



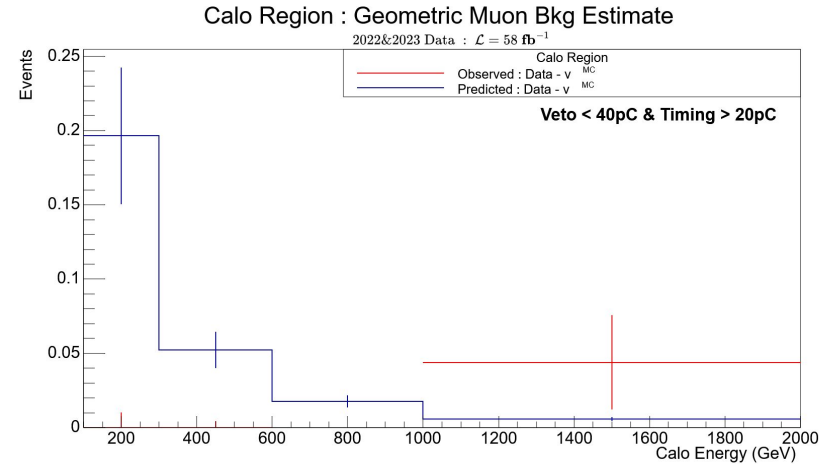
FASER Liverpool

June Update

Sinead Eley

ALPtrino - Geometric Muons

- Looked at estimated background for all regions (inc. leadShield and Magnet region)
- Adjusted correction factor
 - Now also includes correction for not using VetoNu cut
- Using vetoNu cut severely limits statistics
 - Gives 0 events in some bins
 - Can be corrected for not using vetoNu cut and applying correction factor
 - Correction factor uses ratio between number of events when veto nu cut is used vs when it is not used to correct for the lack of VetoNu cut
- Working on getting adding this ABCD info into TREx fitter



Correction Factor

- Correction Factor
 - Timing correction factor (f) calculated by:

$$\frac{Timing_{<20}}{Timing_{>20}}$$

- Veto Nu correction factor (v) calculated by:
 - For B/D Regions (Veto > 40pC)

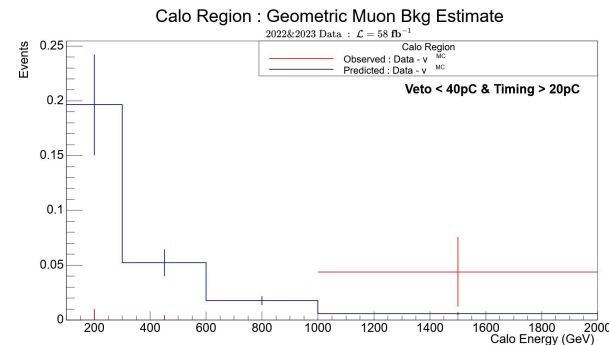
$$\frac{VetoNu_{included}}{VetoNu_{notIncluded}} * \frac{Veto_{>40}}{Veto_{>40}}$$

- For A/C Regions (Veto < 40 pC)

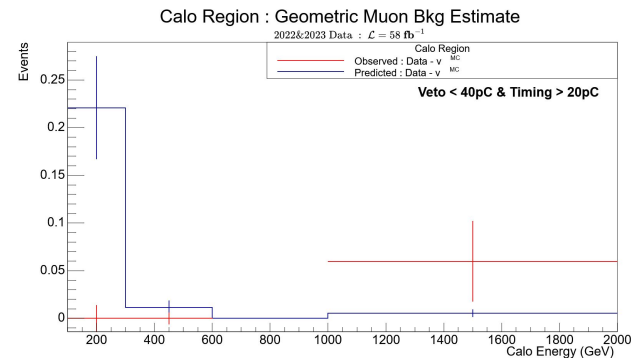
$$\frac{VetoNu_{included}}{VetoNu_{notIncluded}} * \frac{Veto_{<40}}{Veto_{<40}}$$

- Correction factors are combined to give one for regions with :
 - Veto >40 pC
 - Veto <40 pC
- E.g. Correction factor = v*f

NoVetoNu cut w/Correction



w/VetoNu cut



ALPtrino - Geometric Muons

- Cosmics?
 - Previously discussed other potential backgrounds such as cosmics being contributing to the background calculated using the ABCD
 - Lottie proposed a calo timing cut of $>-5\text{ns}$ and $<200\text{ns}$ that should remove these events
 - Testing adding this to the baseline data cuts
 - Seems to give near to no statistics in 2023 data (i.e. with some bins having negative or 0 events)
 - Correction factor also goes to 0 here



ALPtrino - Neutral Hadrons

- Have samples for 22/23 optics from Eli
 - Both μ^+ and μ^- equate to $\sim 200\text{fb}^{-1}$ each
- From running over these samples so far
 - No events pass the baseline cuts
- Discussing 2024 neutral hadron samples with Eli and Wissal next week
 - Hopefully have these soon



Summary

- Making progress with abcd for geom muons
 - Need to look further/ discuss with Lottie over best way to account for cosmic events contributing to number of events in geometric muon background
- Neutral hadron study making progress
 - Will discuss with Eli this coming week about the 2024 samples
- Helping out on the FASERNu assembly campaign in the emulsion facility this week