



# Compare Data and Pythia MC Basic Tracking

## Tracking POG

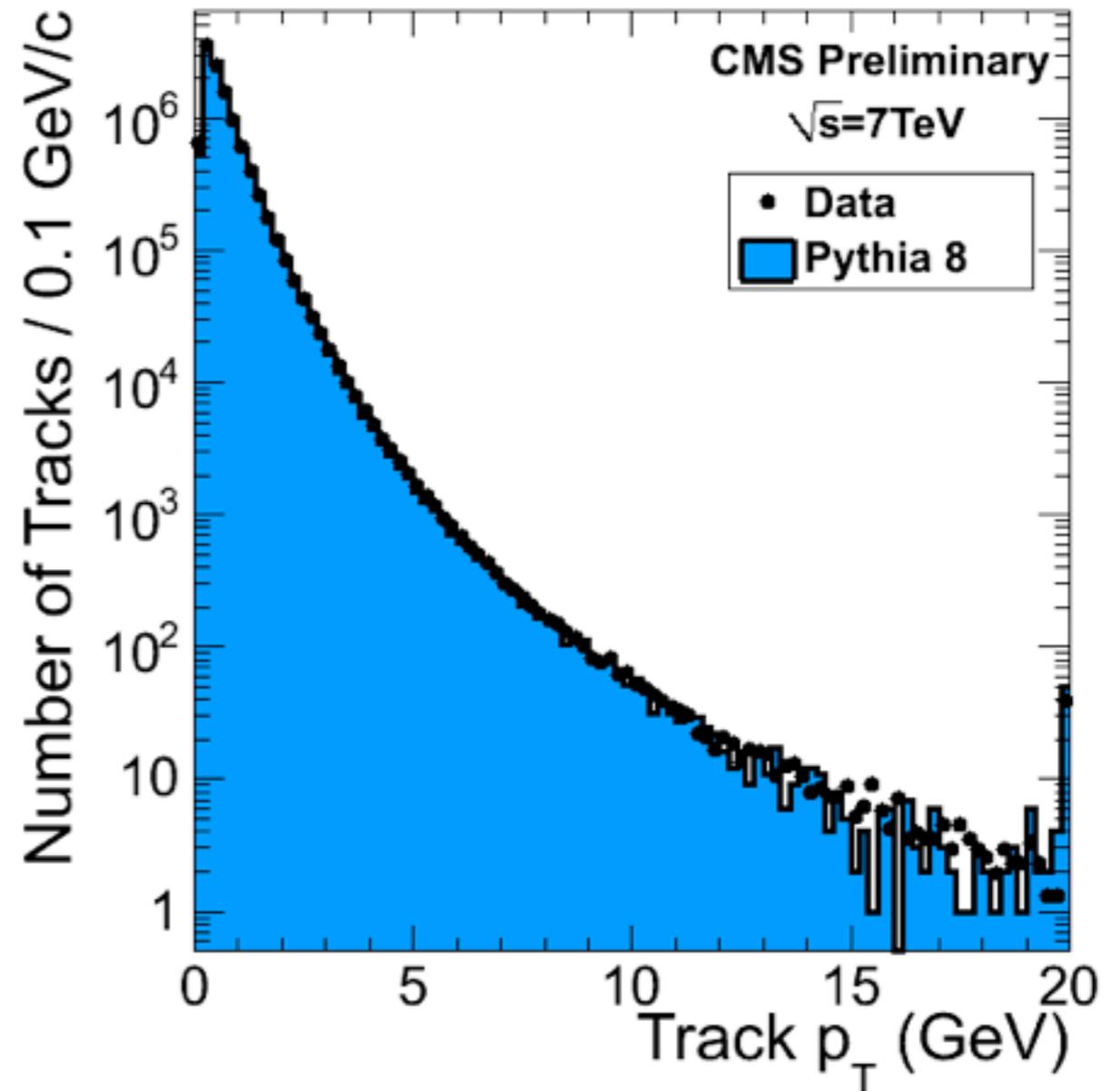
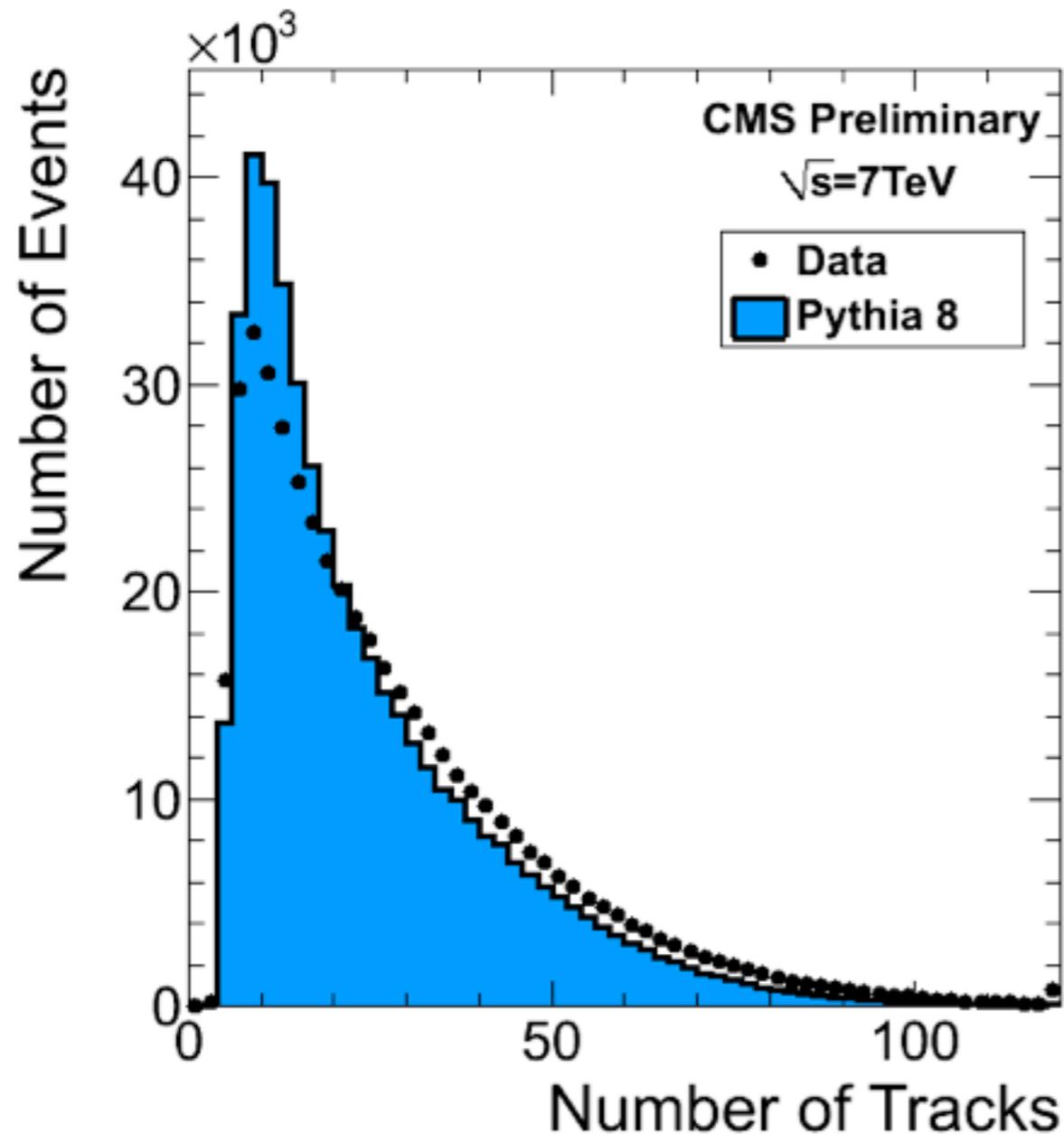
Plots in this talk are available at <http://home.fnal.gov/~ygao/CMS/Tracking/TrackPAS7TeV/>

Details on the MC tuning: <https://twiki.cern.ch/twiki/bin/view/CMS/TrackingPOGMCTuning>

# Compare the Data to Pythia MC

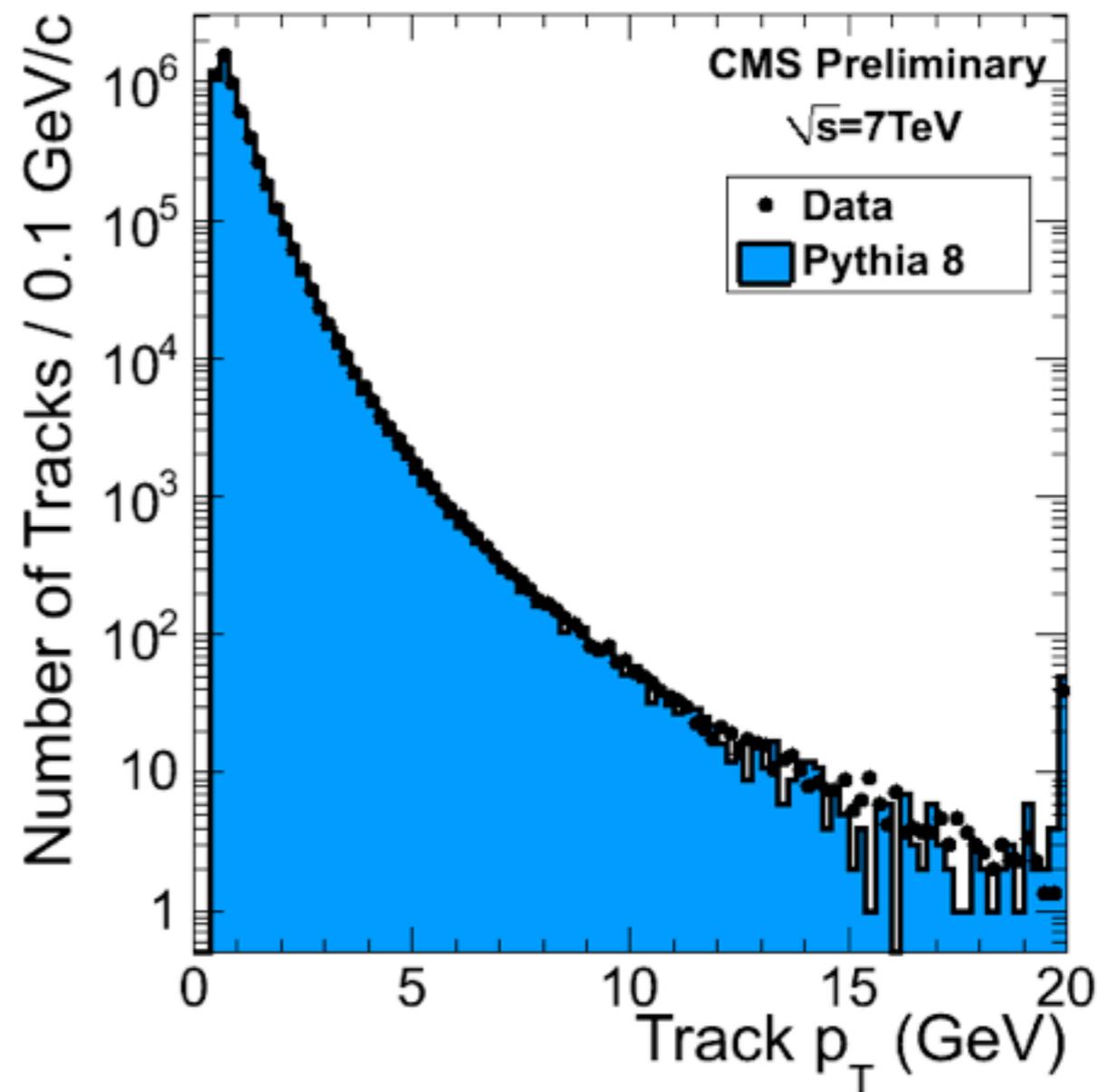
