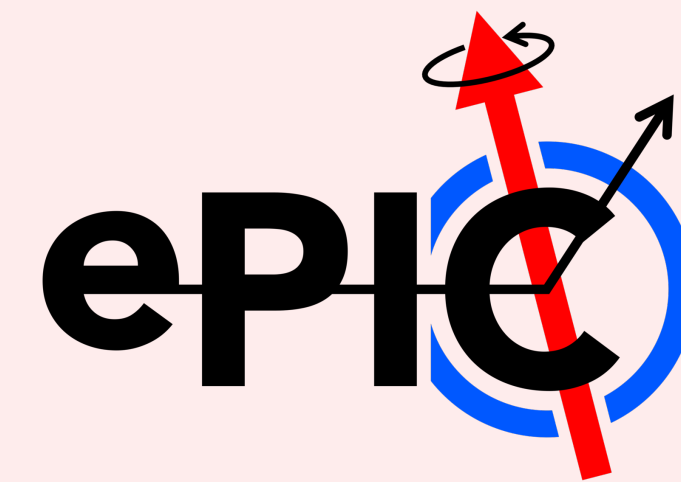
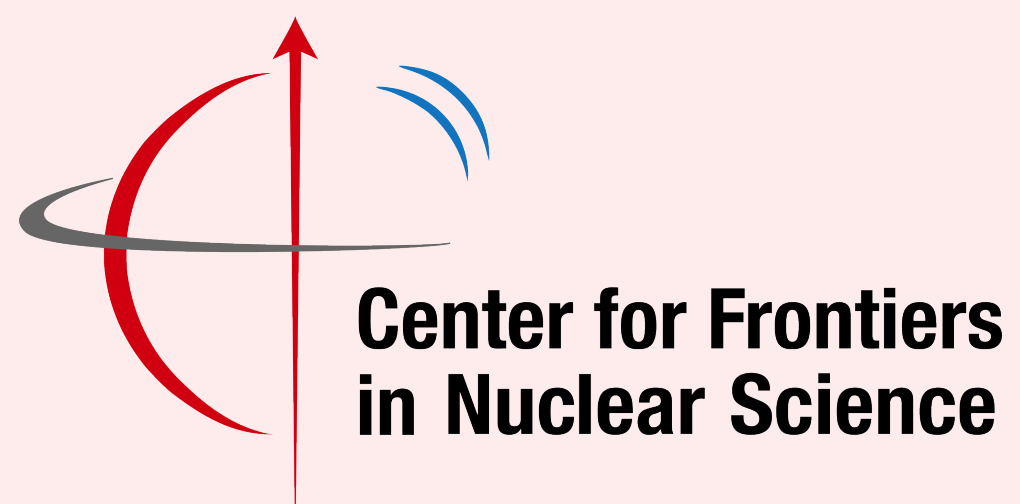


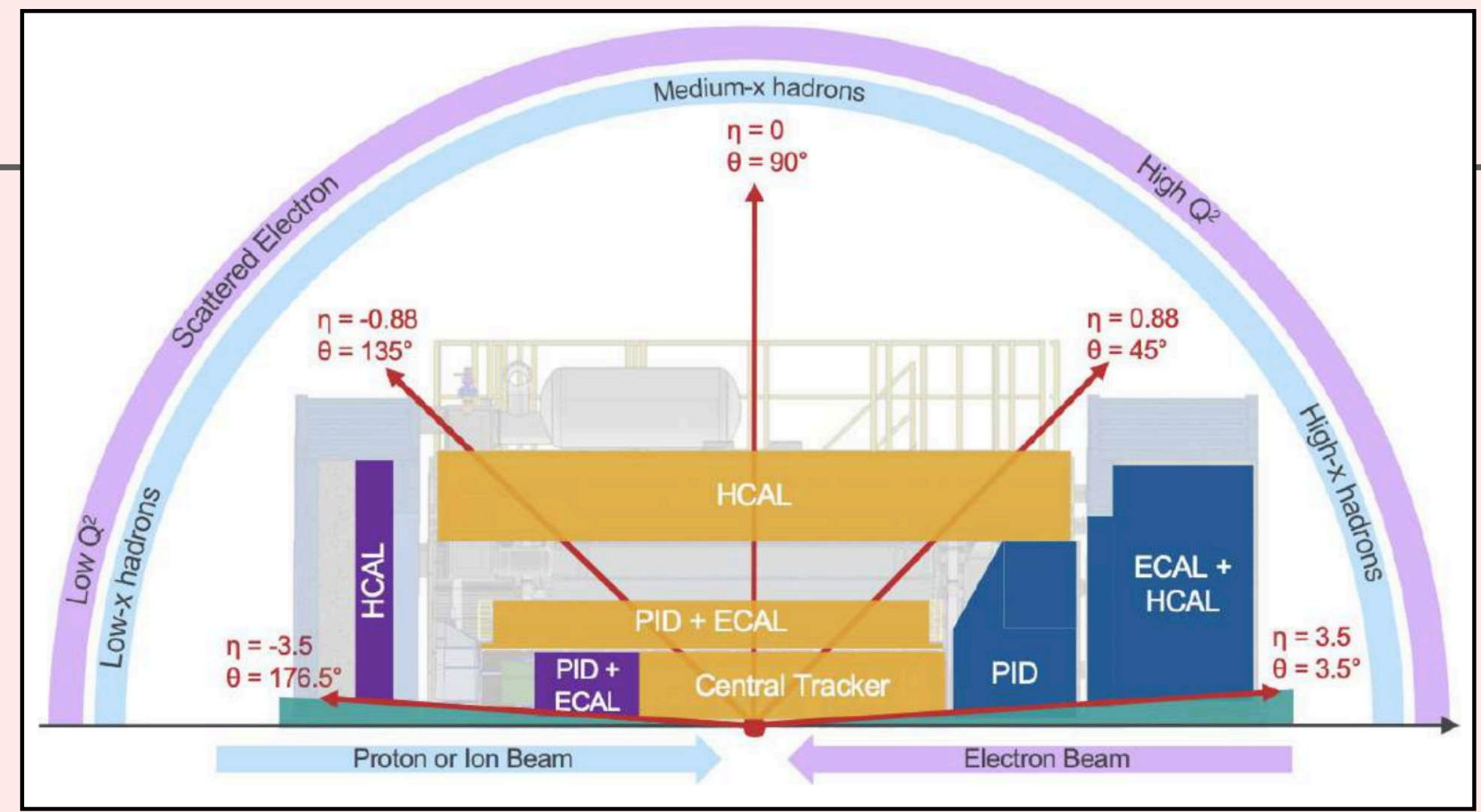
# eID update

Win Lin  
Stony Brook University

Joint inclusive/EW+BSM PWG Meeting  
04/07/2026



# eID quality



“ReconstructedParticle Collection”

