

# A Trivial Unfolding Consistency Check

Slide 1

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## RECAP

### Unfolded Covariance Matrices

- ⌘ For measured spectrum – no problem
- ⌘ For finite detector statistics – no issue arose

### Unfolding Cross-check

- ⌘ UPC+DPMJET response matrix was used to unfold DPMJET Sample

### DPMJET Inputs

- ⌘ Reconstructed Pt spectrum
- ⌘ True Pt spectrum
- ⌘ Measured Pt spectrum (Run 15 Pt data was used)
- ⌘ Covariance matrix extracted from measured Pt spectrum

### Cross-check Unsuccessful

- ⌘ DPMJET sample still had an effect on UPC+DPMJET response matrix
- ⌘ Run 15 data was used as measured spectrum for unfolding DPMJET sample

# Suggested Method – Independent MC Sample

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## PYTHIA

Unfolded PYTHIA sample, which is independent of UPC+DPMJET response matrix

### Unfolding Cross-check

⌘ Using UPC+DPMJET response matrix to unfold Pt spectrum from PYTHIA sample

### PYTHIA Inputs

⌘ Reconstructed Pt spectrum

⌘ Measured Pt spectrum (Reconstructed Pt is used as measured spectrum)

⌘ True Pt spectrum

⌘ Covariance matrix extracted from measured Pt spectrum

### UPC+DPMJET Input

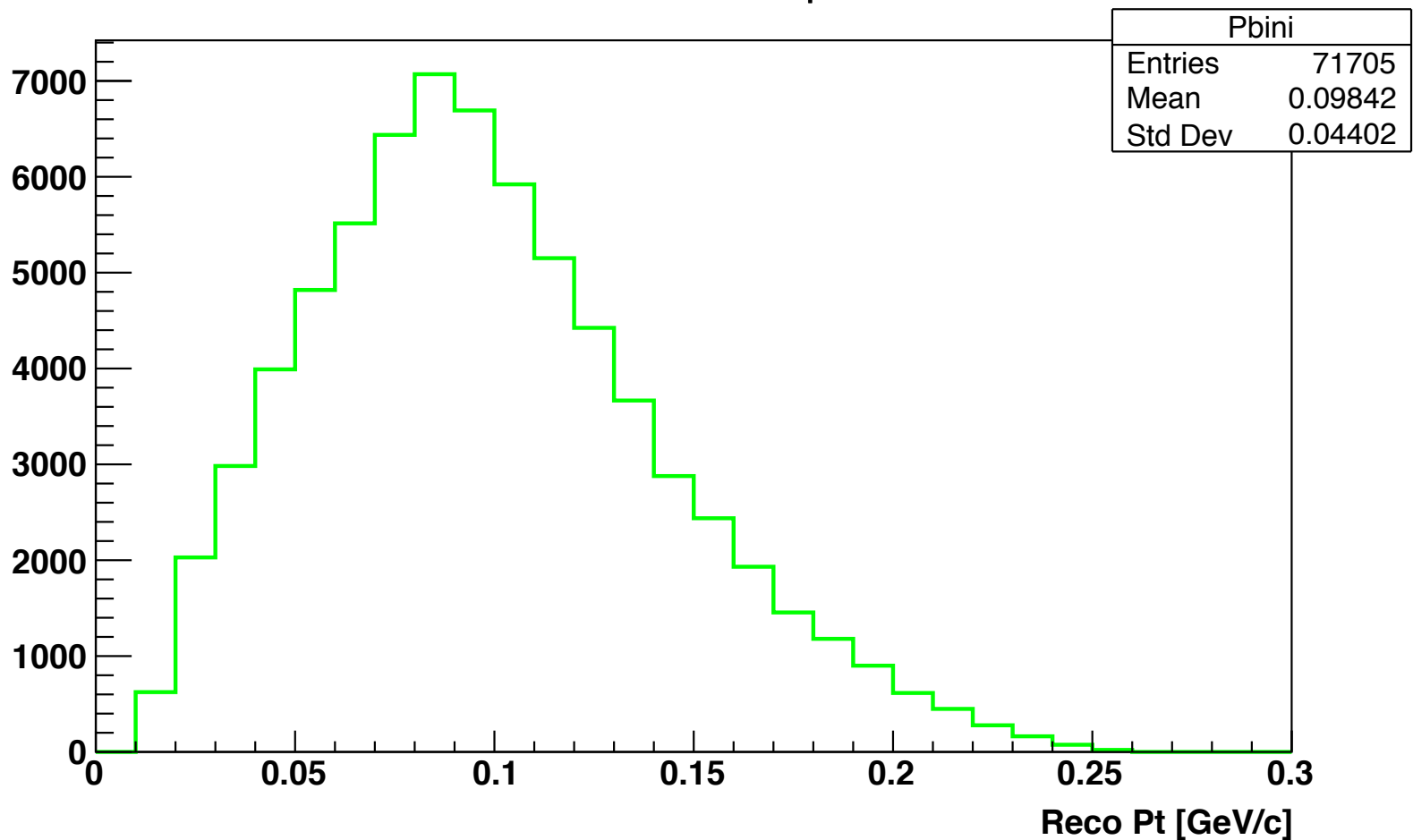
⌘ Detector response matrix

# PYTHIA - Reco Pt Spectrum

Slide 3

⌘ Reconstructed Pt spectrum from PYTHIA sample

PYTHIA - Reco Pt Spectrum

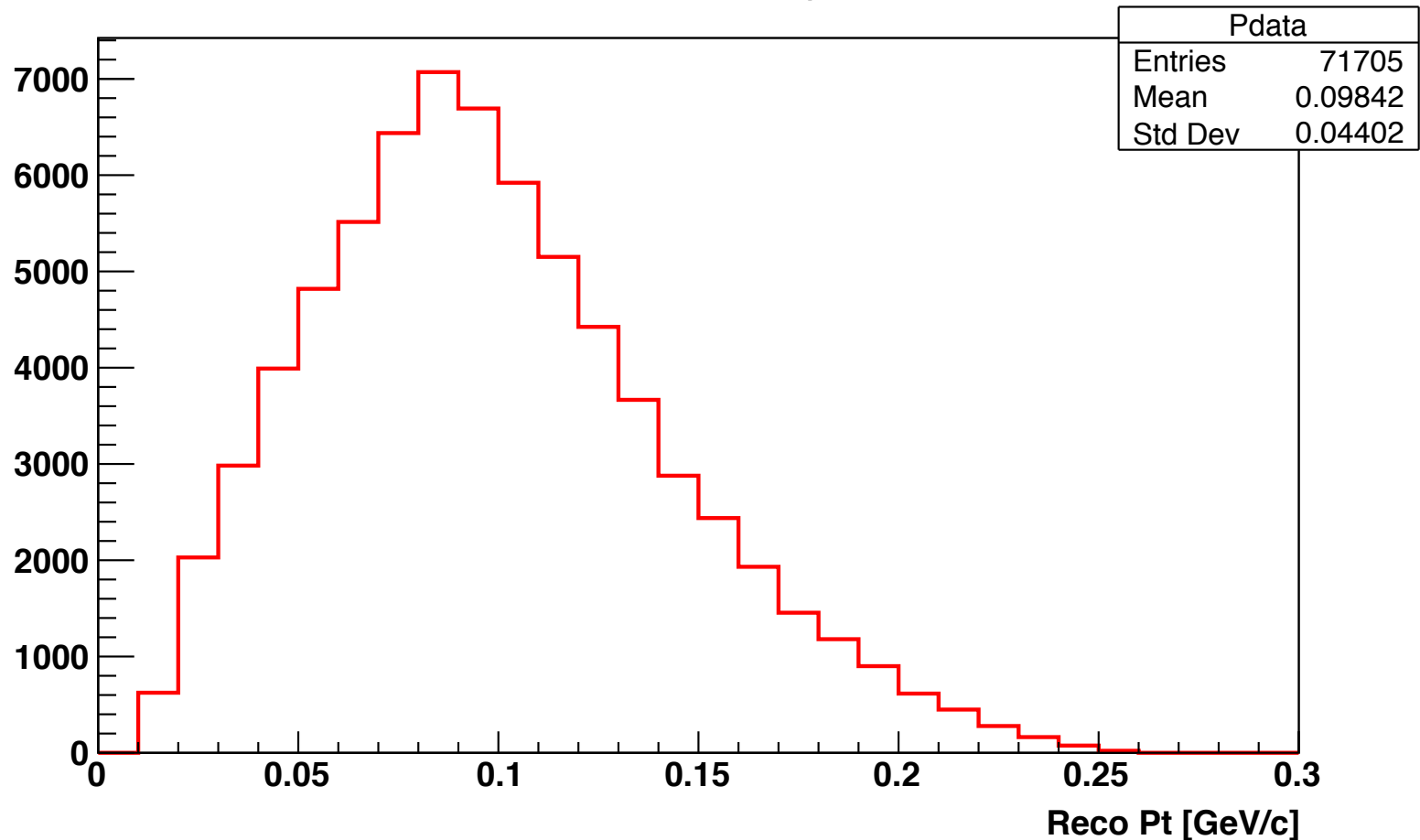


# PYTHIA – Measured Pt Spectrum

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⌘ Measured Pt spectrum - reconstructed Pt distribution is used.