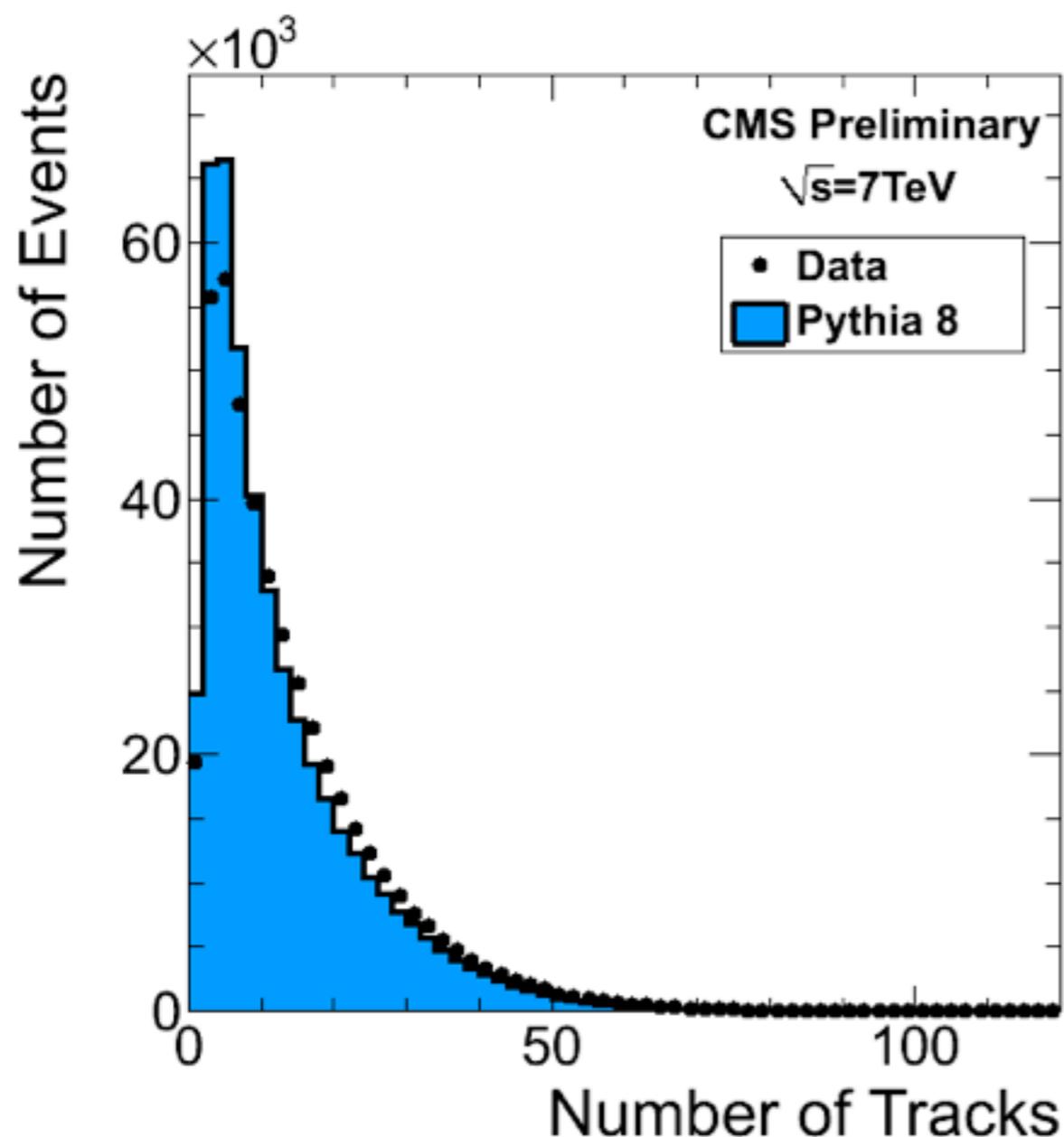
- Dataset reconstructed in 358p3
  - Run 132601: /MinimumBias/Commissioning10-May6thPDSkim\_GOODCOLL-v1
  - **Switch to Pythia 8 MC:** /MinBias\_7TeV-pythia8/Spring10-START3X\_V26B-v1/
- Event selections: GOODCOLL skim
- Track selections
  - HighPurity &&  $ptErr/pt < 5\%$
  - $|dz\ significance| < 10 \{dz(pvtx)/\sqrt{dzErr^2+pvtx\_zErr^2}\}$
- Notes on the plots in the next slides
  - All track distributions except the track multiplicity are normalized by nTracks
  - Track distributions normalized by nEvents are in backup slides (13-16)
  - The first(last) bin of the histograms include the underflow(overflow) bins
  - Data/Pythia D6T comparisons are in backup slides (X-X) ?still need them??