↓

$\geq 1$  track &  $\geq 1$  cluster  
Negatively charge

↓

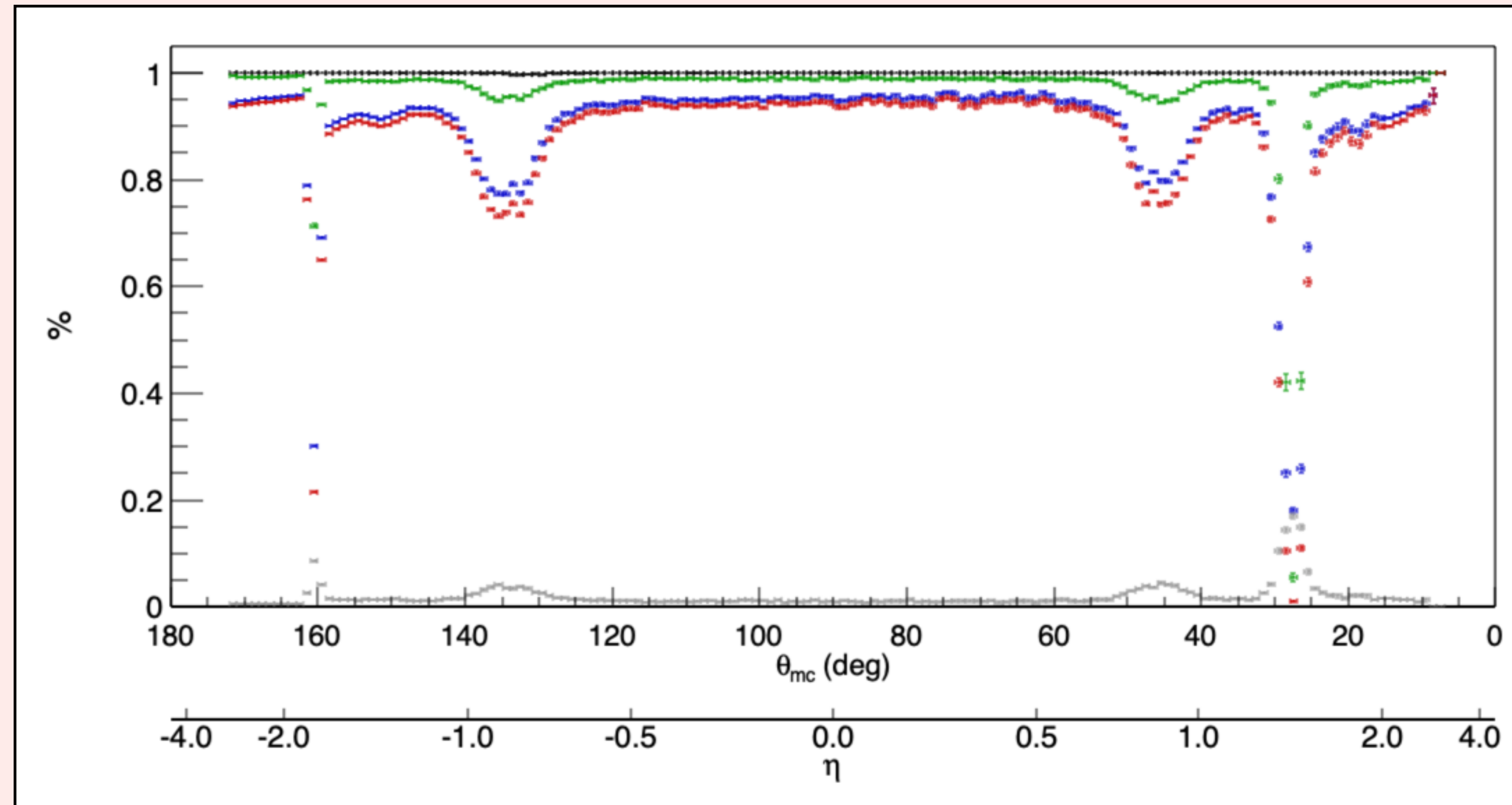
$0.8 < E/p < 1.2$

↓

Isolated cluster:  
 $E_0 / \sum E_{\delta R < 0.4} > 0.9$

↓

Highest  $p_T$

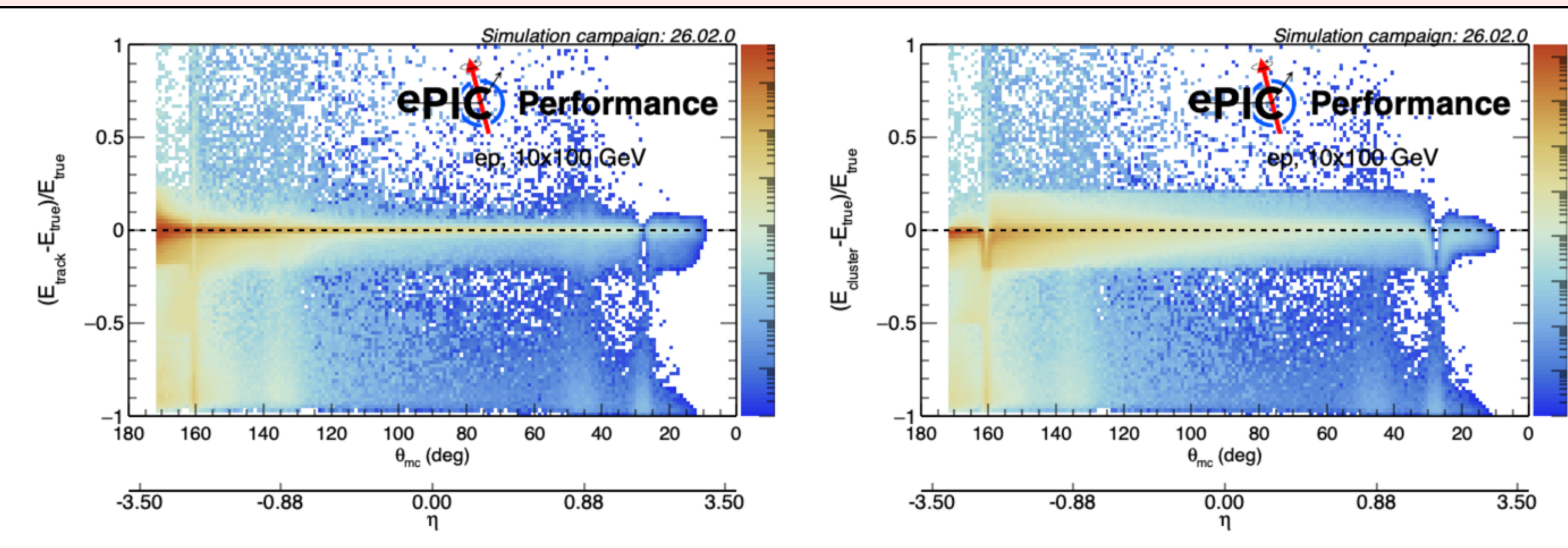
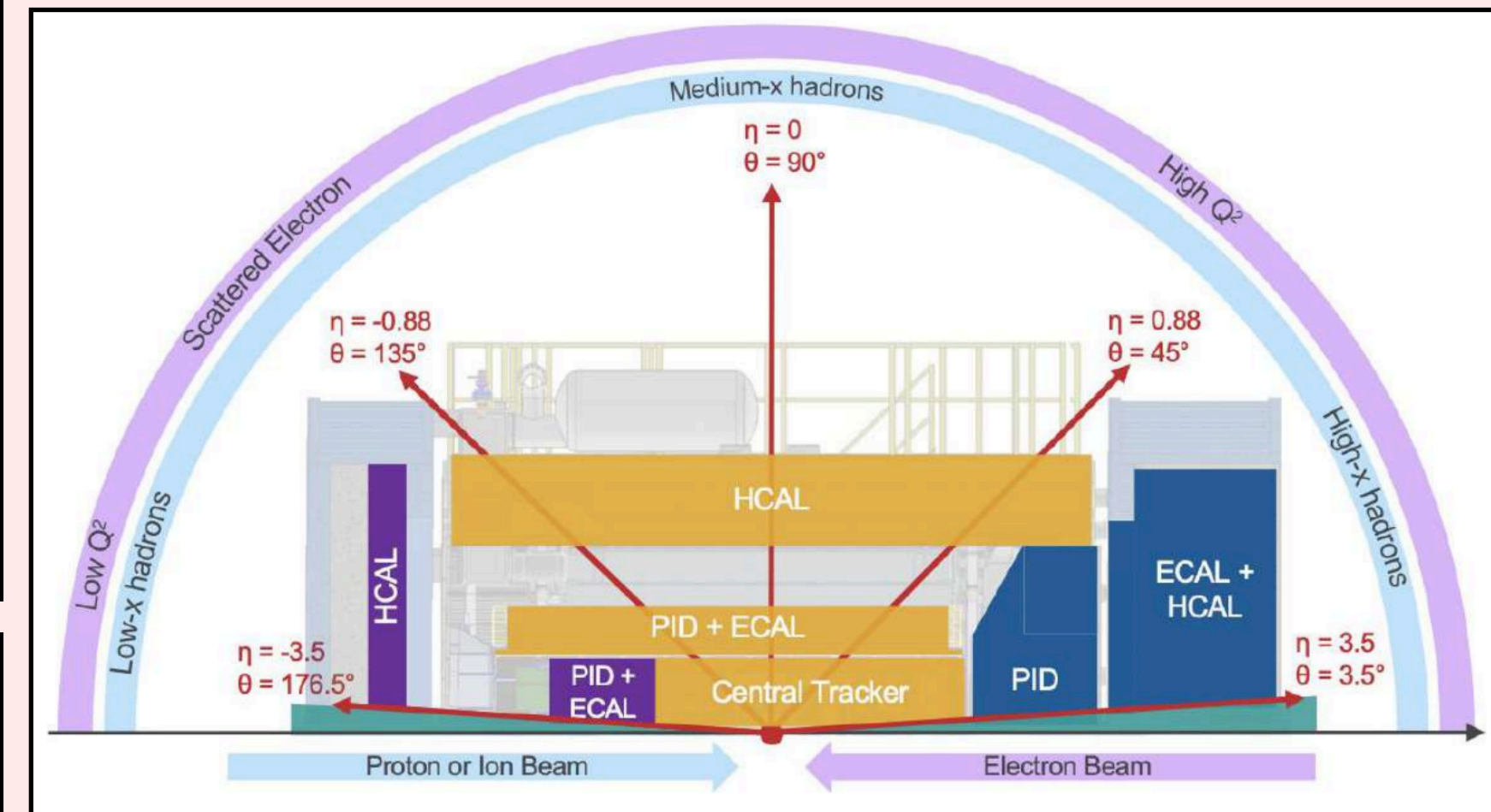
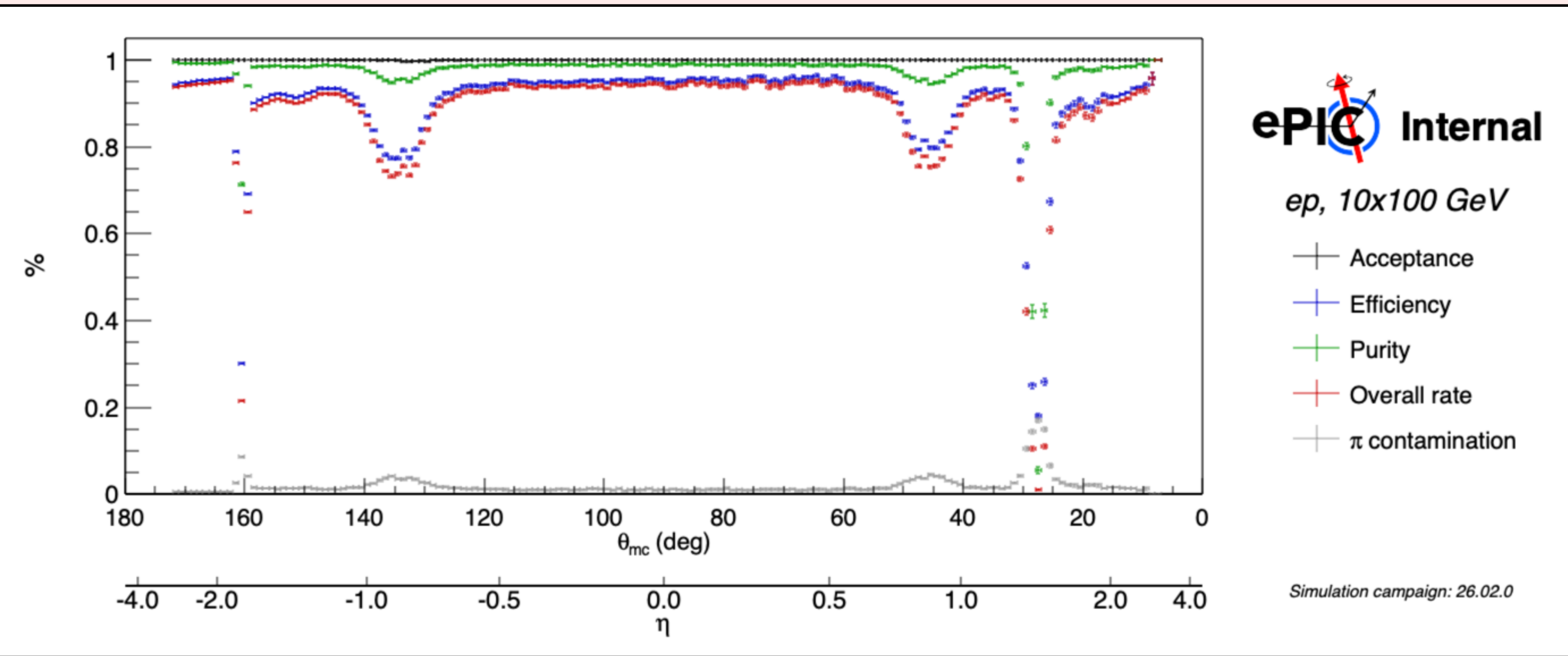


