$\bar{\text{P}}$ANDAroot PID

Dmitry Khaneft

University of Mainz

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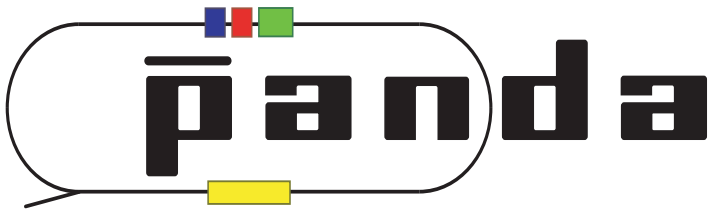


JOHANNES GUTENBERG UNIVERSITÄT MAINZ

Helmholtz-Institut Mainz

Outline

1. Radiative corrections (PHOTOS)
2. PANDAroot PID Criteria
3. PANDAroot PID Algorithms
4. Kinematic fitting
5. Simulation
6. Analysis
7. Results

Radiative corrections (PHOTOS)

2 ways of implementation*

- Integrate PHOTOS in the event generator
  No one within collaboration knows hot to do it
  $\longrightarrow$ Needs a lot of research of PHOTOS
- Integrate the event generator in EvtGen where PHOTOS is available
  Very detailed EvtGen guide available
  $\longrightarrow$ Should be relatively easy to accomplish

* second option was recommended as a better/easier solution

Various PID Criteria

- All - $P \geq 0.0$ required
- VeryLoose - $P \geq 0.0$ required
- **Loose** - $P \geq 0.2$ required
- Tight - $P \geq 0.5$ required
- **VeryTight** - $P \geq 0.9$ required
- Variable - user defined probability

PID Algorithms

- PidAlgoIdealCharged/PidAlgoIdealNeutral
- **PidAlgoEmcBayes**
- PidAlgoMvd
- PidAlgoMdtHardCuts
- PidAlgoDrc
- PidAlgoDisc
- PidAlgoStt

PID Algorithms

- Vertex Constraint
- 4-Constraint
- Mass constraint

Simulation

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

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

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

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

Analysis

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

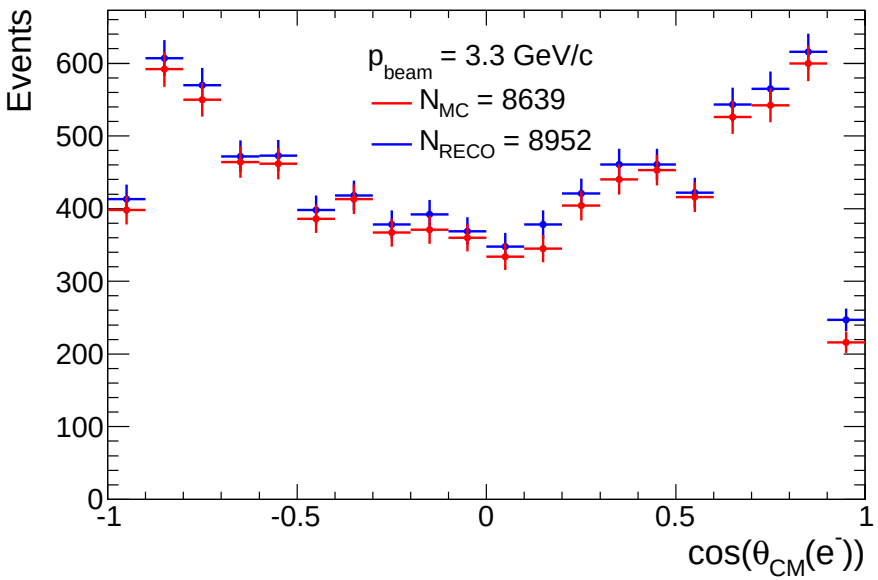
- PidAlgoEmcBayes
  - Loose
  - VeryTight
- With/without Monte Carlo matching

