

# Title

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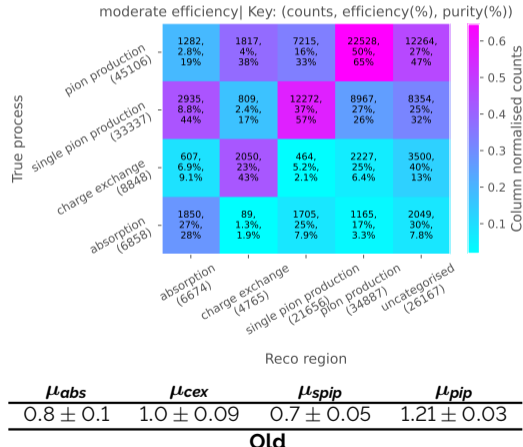
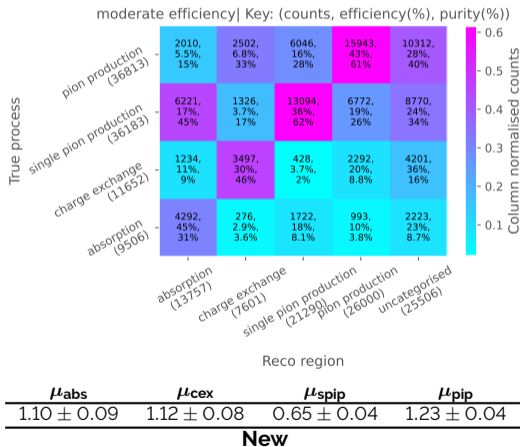
July 5, 2024

## Update to the analysis

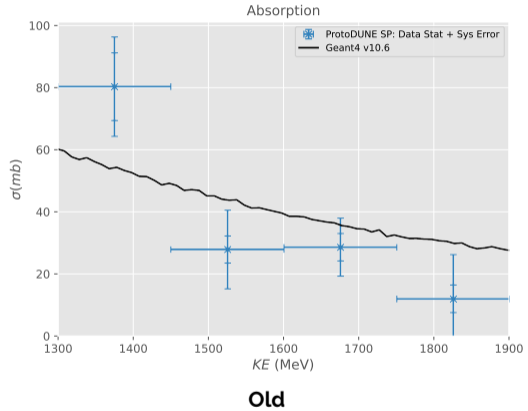
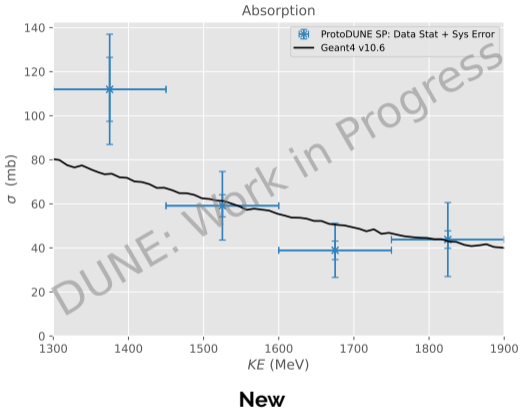
- ▶  $\pi^\pm$  KE threshold was added to the loose and strict  $\pi^\pm$  selections.
- ▶ implemented by requiring the track length  $> 27.1\text{cm}$ , equivalent selecting  $\pi^\pm$  with 100 MeV KE.
- ▶ evaluated the beam momentum systematic the same way Richie does.
  - During ProtoDUNE run 1, one of the fibre beam profile monitors in the beam instrumentation was displaced.
  - Study in MC found this displacement adds a 1.2% uncertainty in the measured beam momentum
- ▶ Number of throws was increased for systematics evaluated using toy method.
- ▶ fit inaccuracy cross check tested a more broad range of normalisations  $[0.8,1.2] \rightarrow [0.5,1.5]$
- ▶ Number of repeats for the fit inaccuracy systematic was increased from 5 to 100