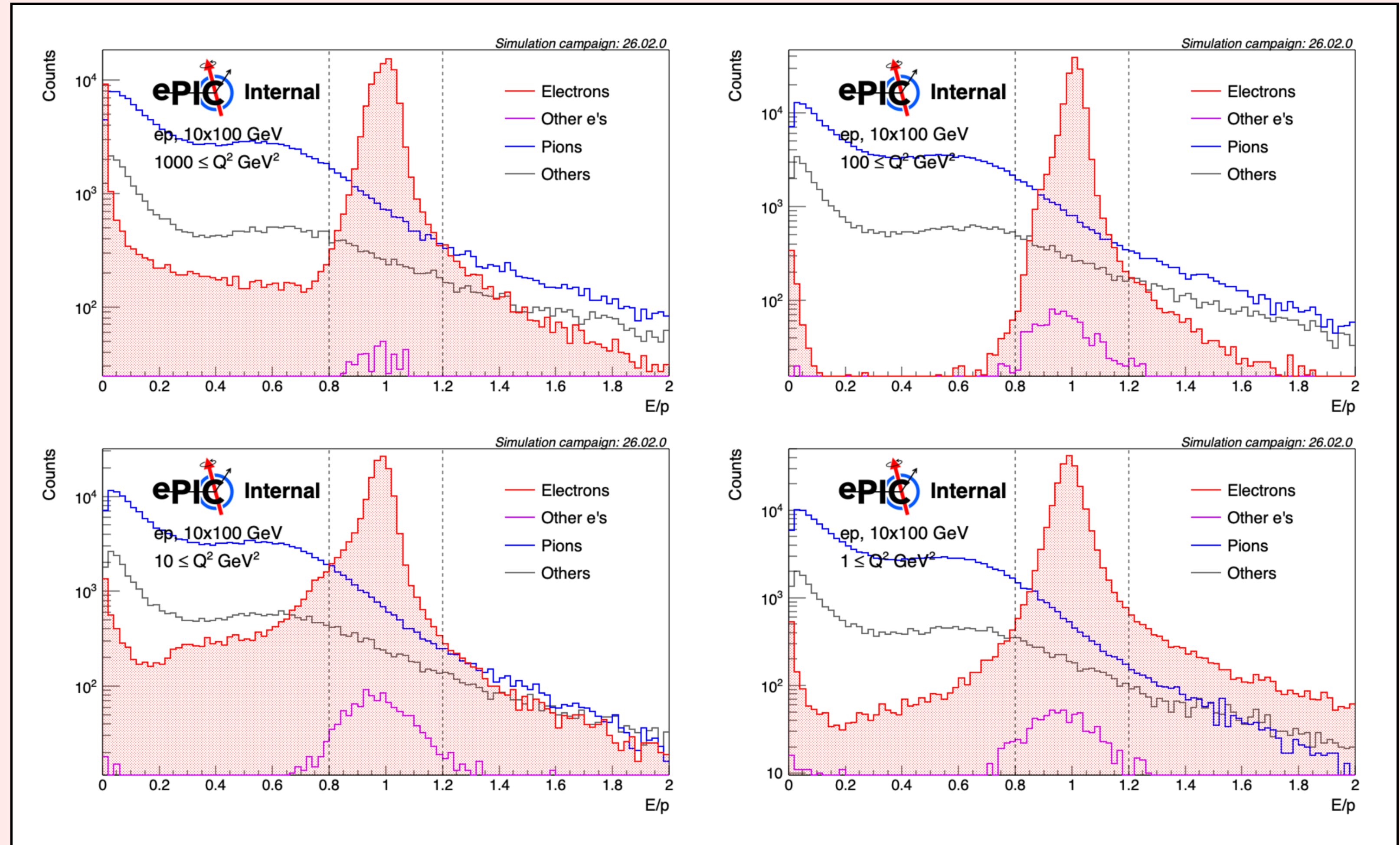
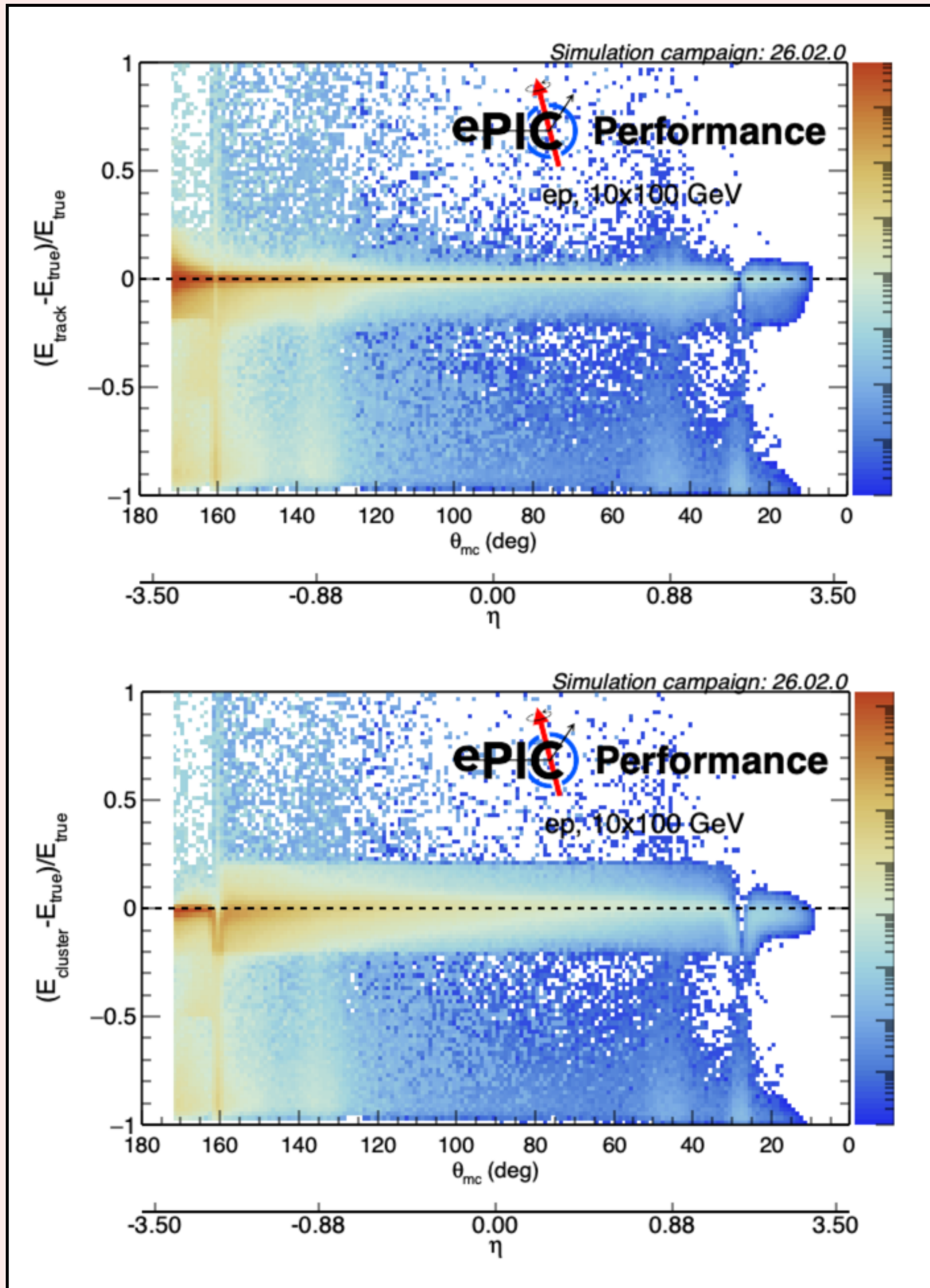
**ePIC Internal**