PYTHIA - Data Pt Spectrum

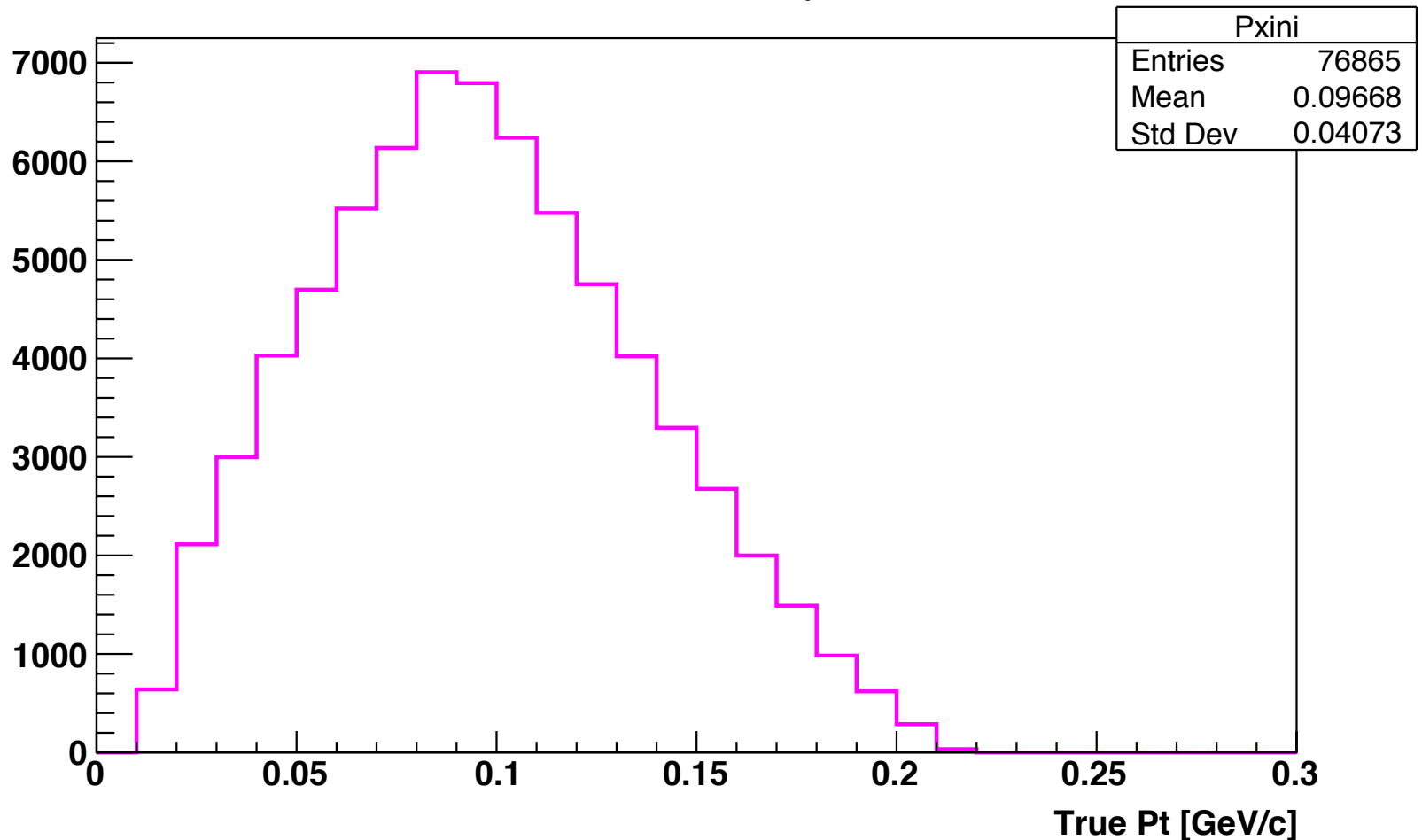


# PYTHIA - True Pt Spectrum

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⌘ Truth Pt distribution from PYTHIA sample

PYTHIA - True Pt Spectrum