# KE threshold

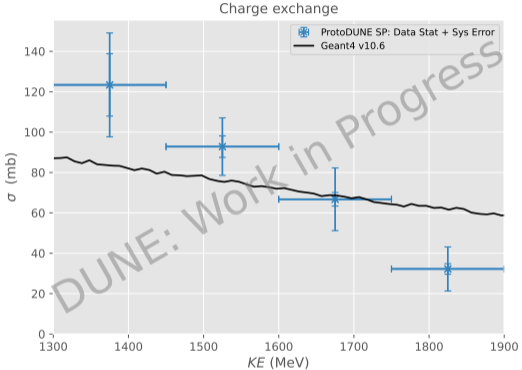
- ▶ KE threshold results in more pure, less efficient  $\pi^\pm$  selections
- ▶ Impact is more events are categorised as either abs or cex
- ▶ abs and cex normalisations increase, the spip normalisation decreases



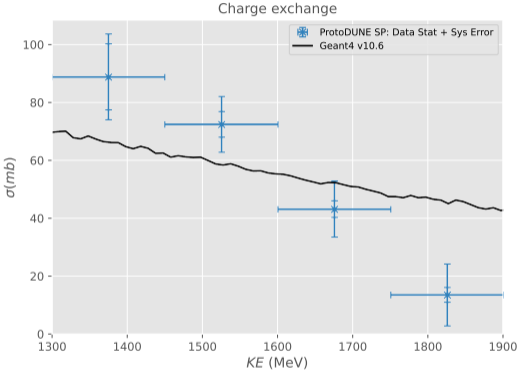
# measured cross sections



# measured cross sections

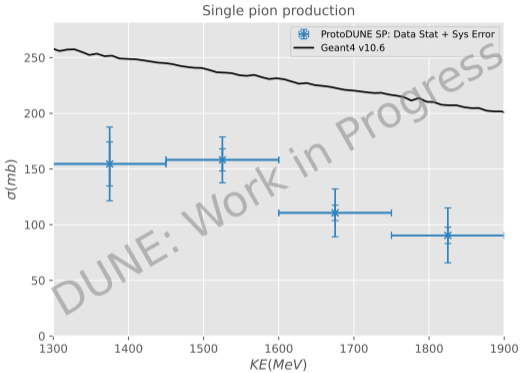


New

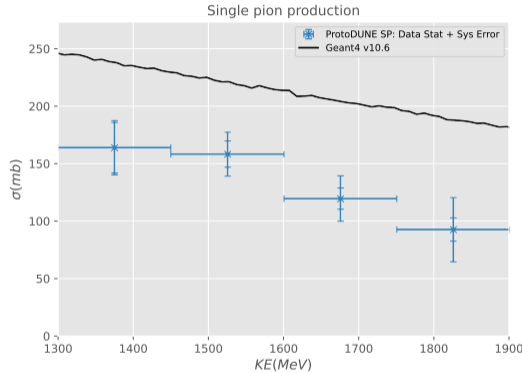


Old

# measured cross sections

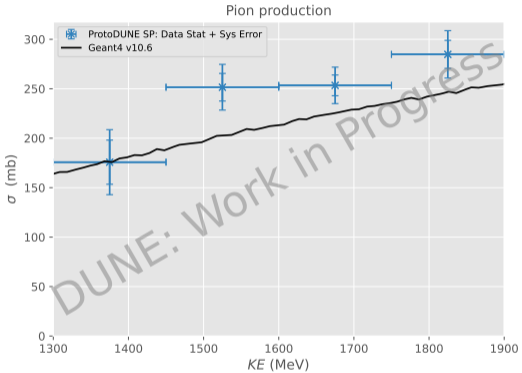


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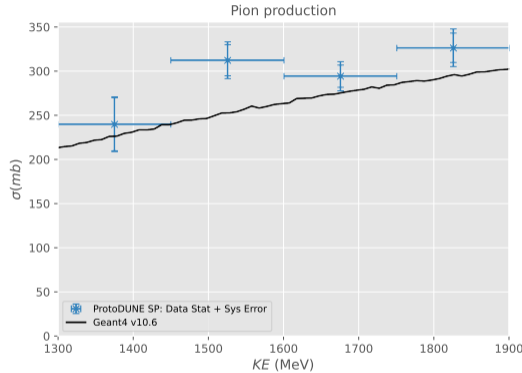