# Data/Pythia 8 Track Distributions ( $p_T > 0$ )



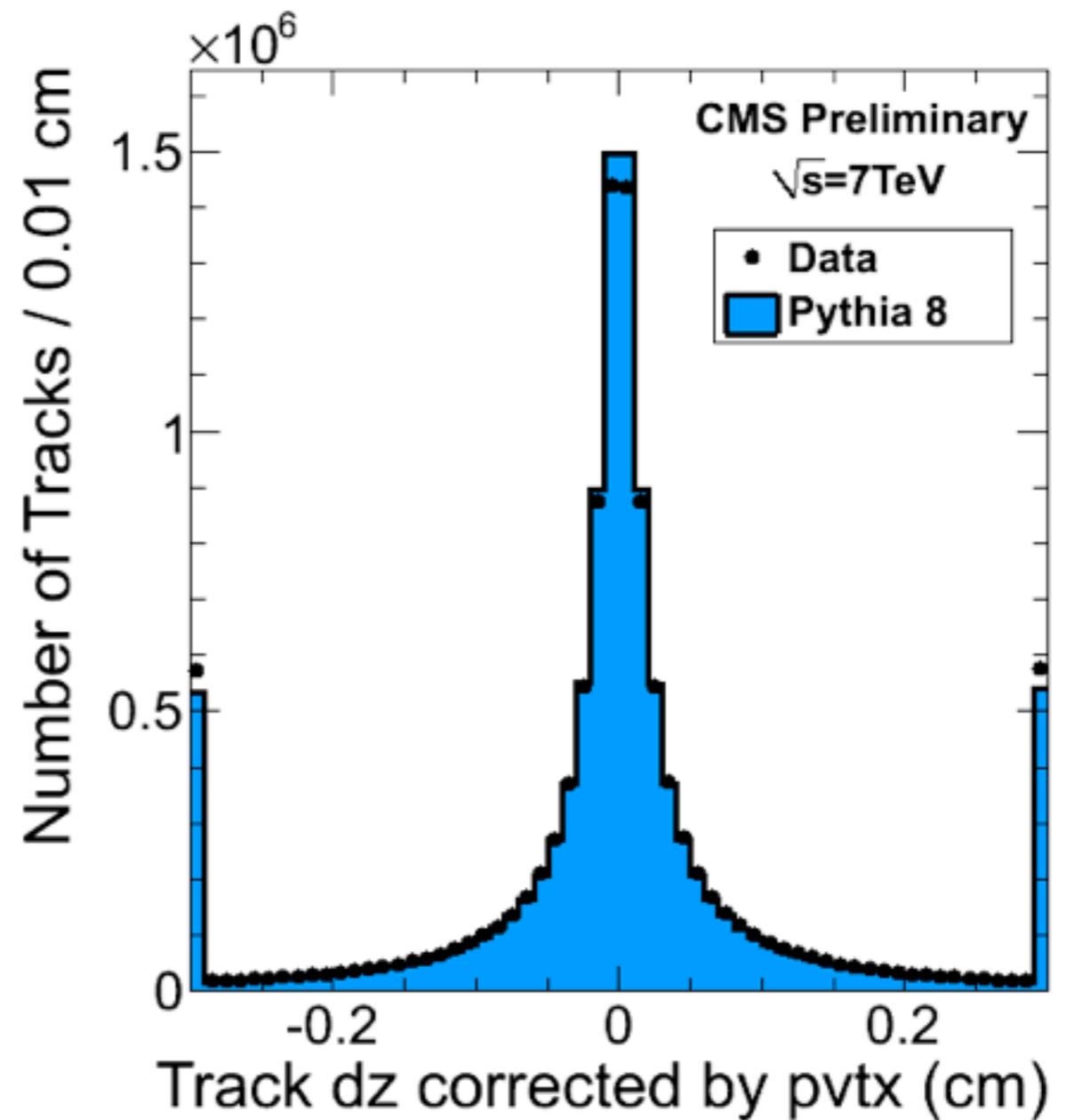
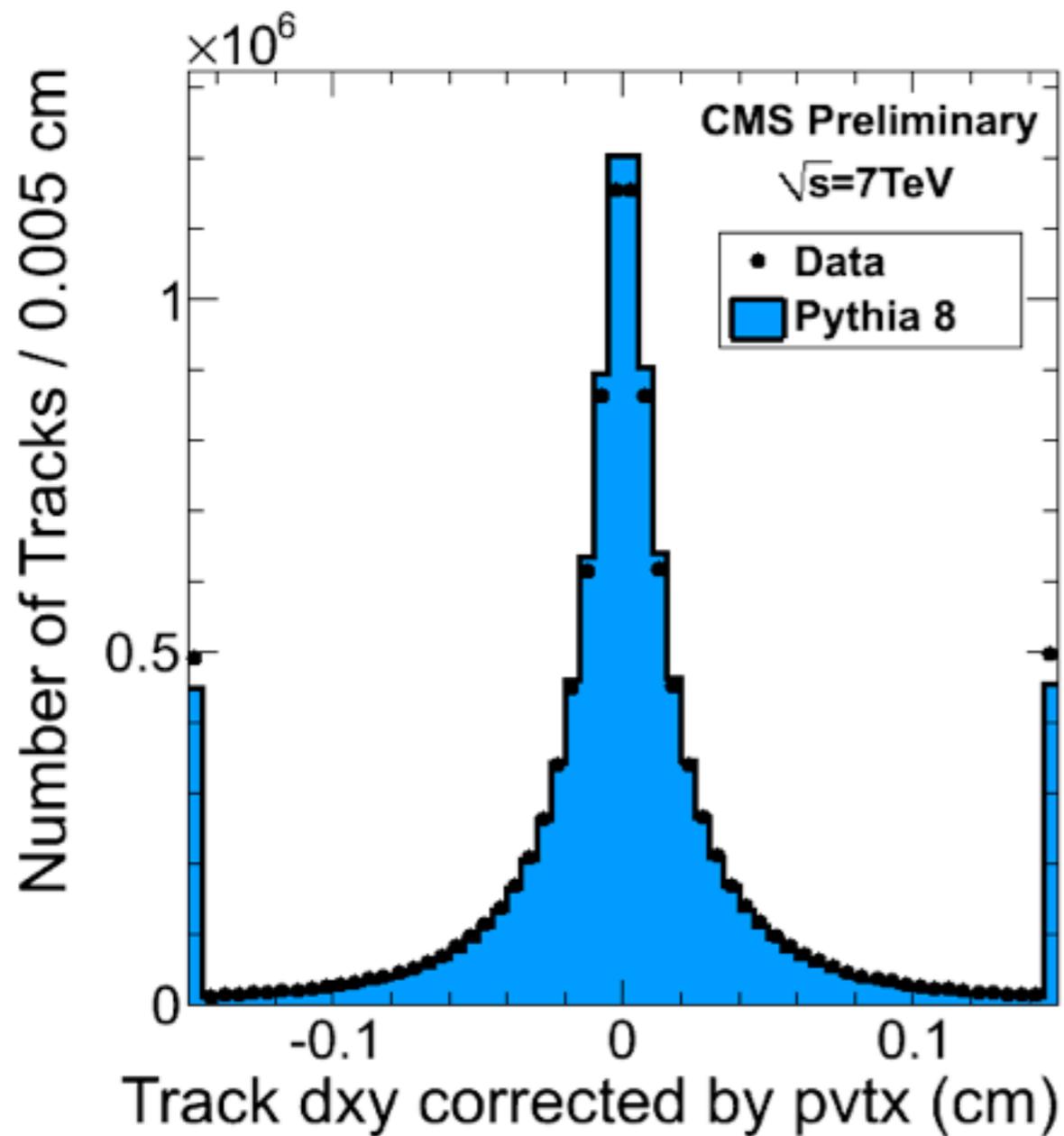
- The excess in the data are