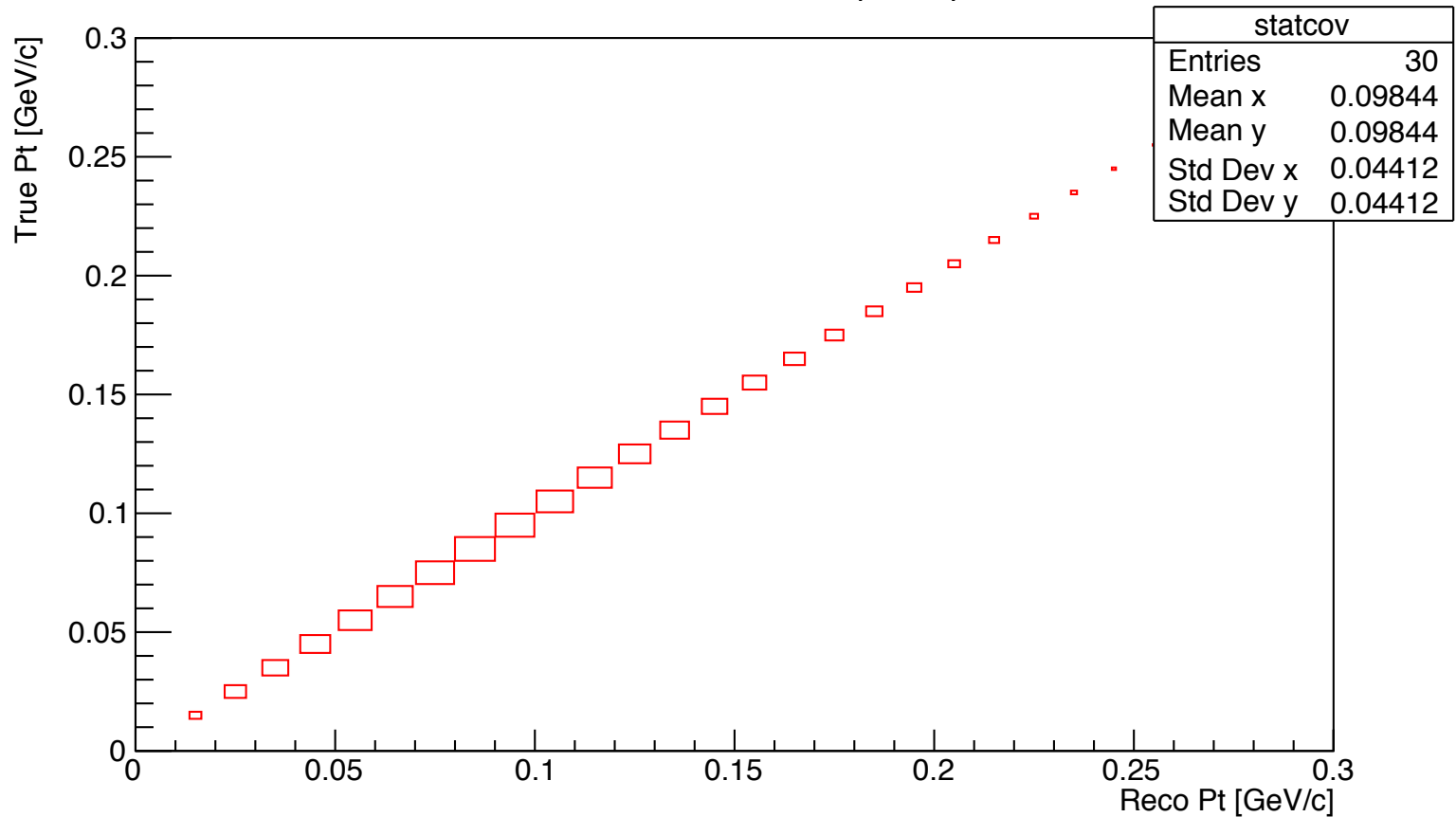


# PYTHIA – Covariance Matrix

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⌘ Covariance matrix extracted from the measured Pt spectrum of PYTHIA sample