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

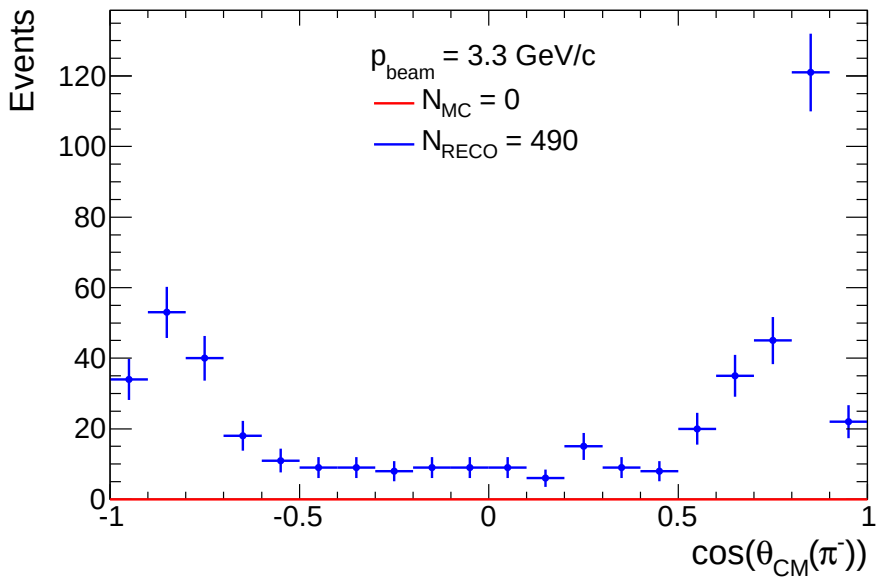
- PidAlgoEmcBayes
  - Loose
  - VeryTight
- Without Monte Carlo matching

Without MC matching (Loose)