mainly in the low  $p_T$  region
- The nTrack plot in log scale and data/MC  $\sim p_T$  plot is in backup slide 11

# Data/Pythia 8 Tracking Distributions ( $p_T > 0.5 \text{ GeV}$ )

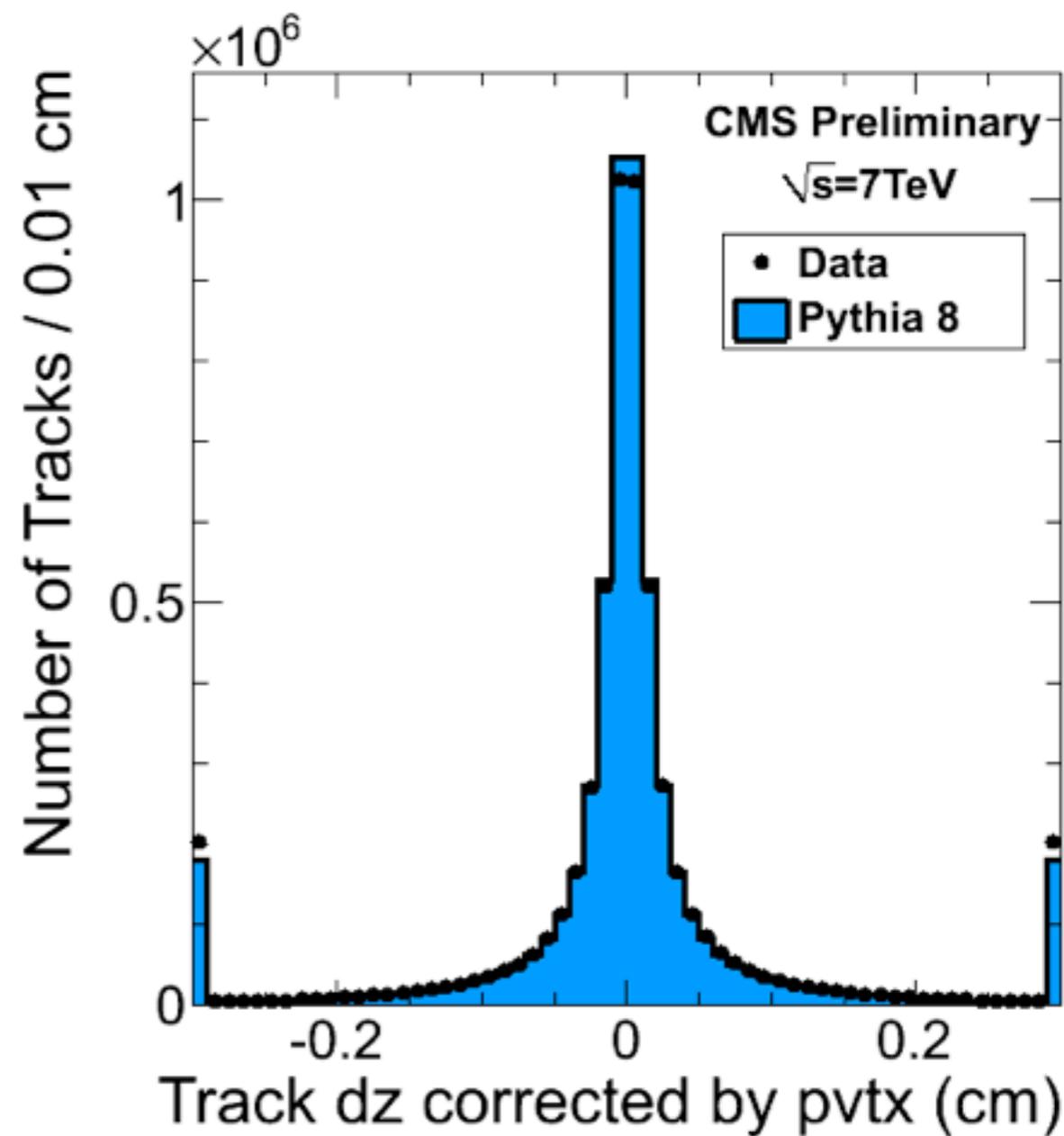
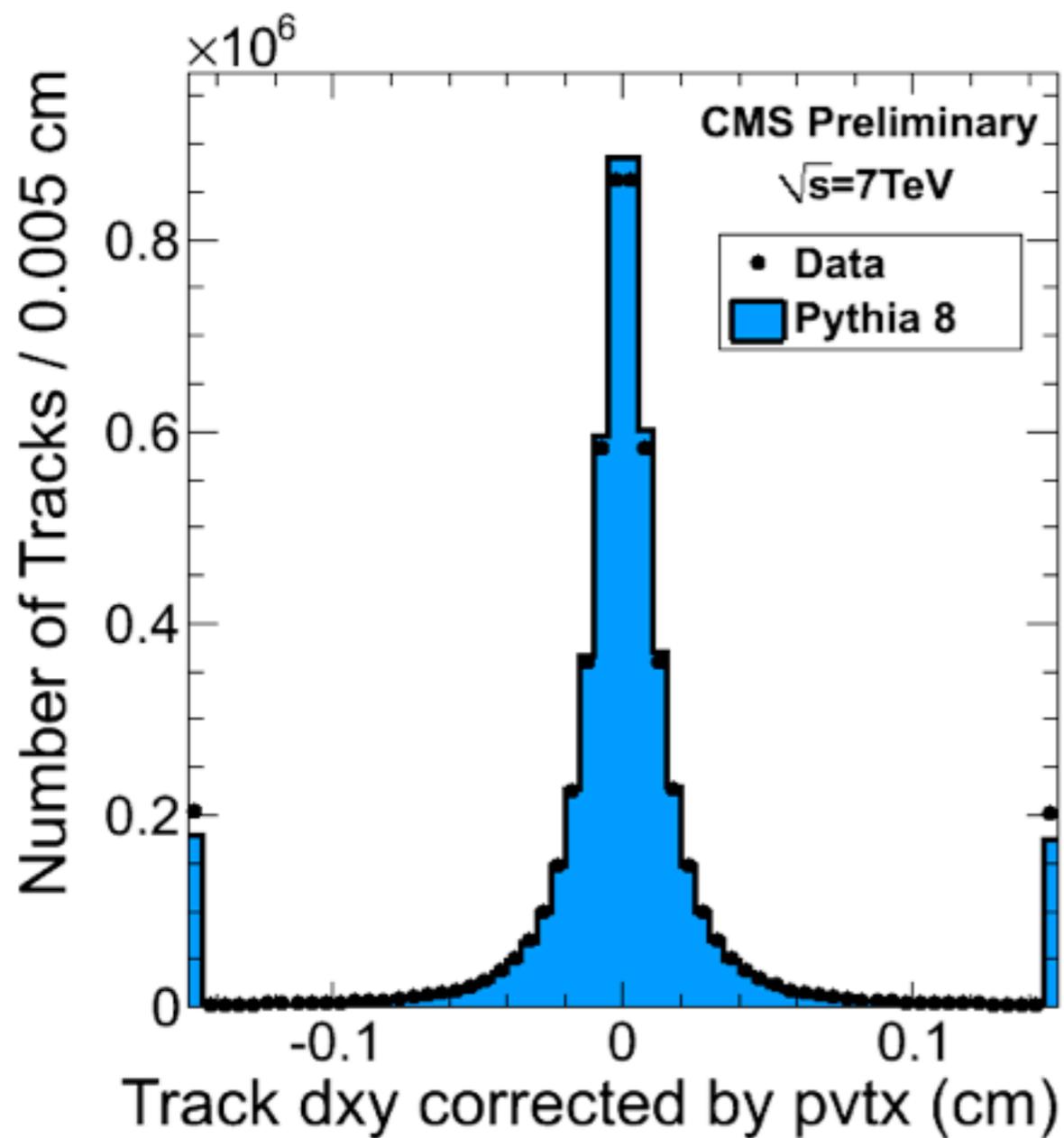


- The track multiplicity agrees better between data/MC