Old

# measured cross sections

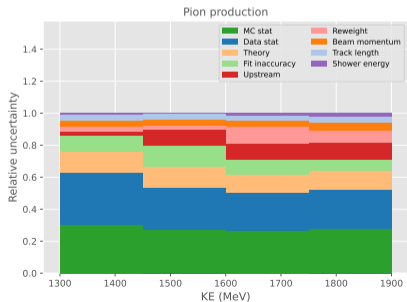
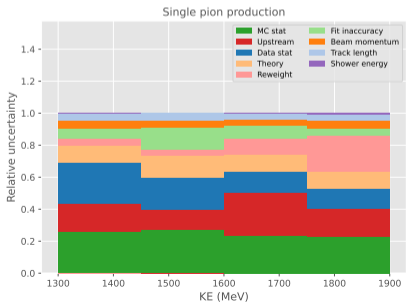
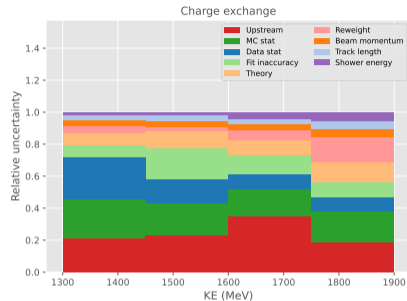
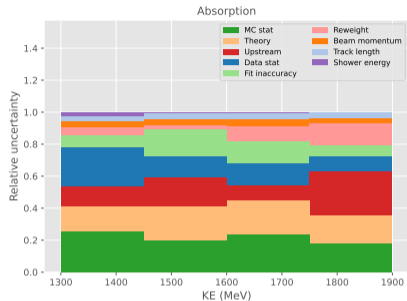


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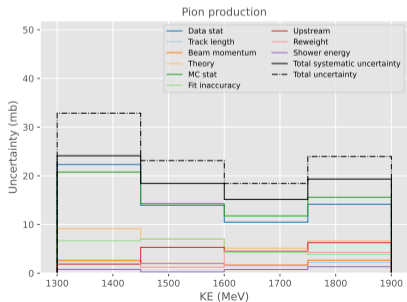
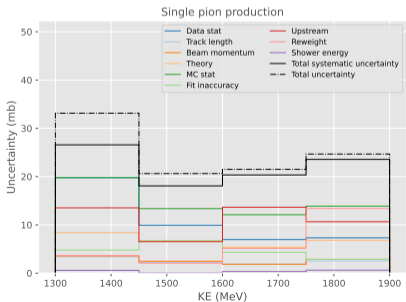
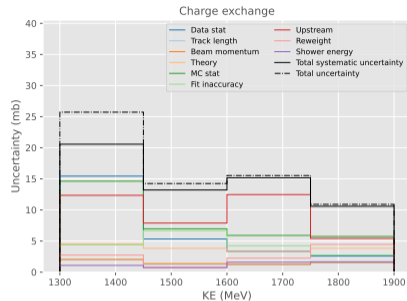
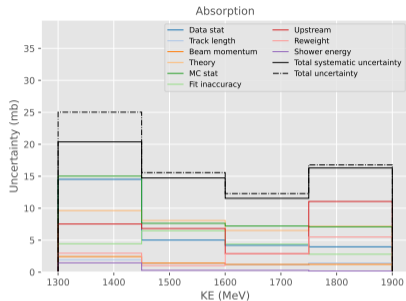
Old

# Systematic Uncertainty





# Systematic Uncertainty



# Old Systematic Uncertainty