Covariance Matrix (BOX)

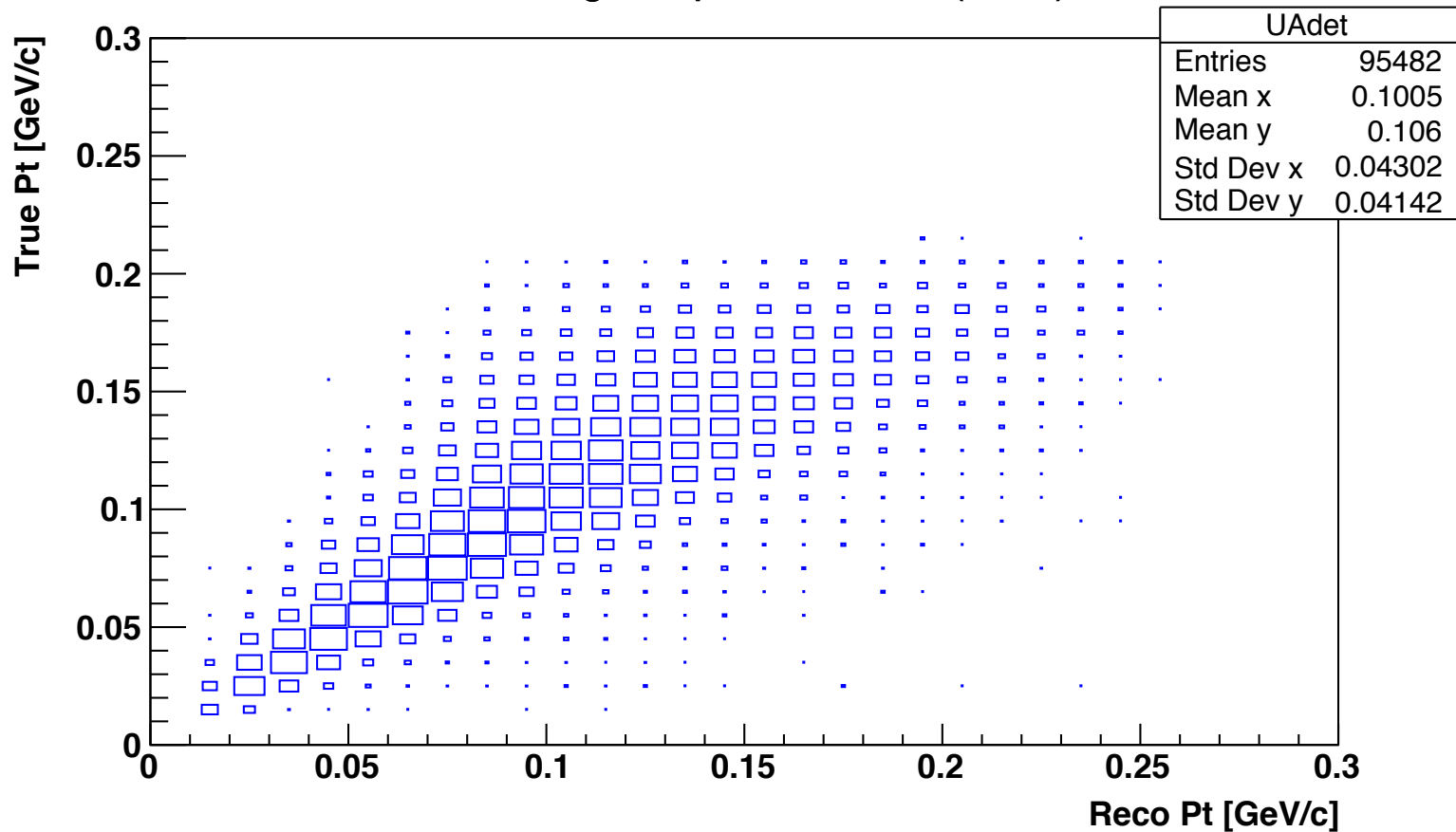


# Response Matrix – UPC+DPMJET

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⌘ Actual smeared detector response matrix obtained using UPC+DPMJET sample