- There is still an overall excess of tracks in the data.
- The nTrack plot in log scale and data/MC $\sim p_T$  plot is in backup slide 12

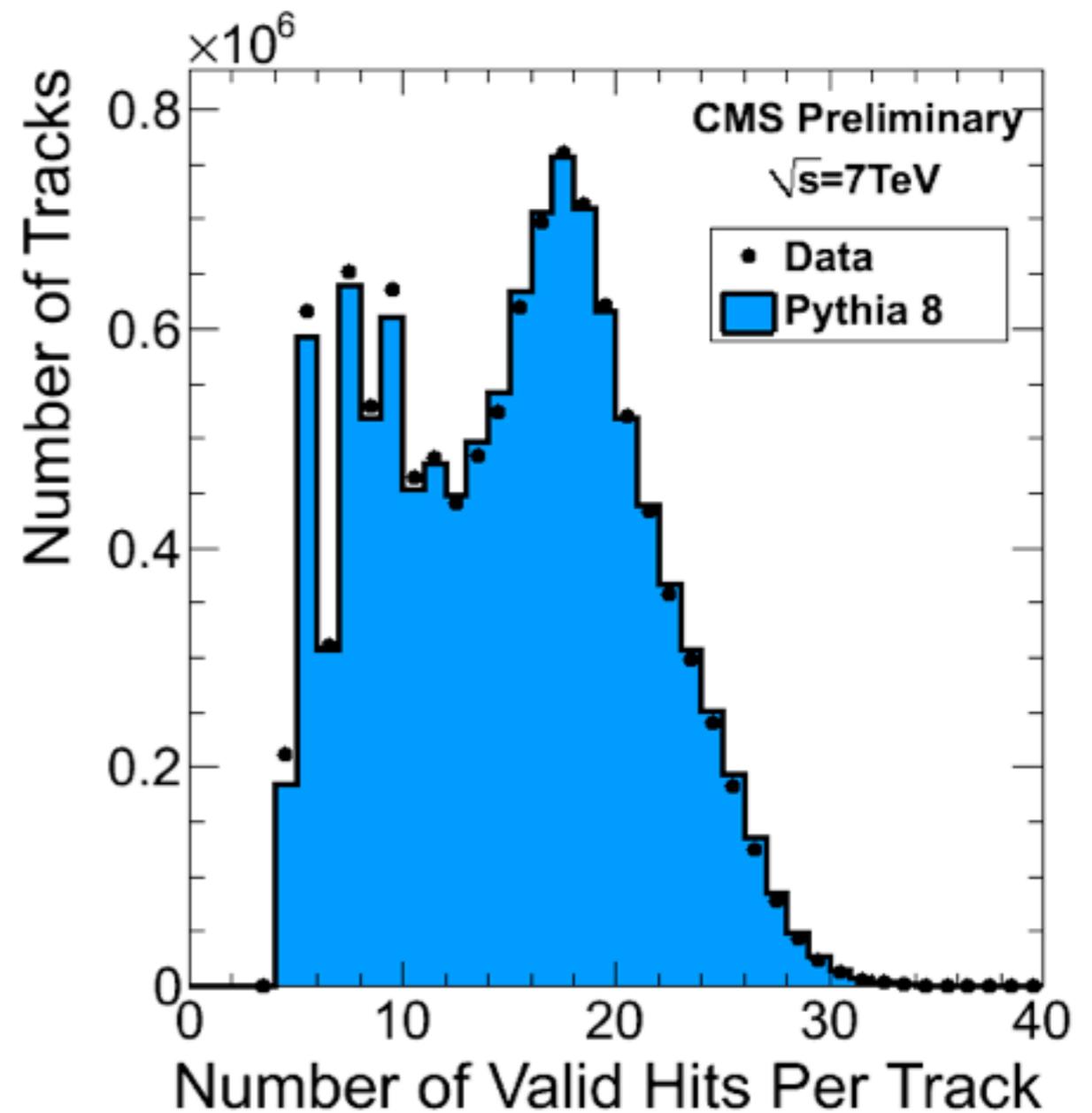