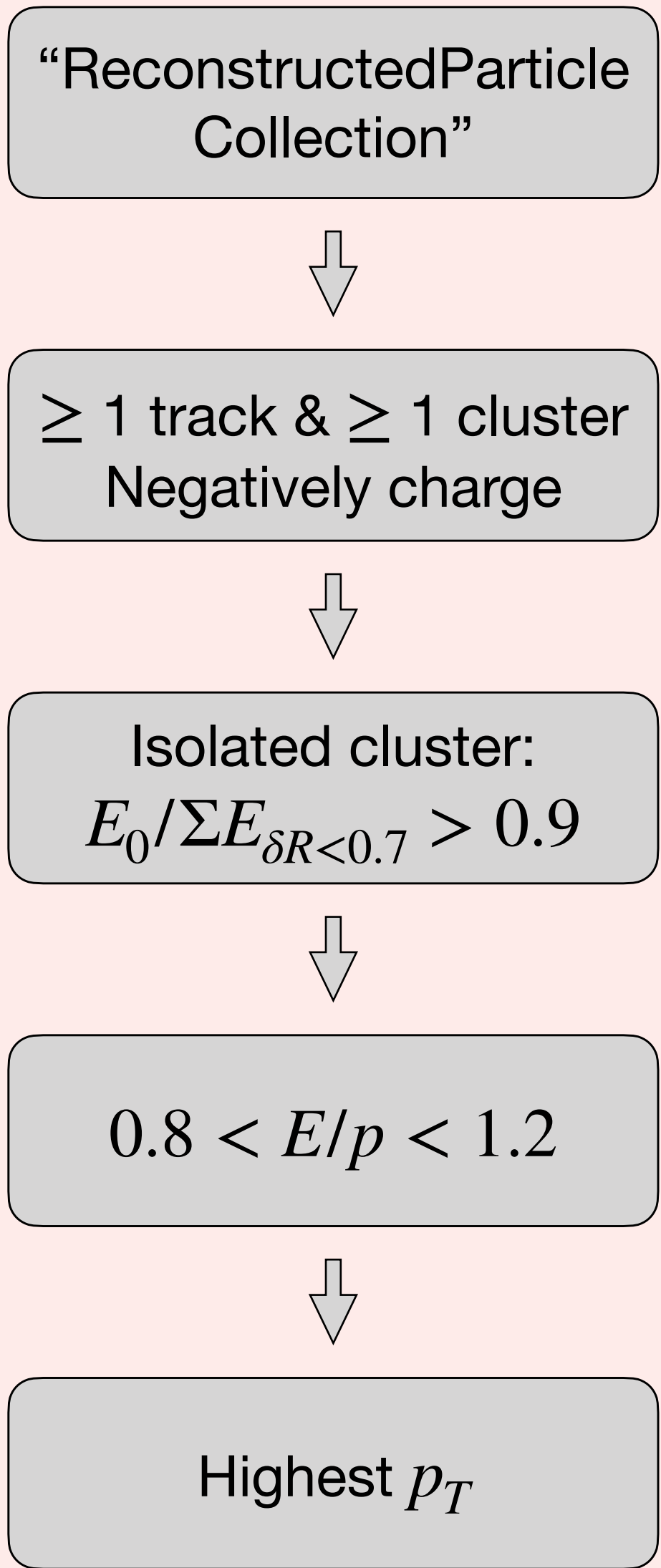
*ep, 10x100 GeV*

—+— Acceptance  
—+— Efficiency  
—+— Purity  
—+— Overall rate  
—+—  $\pi$  contamination