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

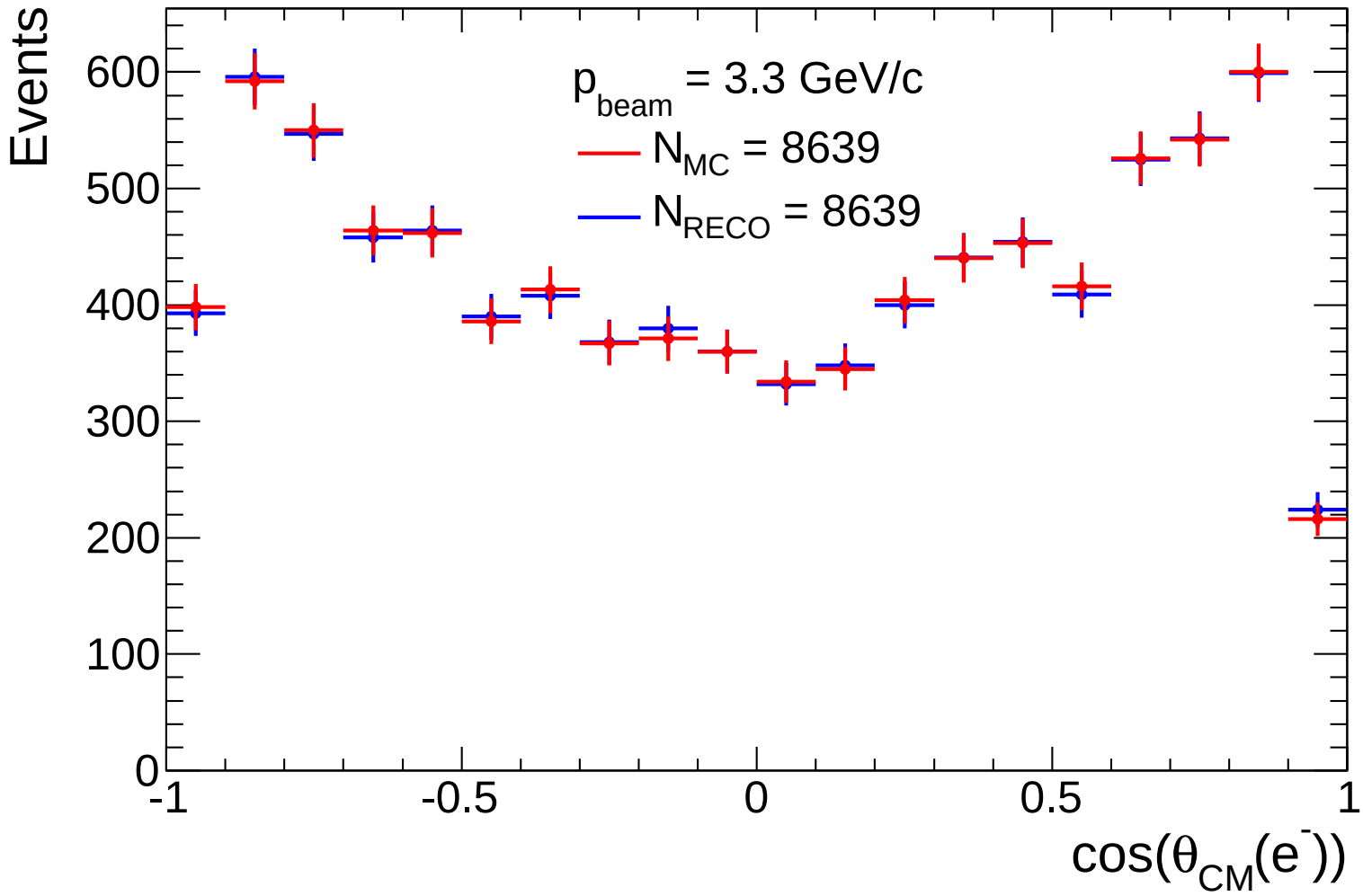


$\bar{p}p \to \pi^+\pi^-$



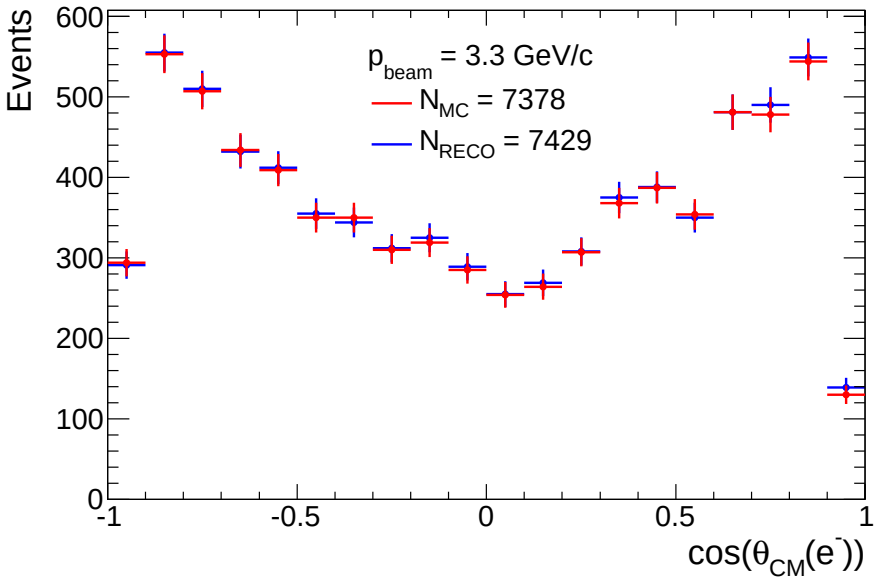
With MC matching (Loose)

