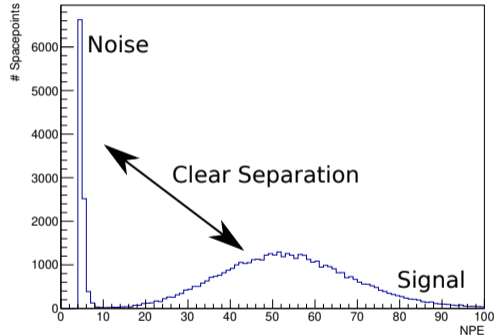
Efficiency Improvements

- I wrote a first order fix as a MAUS Mapper, refitting failed tracks
 - used for Victoria's paper,
- Francois implemented a more forceful fix, finding additional tracks
 - used for Chris' paper,
- Have made improvements to the source of the problem
 - the pattern recognition algorithm.



Pattern Recognition V2.

- Assume NPE for signal $>$ NPE for noise,
- Don't require a fit to find a track!
- Look at the number of spacepoints with a large signal,
- Include a flag even if the fit fails for post processing,
- Requires better initial noise rejection.



Pattern Recognition V2.

- Finished the model and have a MAUS branch out for testing,
- Included some extra details to improve the low- p_t efficiency,
- Needs some cleaning up and final verification, but nearly ready to merge,
- Added the noise model in, everything works together.



Tracker Materials Model

- Have some old stations at IC, one has been “sacrificed” . . .
- Mass measurements made, need to work through the maths and make sure the assumptions are correct,
- Need ideally to produce a new MC model and test it,
- A tedious job that needs finishing at this stage.



Reconstruction Systematics

- Issue stems primarily from the field model assumed by the reconstruction,
- Need to perform some precise systematic studies using Jo's field maps,
- Need to finish the field-iterated Kalman fit - believed to fix the problem,
- Quite a big job, but most of the pieces are available.



Conclusions

- Slowly getting through the list,
- Noise model should be greatly improved in the next MAUS release. E-Mail me if you want to play with a sneak preview, there is a test version,
- Still a bit to do, but not currently a bottleneck.