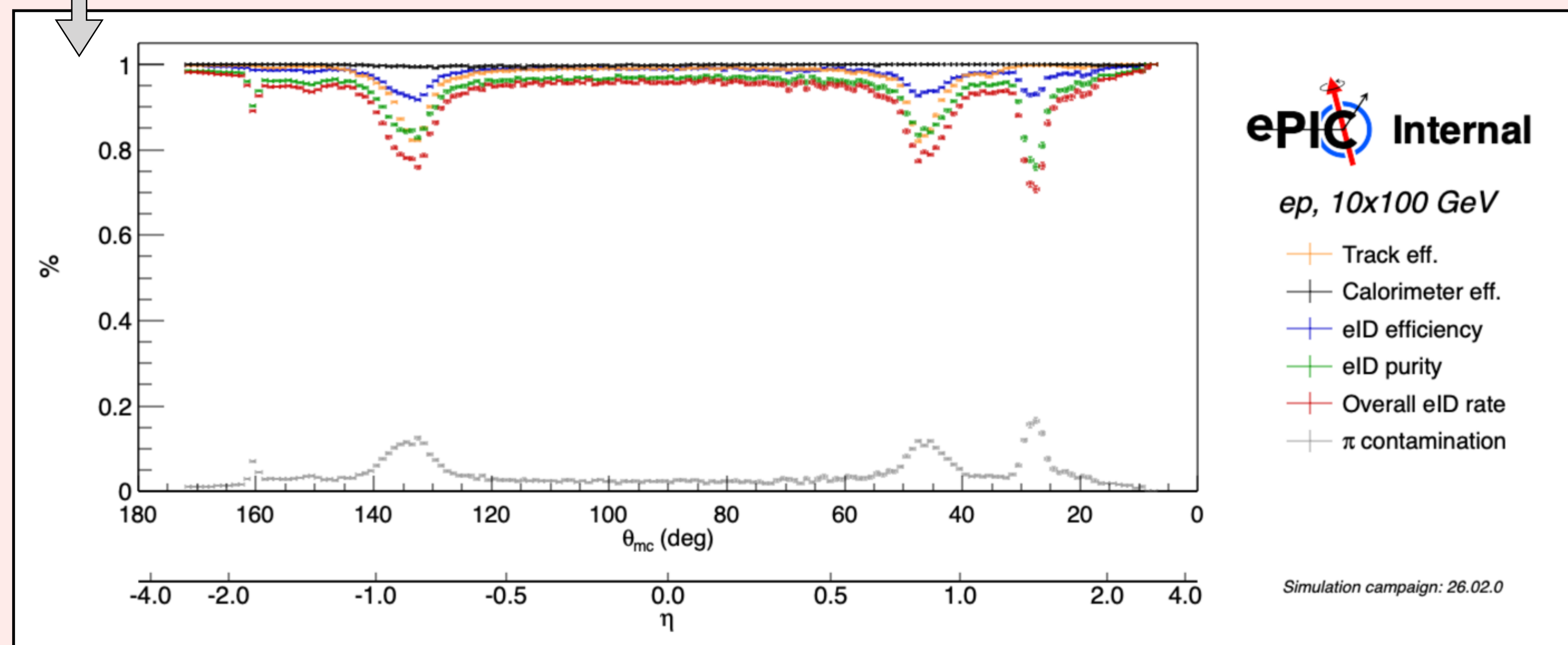
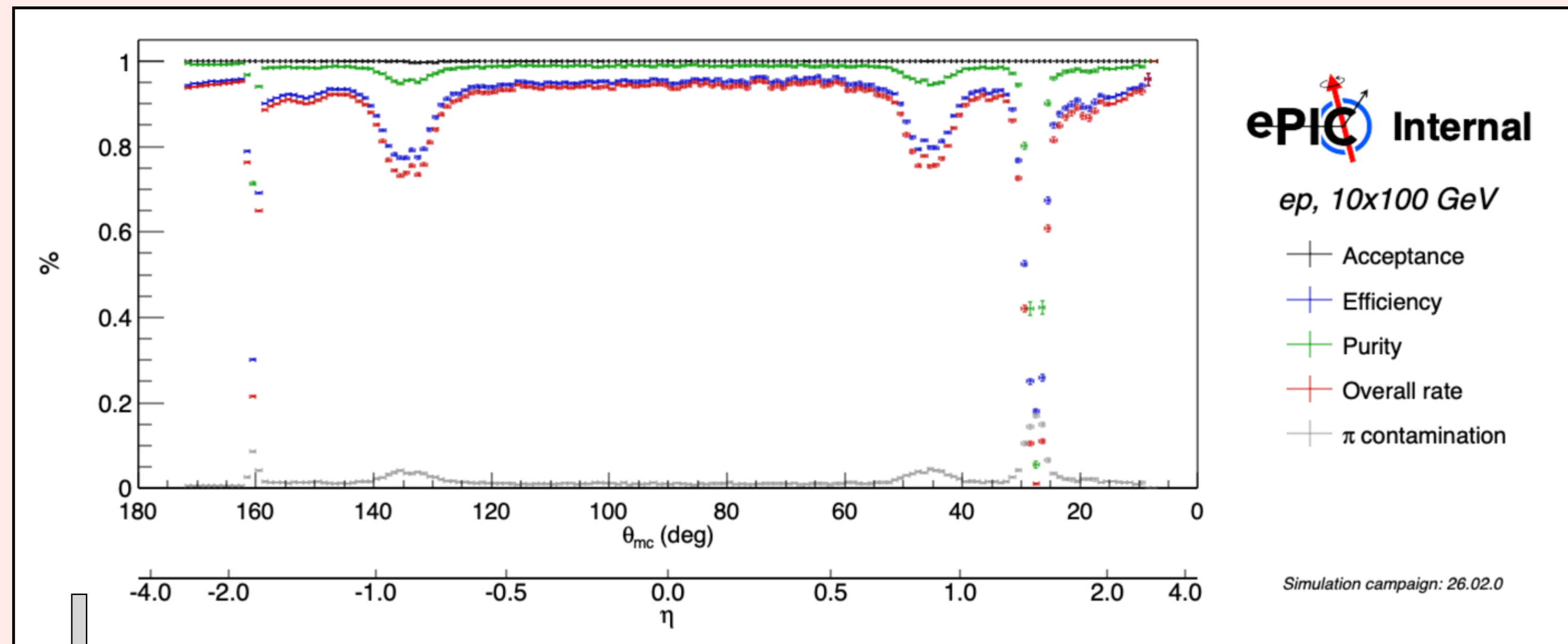
*Simulation campaign: 26.02.0*