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

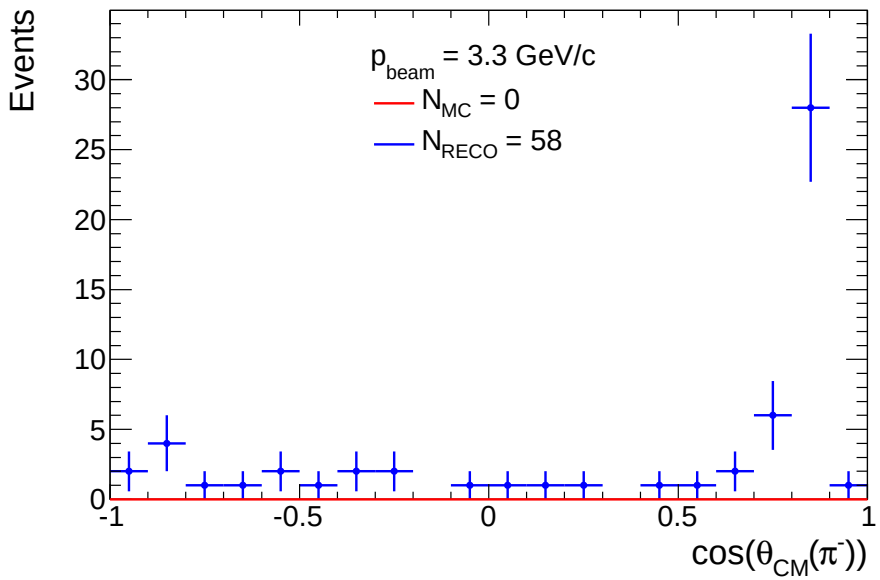


Without MC matching (VeryTight)

