Status of the Tracker Reconstruction

C Hunt

MICE VC

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The Main Issues

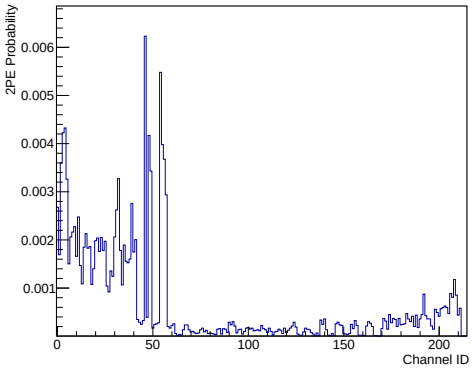
- Difference in noise rates between MC and Data,
- Difference in efficiency between MC and Data,
- Track finding efficiency in the analyses,

Modelling the Tracker Noise

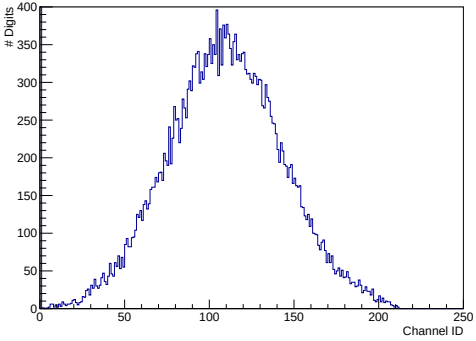
- Current release there is no default noise model,
- Using the current implmentation produces negligible noise rates,
- Testing a data-driven model using the calibration data,
- Still a lot of tweaking to do, but first iteration basically ready.

Thanks to Tom for performing a valibration study on the new MC model
It looks like its ready to go!

Modelling the Tracker Noise



2PE Noise Rate from Calibration



MC Simulated Digits

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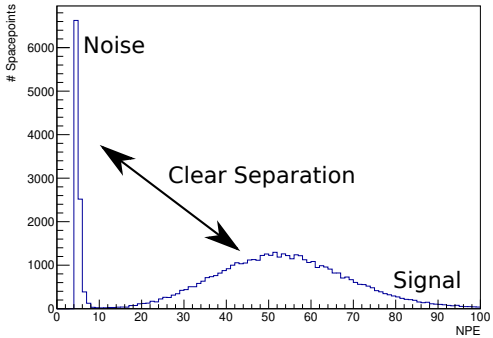
Efficiency Improvements

- 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,
- Currently improving 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.



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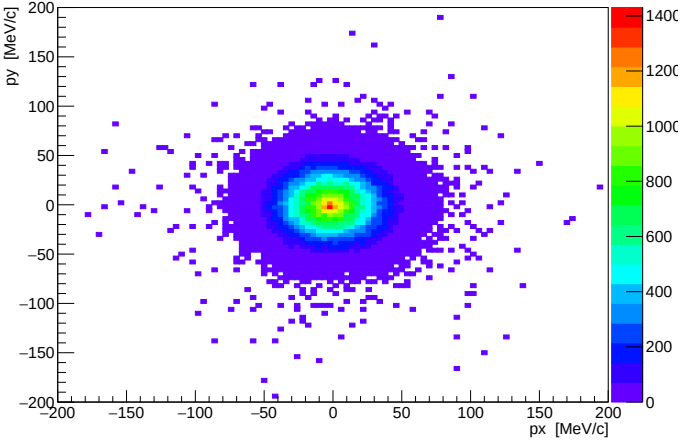
Pattern Recognition V2.

A Taster...



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Noise Rejection

Durga and Me.

- Durga :
  - NPE based cut,
  - Easiest to implement,
  - varying the cut and examine the efficiency and purity.
- Me:
  - ADC Based Cut,
  - Requires reproduction of calibration files,
  - Validating performance across calibrations.

Initial results looks like we can survive with the NPE driven cut,
but just need to make sure.

Status of the Long Emittance Paper

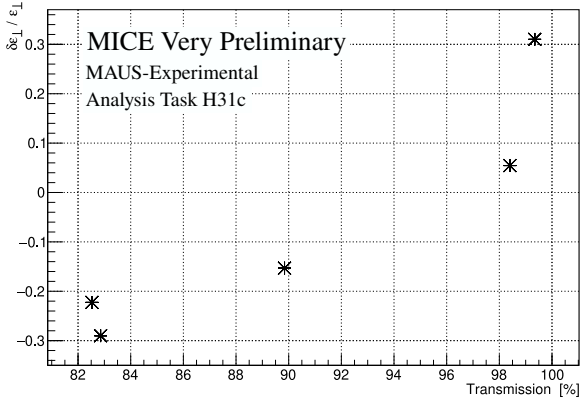
Current Status

Not much is active due to other activities,
But helping others helps ourselves!

- Starting to draw on the experiences of the previous analyses,
- Content is planned, couple of variations are possible,
- Exact plots still depend on the development of beam selection - would like a pure emittance calculation that shows cooling.

Currently fighting efficiency versus cooling signal.
Would like to have more than 1500 muons...

Early Results



- Scanning emittances in the beam selection routines,
- Only approx. 1000-2000 muons per point,
- Statistical uncertainties not shown and non-negligible,
- Want 90% transmission minimum.

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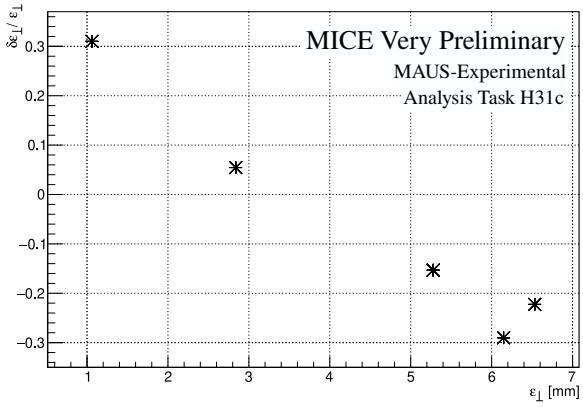
Early Results



- Only approx. 1000-2000 muons per point,
- Statistical uncertainties not shown and non-negligible,
- Should look similar to the plots in the DEMO paper...

Things of Note

- Start selecting beam in p_z not $|p|$, to reduce the chromatic emittance growth (small effect),
- Examined with Jaroslaw the feasibility of selecting non-ideal beams to increase efficiency - seems to work!
- Starting to think about using Paul's analysis to deconvolve the emittance growth - is it a systematic correction?
- Still a lot to do, but the pieces are slowly being arranged.

Expect much more at the next CM.