

PANDAroot PID

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Outline

- 1 Simulation
- 2 Analysis
- 3 Results

Simulation

Signal $\bar{p}p \rightarrow e^+e^-$

- $N = 10^4$
- $p_{beam} = 3.3 \text{ GeV}/c$
- $G_E/G_M = 0.0$

Background $\bar{p}p \rightarrow \pi^+\pi^-$

- $N = 10^4$
- $p_{beam} = 3.3 \text{ GeV}/c$

Analysis

PID algorithm 1

- PidAlgoEmcBayes

PID algorithm 2

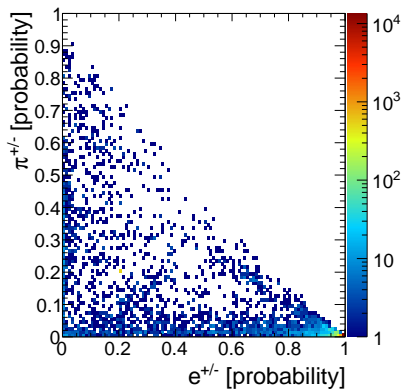
- PidAlgoEmcBayes
- PidAlgoMvd
- PidAlgoMdtHardCuts
- PidAlgoDrc
- PidAlgoDisc
- PidAlgoStt

Cuts criteria

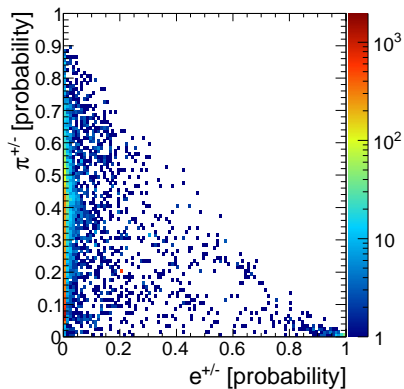
- Exactly 1 positive and 1 negative track
- $p(e^{+/-}) > 90\%$ and $p(\pi^{+/-}) < 9\%$
- Energy and momentum conservation within resolution of 20%

Probabilities (algorithm 1)

$$\bar{p}p \rightarrow e^+e^-$$

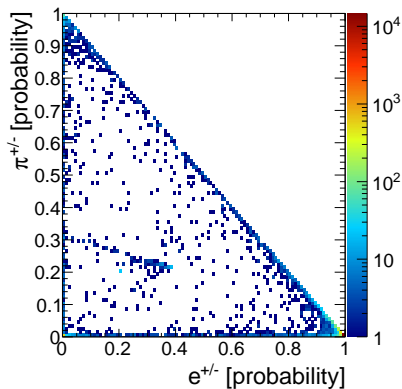


$$\bar{p}p \rightarrow \pi^+\pi^-$$

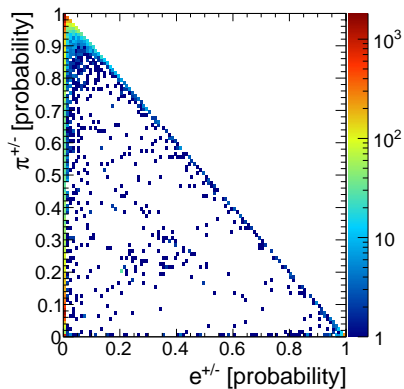


Probabilities (algorithm 2)