### Smearing Response Matrix (BOX)

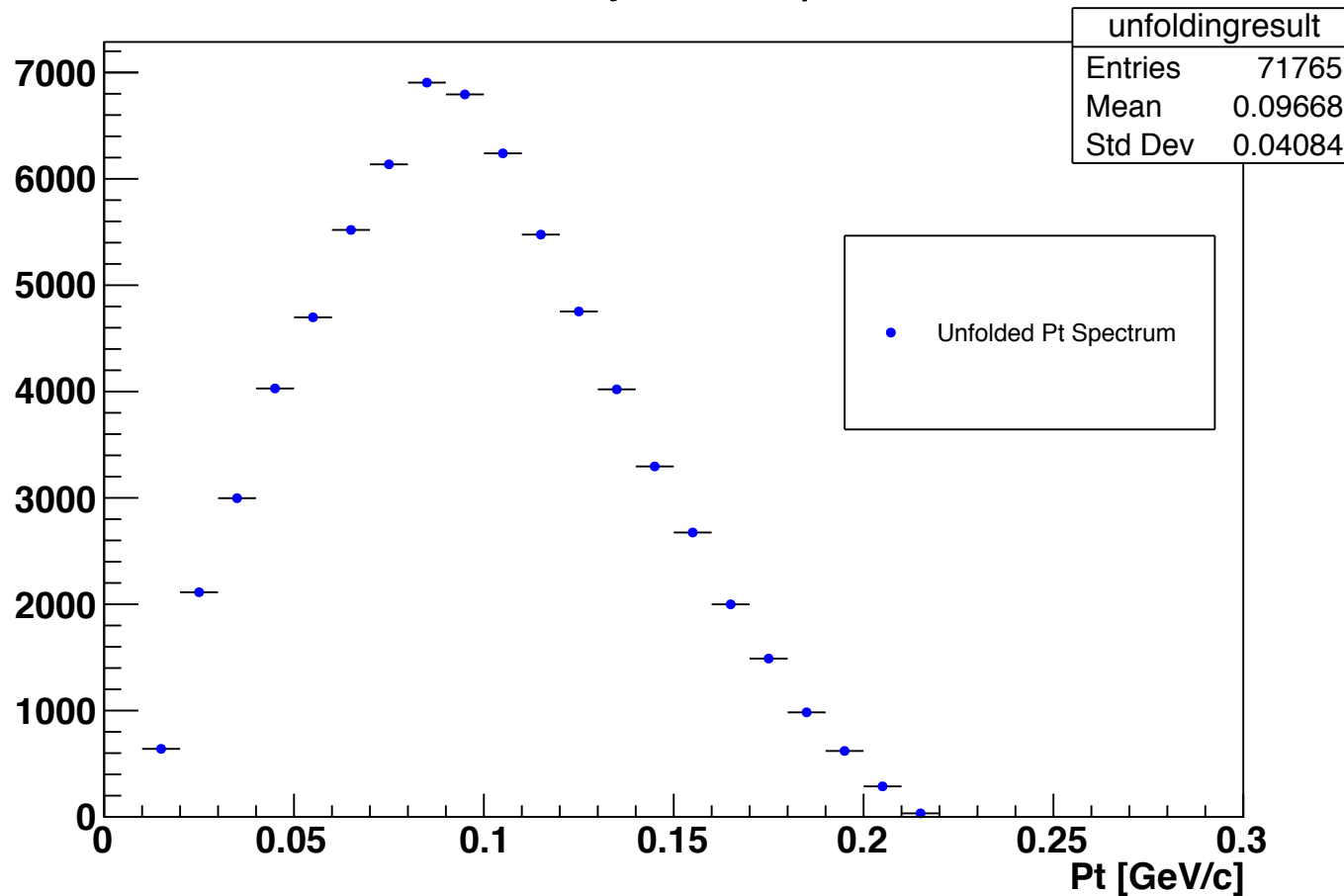


# PYTHIA – Unfolded Spectrum

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⌘ Unfolded Pt spectrum for PYTHIA sample using UPC+DPMJET response matrix