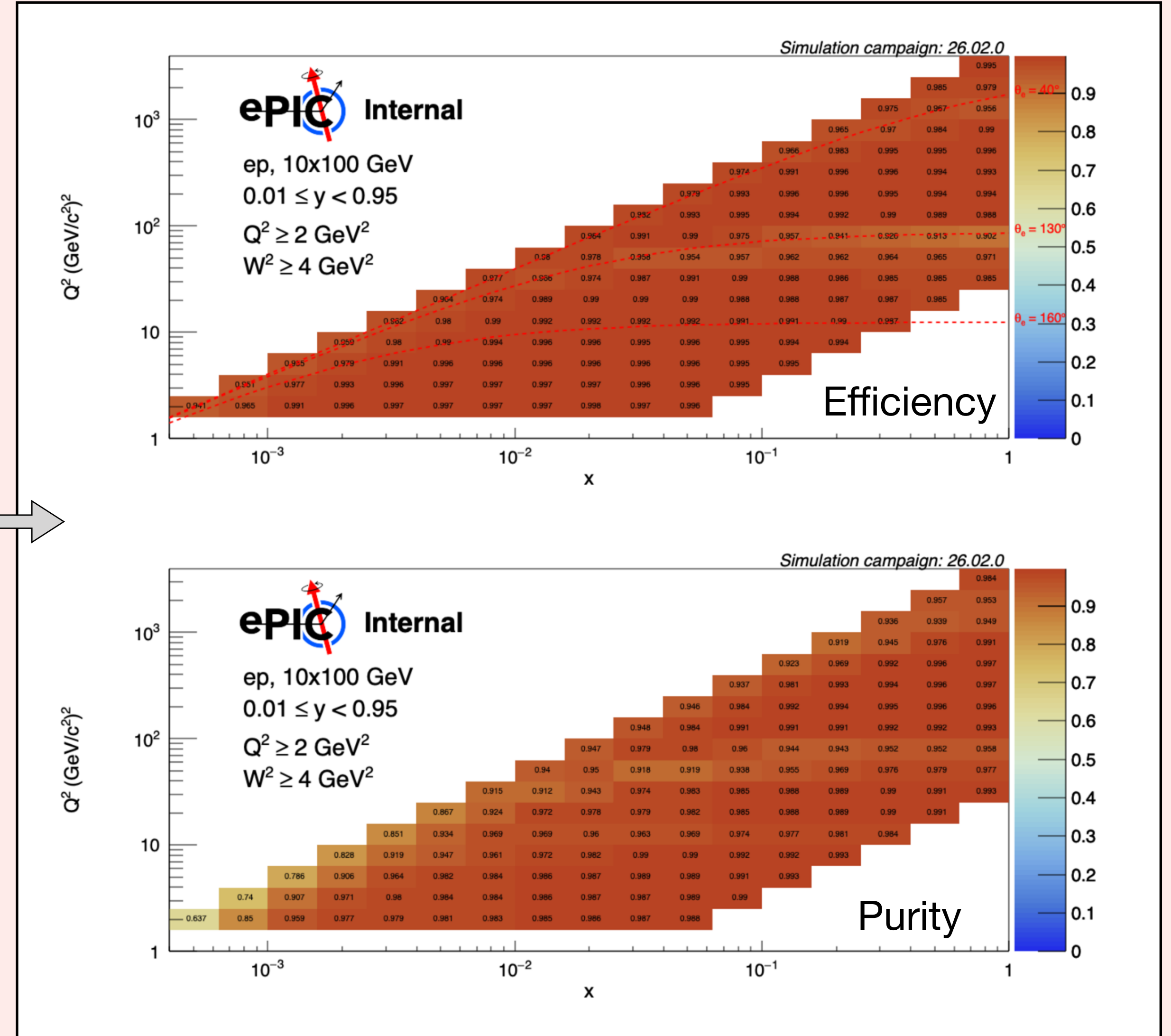
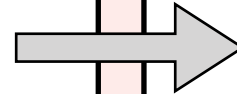
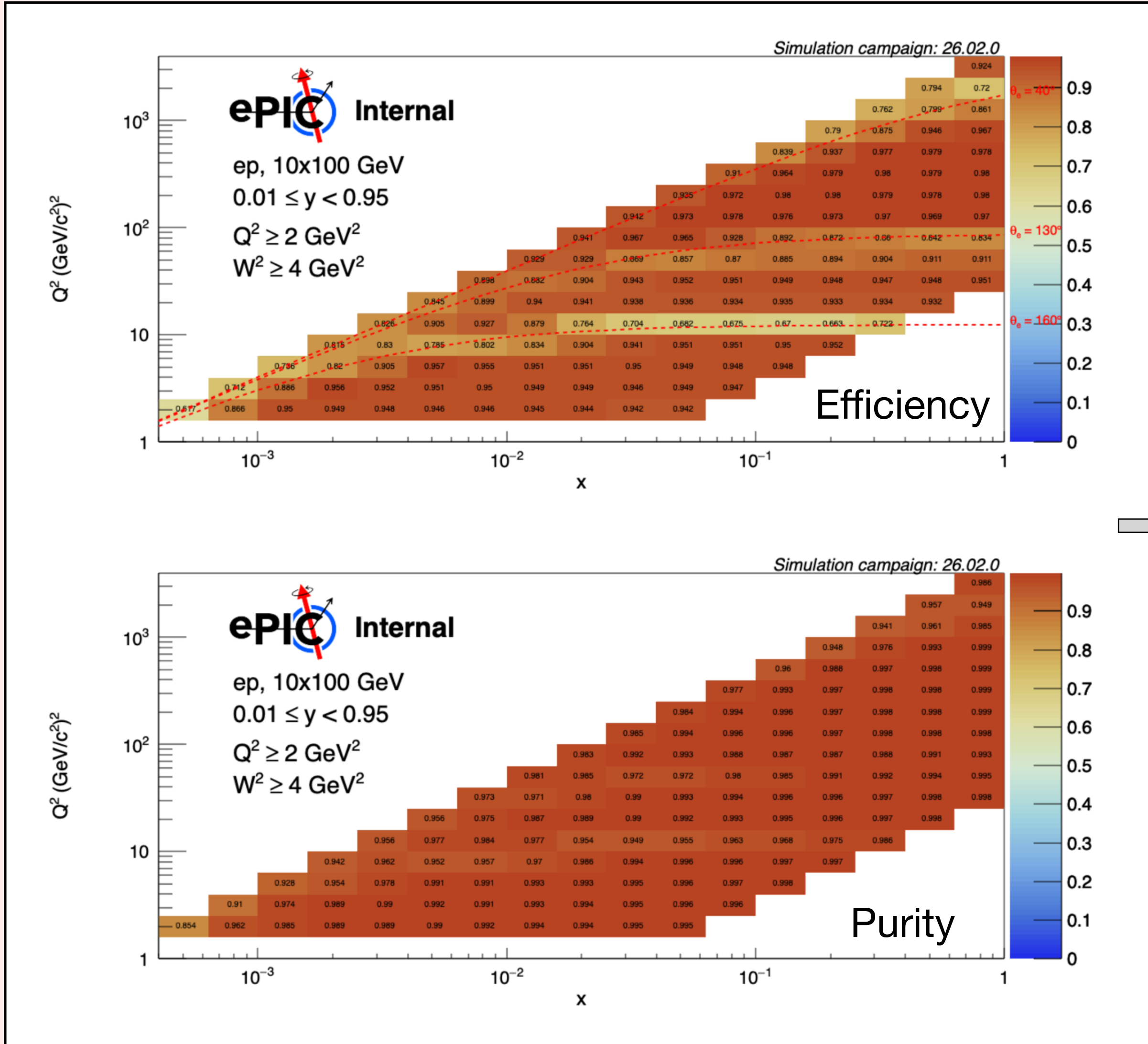


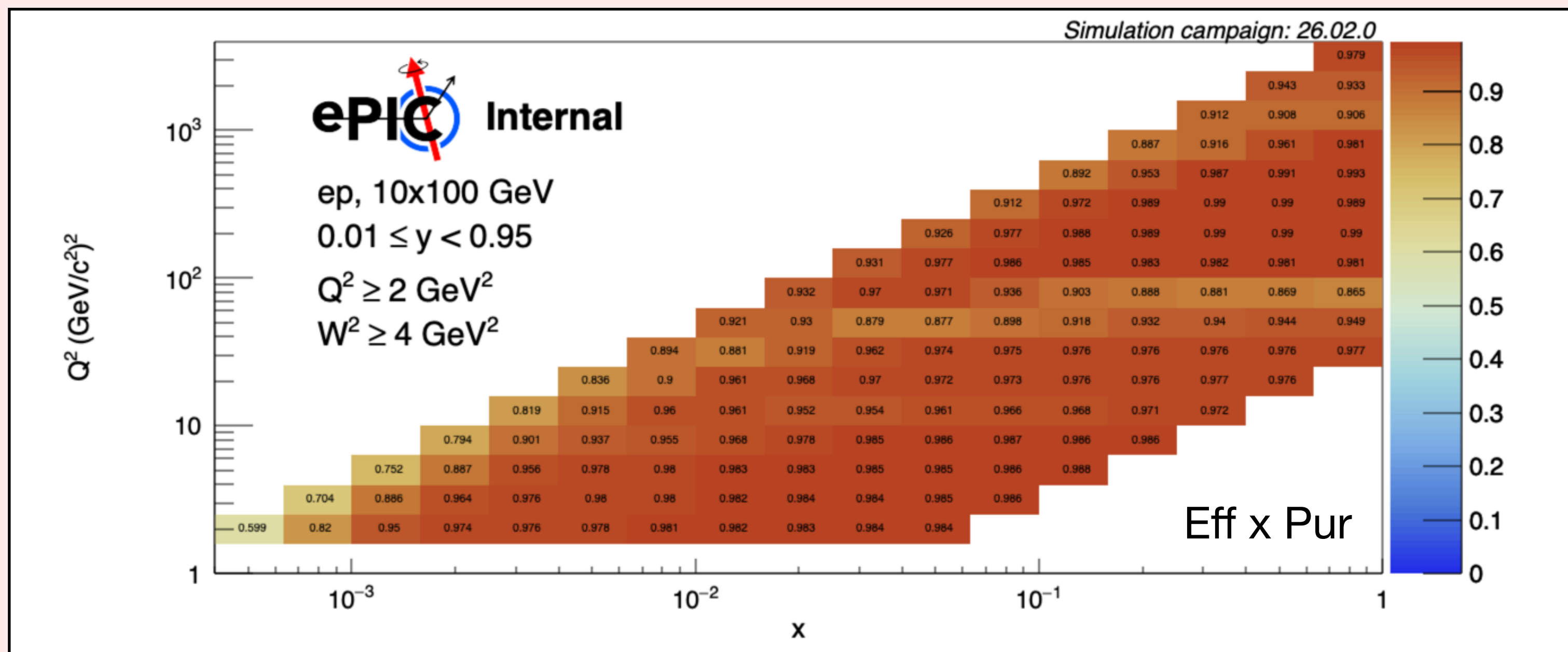
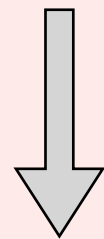
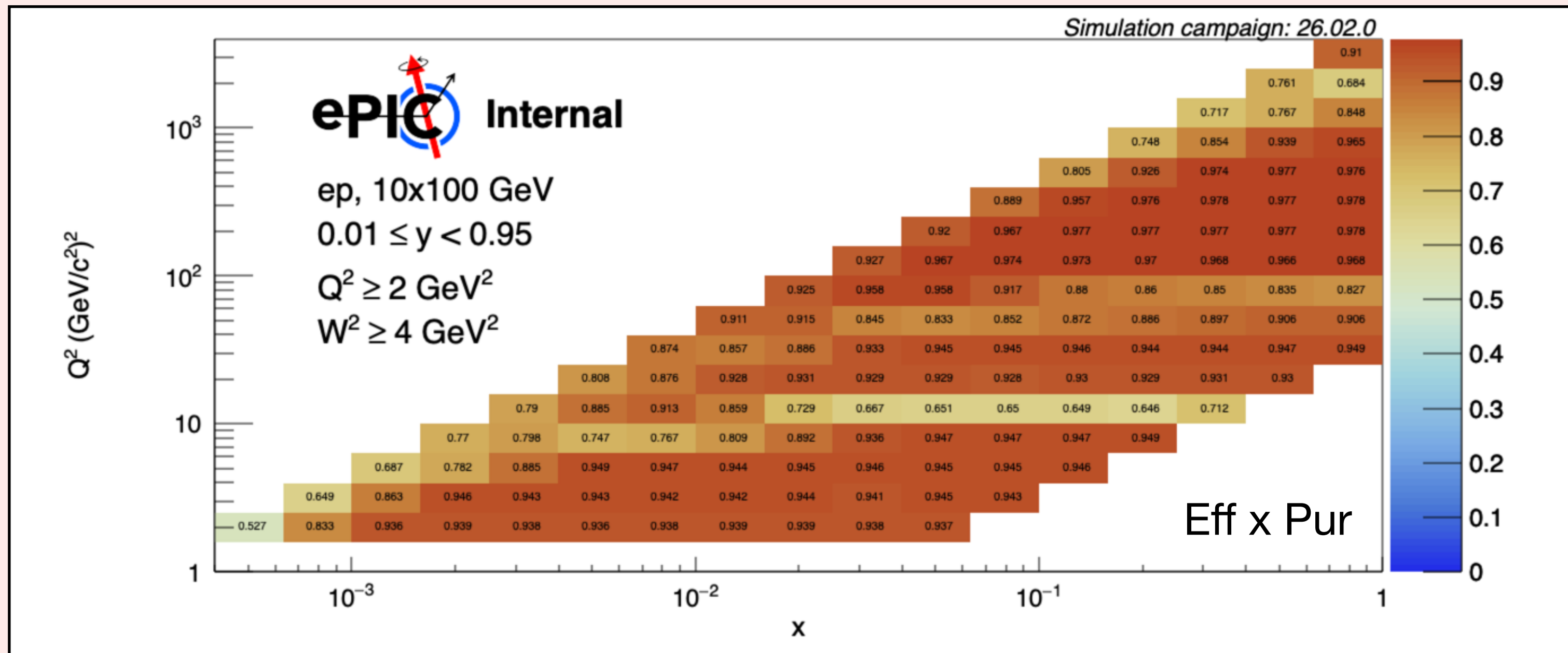