$$\bar{p}p \rightarrow e^+e^-$$

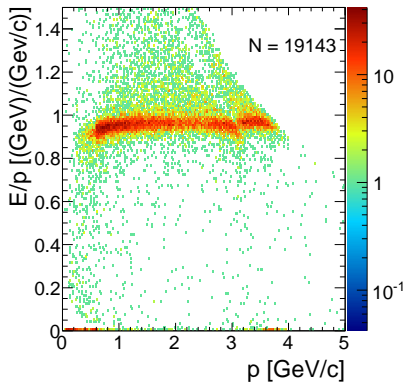


$$\bar{p}p \rightarrow \pi^+\pi^-$$

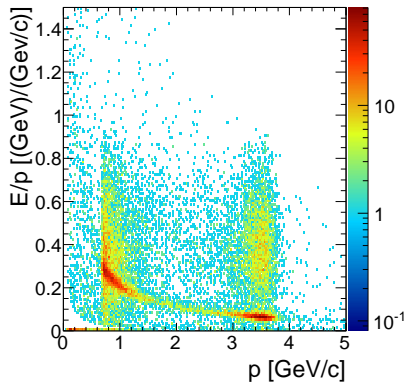


E vs E/p

$$\bar{p}p \rightarrow e^+e^-$$

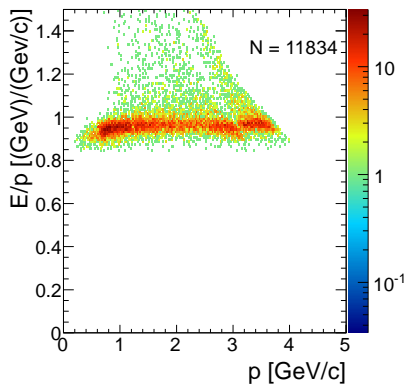


$$\bar{p}p \rightarrow \pi^+\pi^-$$

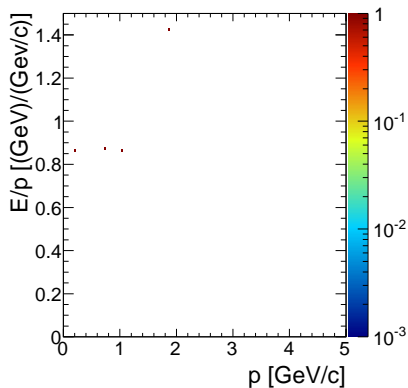


E vs E/p 90

$$\bar{p}p \rightarrow e^+e^-$$

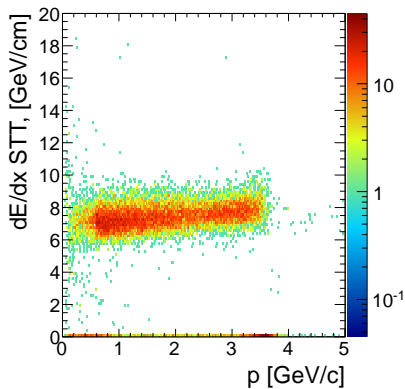


$$\bar{p}p \rightarrow \pi^+\pi^-$$

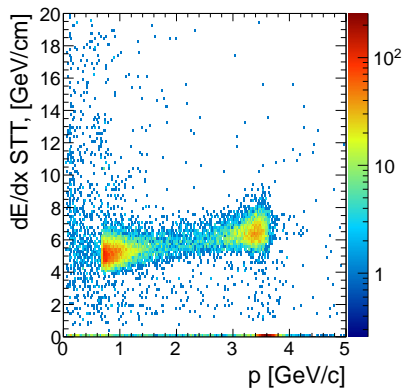


STT dE/dx

$$\bar{p}p \rightarrow e^+e^-$$

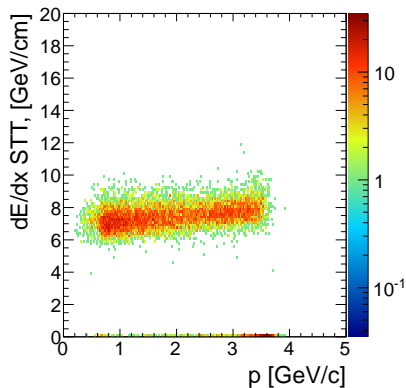


$$\bar{p}p \rightarrow \pi^+\pi^-$$

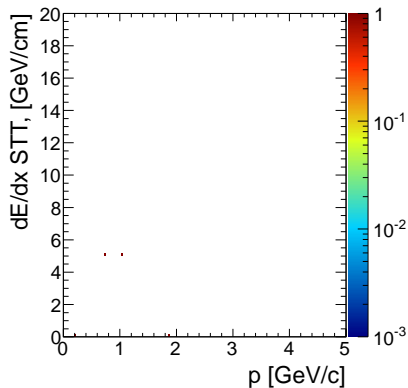


STT dE/dx 90

$$\bar{p}p \rightarrow e^+e^-$$

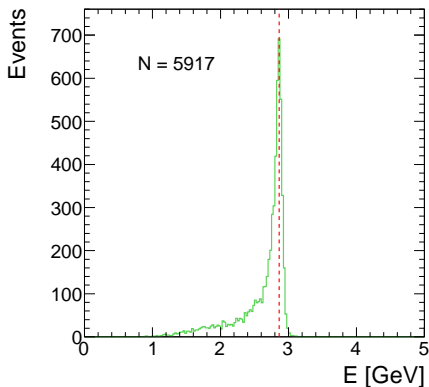


$$\bar{p}p \rightarrow \pi^+\pi^-$$

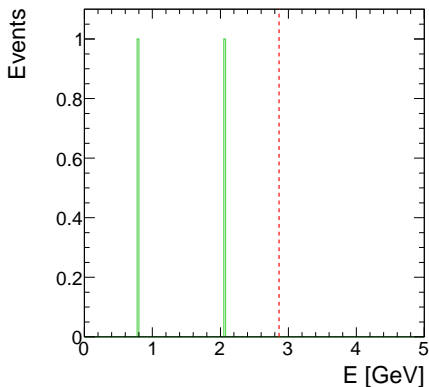


Energy of reconstructed pairs (algorithm 1)