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

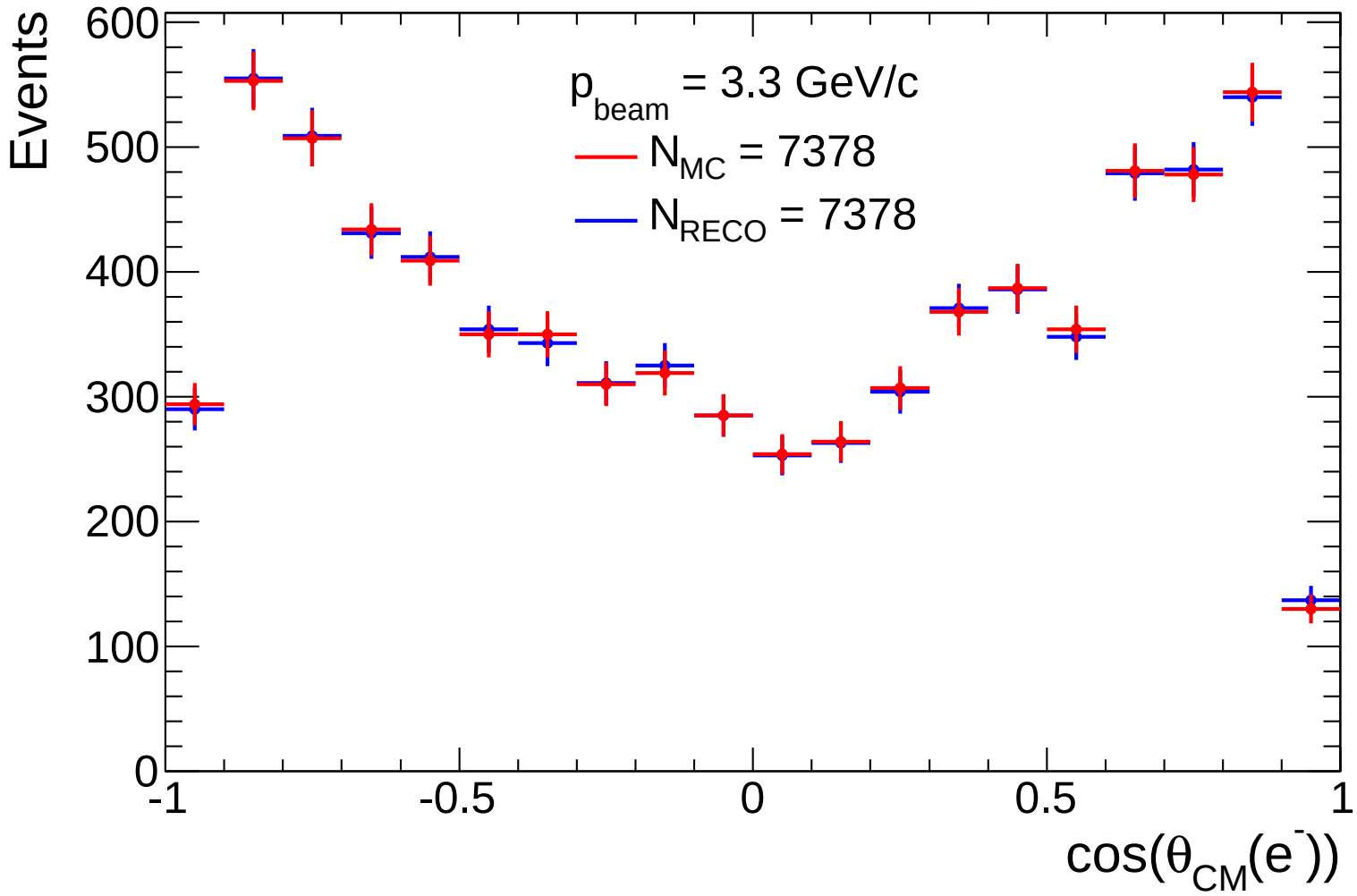


$\bar{p}p \to \pi^+\pi^-$



With MC matching (VeryTight)