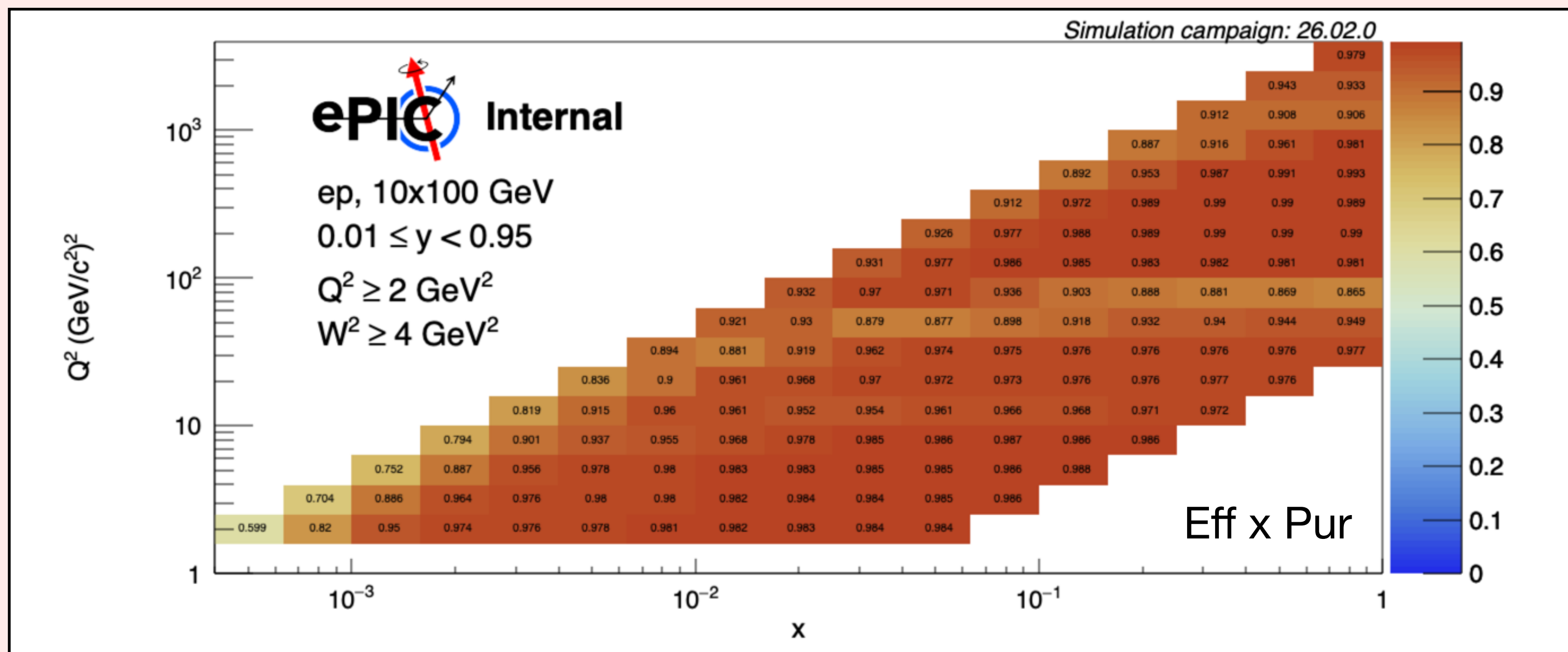
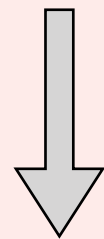
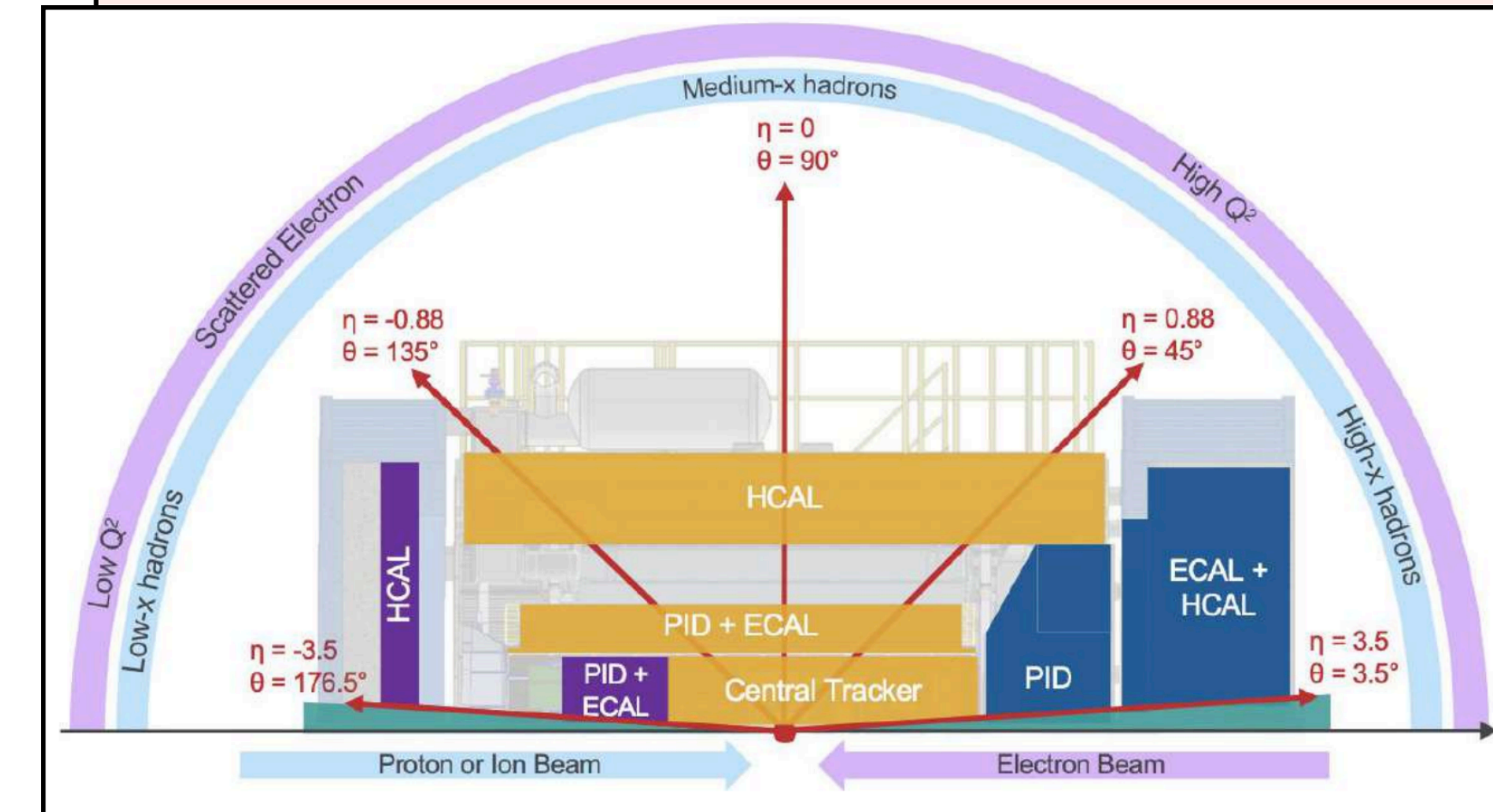
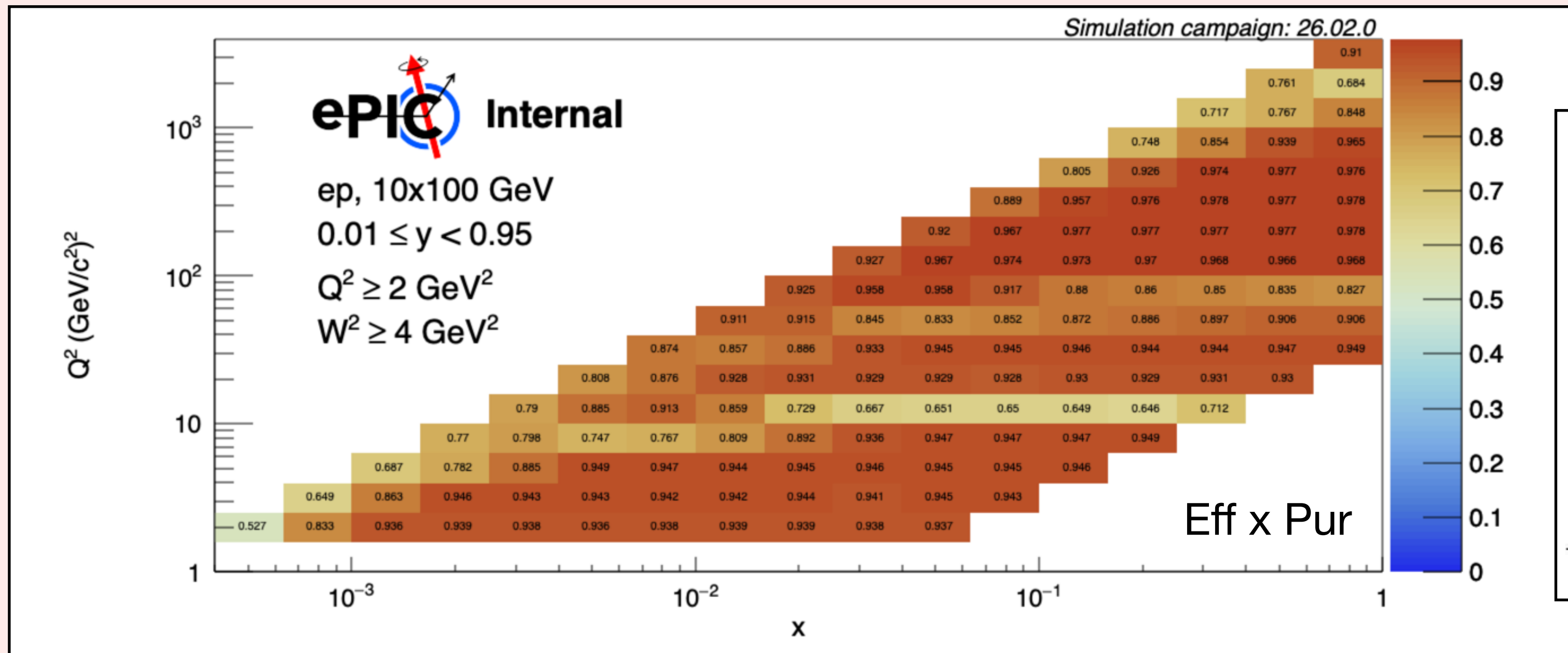