## Unfolded Pythia Pt Spectrum



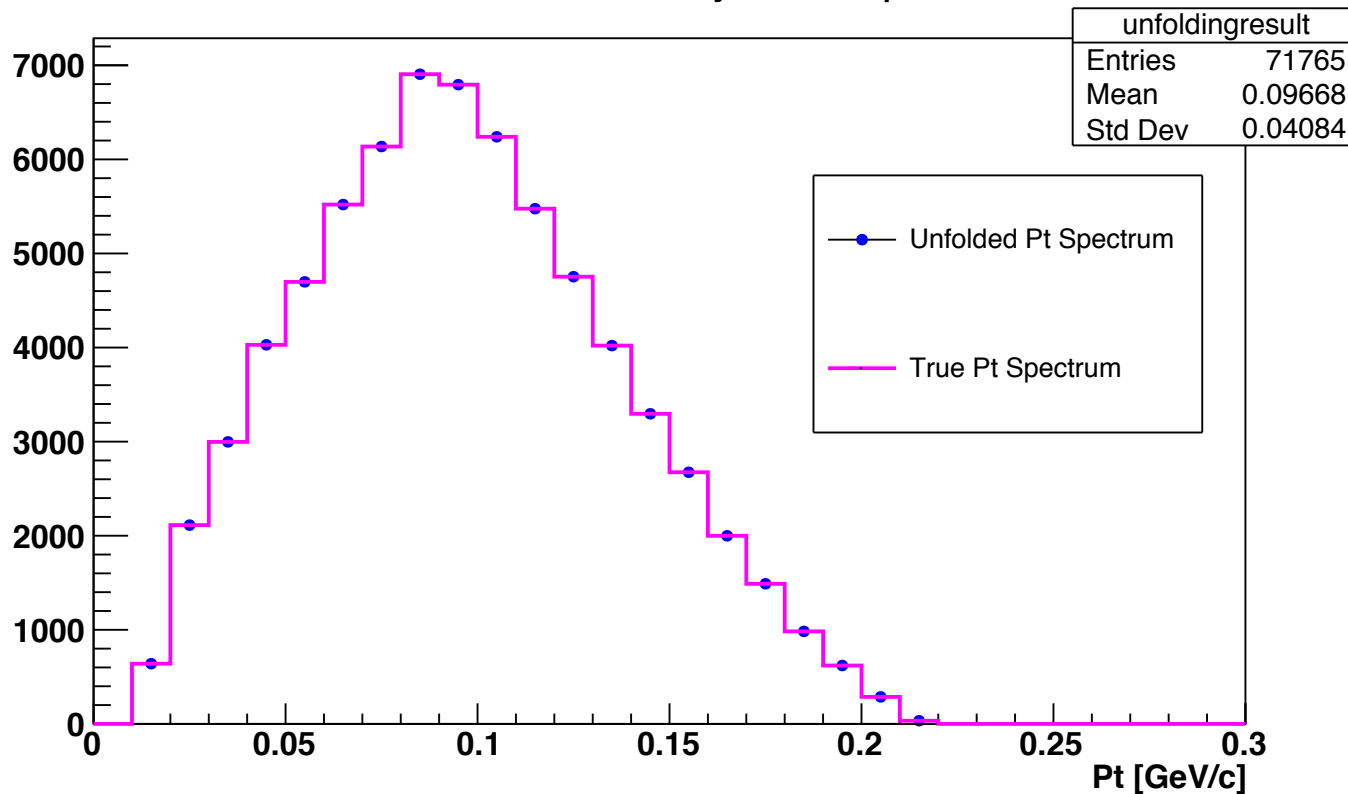


# Unfolding - Cross-check

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⌘ Consistency check – Unfolded and true Pythia Pt distributions

Unfolded and True Pythia Pt Spectra



⌘ Unfolded spectrum reproduces well true spectrum from PYTHIA sample

# Data, Unfolded, True, Reco - Superposed

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⌘ Superposed data, unfolded, true and reco Pt spectra from Pythia sample

Superposed Reco, Unfolded, True and Measured Pt Spectra