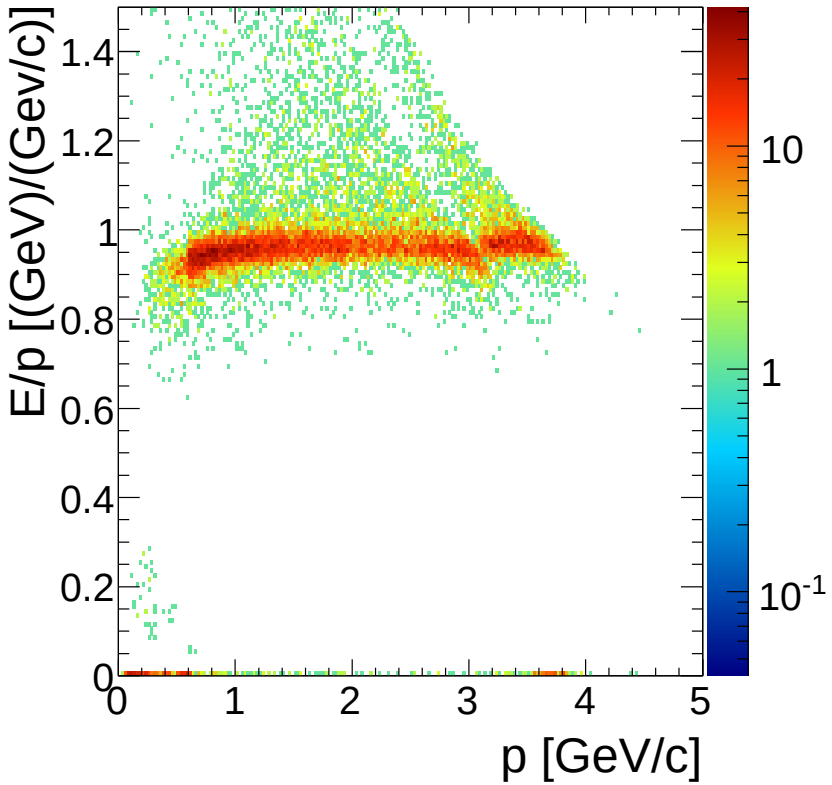
$\bar{p}p \to e^+e^-$



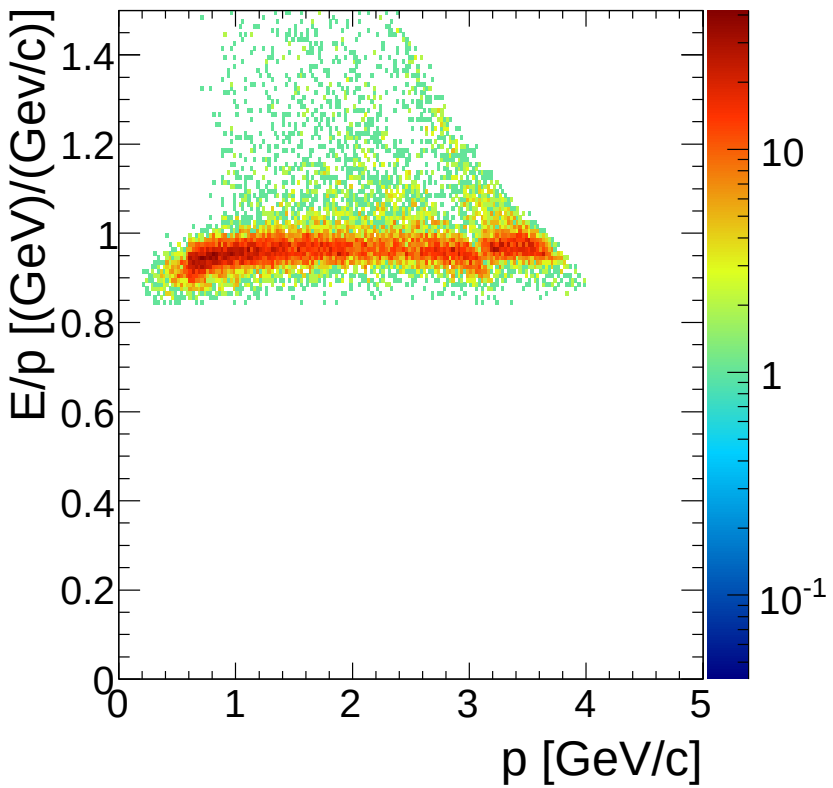
Without MC matching

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

Loose



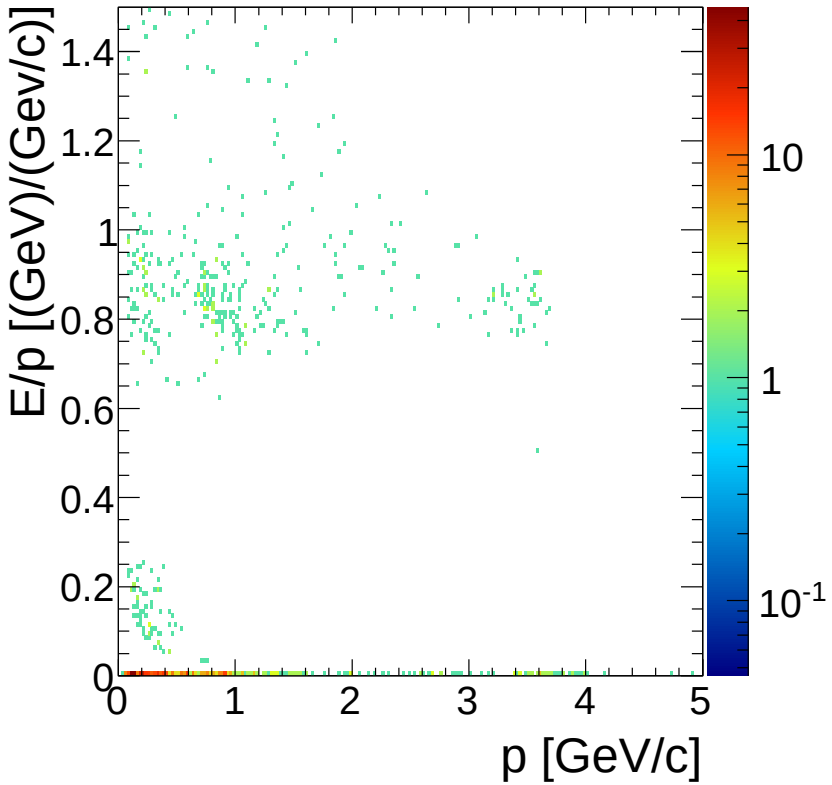
VeryTight



Without MC matching

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

Loose



VeryTight