If none satisfies E/p selection









- 🤔
- Select primary vertex?
  - HCal?
  - PID detector?
  - $E_{\text{min}}$  in calorimeter?

## 3 types of mix available

①

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 | ●      | ●●●●   | ●      |           |          |         |
| Event 2 | ●      | ●●●●   |        |           | ●        | ●       |
| Event 3 | ●      | ●●●    |        | ●         |          |         |
| Event 4 | ●      | ●●●    | ●      |           |          | ●       |
| Event 5 | ●      | ●●●●   | ●      |           |          |         |

### **2μs BG + 1 DIS**

- Available: 10x100 GeV,  $Q^2 > 1 \text{ GeV}^2$  samples for eID

②

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 |        | ●●●●   | ●      |           |          |         |
| Event 2 |        | ●●●●   |        |           | ●        | ●       |
| Event 3 | ●      | ●●●    |        | ●         |          |         |
| Event 4 |        | ●●●    | ●      |           |          | ●       |
| Event 5 |        | ●●●●   | ●      |           |          |         |

### **2μs BG + Realistic DIS rate**

- Can mix either  $Q^2 > 1 \text{ GeV}^2$  or  $Q^2 < 1 \text{ GeV}^2$

③

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 |        | ●●●●   | ●      |           |          |         |
| Event 2 |        | ●●●●   |        |           | ●        | ●       |
| Event 3 |        | ●●●    |        | ●         |          |         |
| Event 4 |        | ●●●    | ●      |           |          | ●       |
| Event 5 |        | ●●●●   | ●      |           |          |         |

### **2μs BG + no DIS**

## 3 types of mix available

①

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 | ●      | ●●●●   | ●      |           |          |         |
| Event 2 | ●      | ●●●●   |        |           | ●        | ●       |
| Event 3 | ●      | ●●●    |        | ●         |          |         |
| Event 4 | ●      | ●●●    | ●      |           |          | ●       |
| Event 5 | ●      | ●●●●   | ●      |           |          |         |

### 2μs BG + 1 DIS

- Available: 10x100 GeV,  $Q^2 > 1 \text{ GeV}^2$  samples for eID
- Need higher  $Q^2$  events to see effect in full phase space
- Need  $Q^2 > 0 \text{ GeV}^2$  samples

②

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 |        | ●●●●   | ●      |           |          |         |
| Event 2 |        | ●●●●   |        |           | ●        | ●       |
| Event 3 | ●      | ●●●    |        | ●         |          |         |
| Event 4 |        | ●●●    | ●      |           |          | ●       |
| Event 5 |        | ●●●●   | ●      |           |          |         |

### 2μs BG + Realistic DIS rate

- Can mix either  $Q^2 > 1 \text{ GeV}^2$  or  $Q^2 < 1 \text{ GeV}^2$

③

| Event   | signal | synrad | ebrems | etouschek | ecoloumb | p.b.gas |
|---------|--------|--------|--------|-----------|----------|---------|
| Event 1 |        | ●●●●   | ●      |           |          |         |
| Event 2 |        | ●●●●   |        |           | ●        | ●       |
| Event 3 |        | ●●●    |        | ●         |          |         |
| Event 4 |        | ●●●    | ●      |           |          | ●       |
| Event 5 |        | ●●●●   | ●      |           |          |         |

### 2μs BG + no DIS



- Use ① to check eID, KE recon.
- Use ②/③ to check contamination from pure BG (what is the rate of identifying signal?)
- Use ② to check low  $Q^2$  behavior