$$\bar{p}p \rightarrow e^+e^-$$

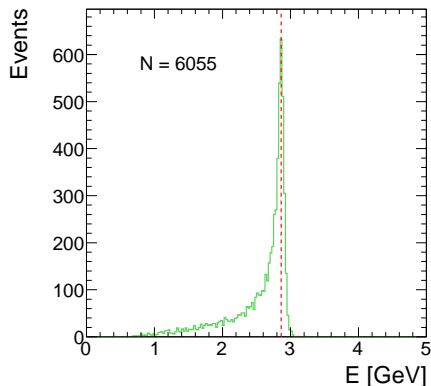


$$\bar{p}p \rightarrow \pi^+\pi^-$$

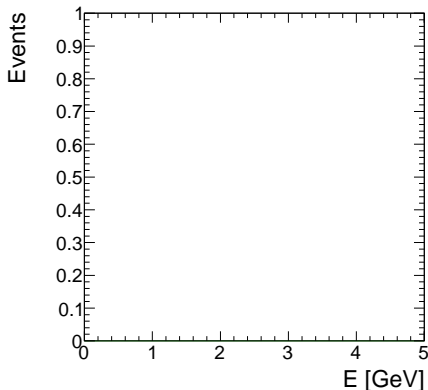


Energy of reconstructed pairs (algorithm 2)

$$\bar{p}p \rightarrow e^+e^-$$

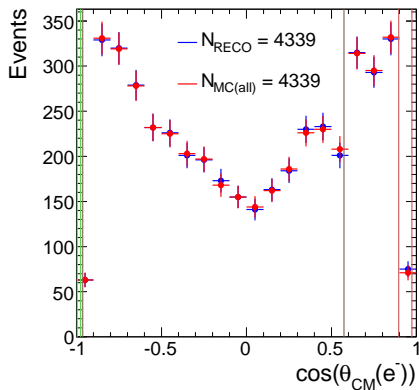


$$\bar{p}p \rightarrow \pi^+\pi^-$$

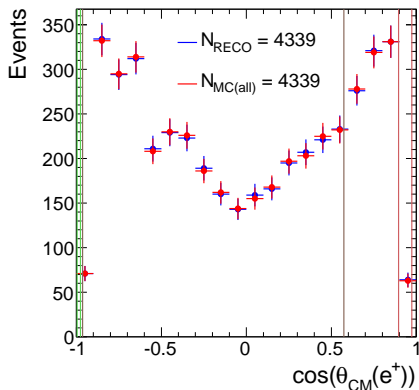


$\cos(\theta_{CM})$ (algorithm 1)

$\bar{p}p \rightarrow e^+e^-$

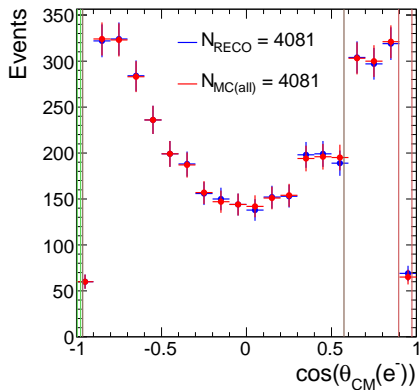


$\bar{p}p \rightarrow e^+e^-$

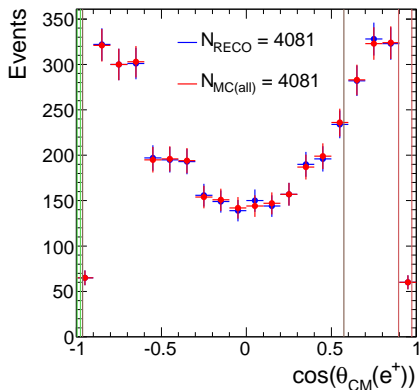


$\cos(\theta_{CM})$ (algorithm 2)

$\bar{p}p \rightarrow e^+e^-$

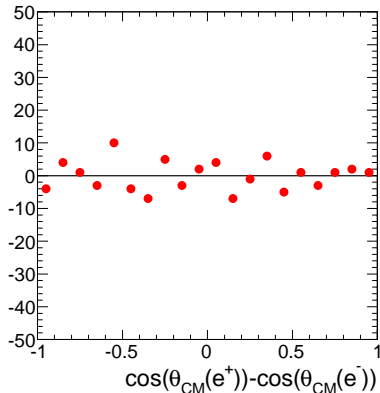


$\bar{p}p \rightarrow e^+e^-$



$$" \cos(\theta_{CM}(e^+)) - \cos(\theta_{CM}(e^-)) "$$

$\bar{p}p \rightarrow e^+e^-$
(algorithm 1)



$\bar{p}p \rightarrow e^+e^-$
(algorithm 2)

