\( \nu_e \) systematics

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Introduction

- Chasing data/MC agreements in widths
- Starting on some systematics
Reprocessed my sand muon sample with hard charge cut at 6, 10 pe
  Default reco lets in low pe hits with time/space neighbours
Ideally look at median width, but now it’s always 0!
Hit widths is useful distribution
Hit widths after charge cut

- Cut at 6pe
- Cut at 10pe

Agreement much improved after cut
Node $n$ hits after charge cut

Charge cuts massively reduce doublet efficiency

Don’t improve data/MC so much
Muon correction/systematic

- Compare selected fractions in sand $\mu$ data and MC
- New: exclude USECAL (first 14 layers)
- For median:
  - data=1.4%, mc=1.2%, data/mc=1.18
- For residual syst, will use thru$_\mu$
  - Using TPC to measure momentum, improve MC
  - First indications are that my current MC is not great in this respect
Method:
1. Find smearing to make MC node $E$ width match data for stopping $\mu$
2. Apply same smearing to $\nu$ interaction MC
3. Calculate change in energy scale (and selection eff.?)

Ideal: smear actual energy deposit inside elecSim
   ▶ Don’t have appropriate input files for $\nu$ interaction MC

Compromise: smear hit charge in p0dRecon
   ▶ After poisson randomization, thresholds, etc

Spanner in works: how much of width is due to variation with time?
Interlude: drift

- Time variation widens node energy spectrum
- Probably not enough to account for whole width
Smearing of 15% looks good

That’s all folks...
Conclusions

- I think we have enough to say width disagreements “understood”
- Some progress on systs