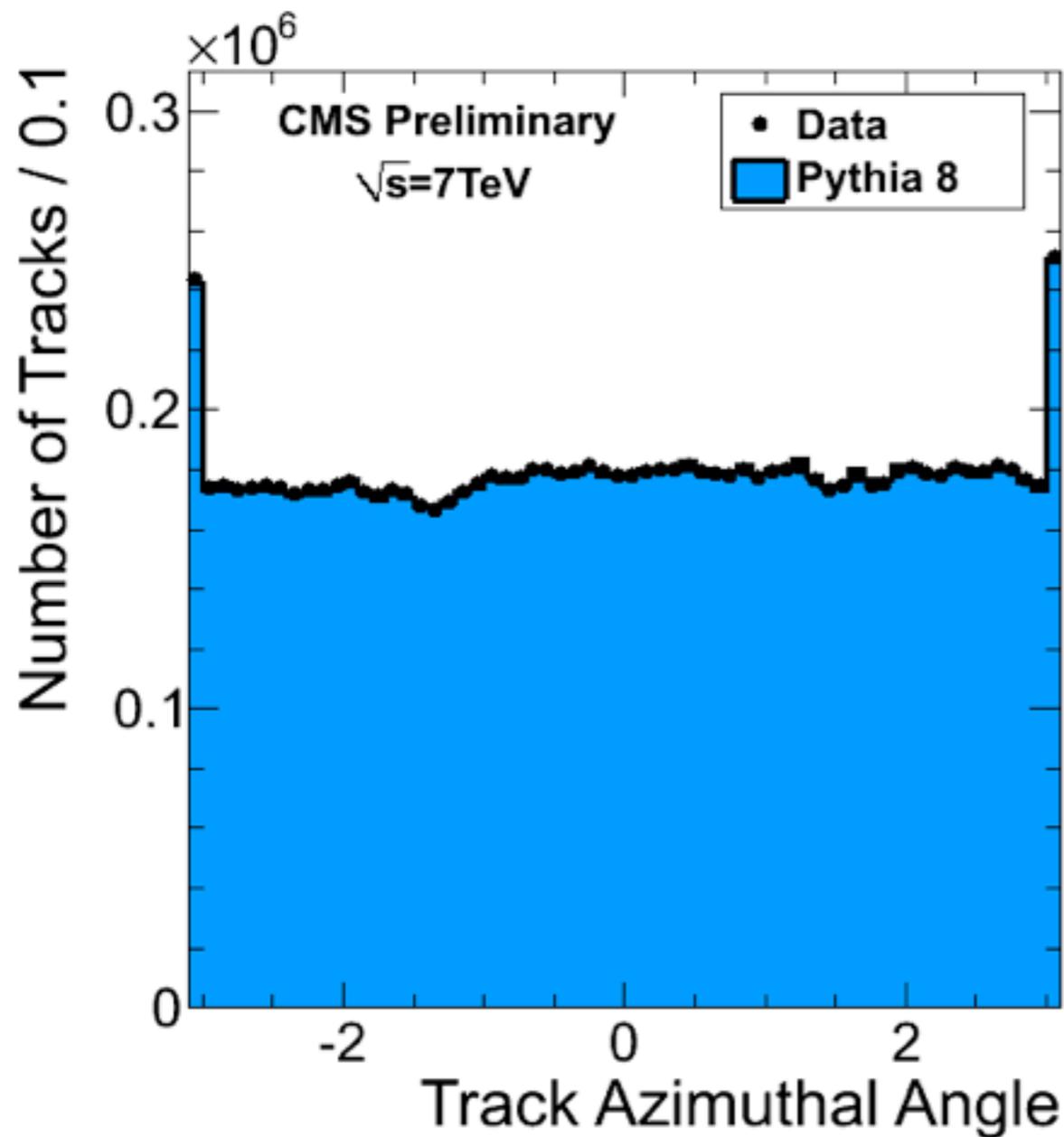
# Data/Pythia 8 Track Distributions ( $p_T > 0$ )



# Data/Pythia 8 Track Distributions ( $p_T > 0.5 \text{ GeV}$ )

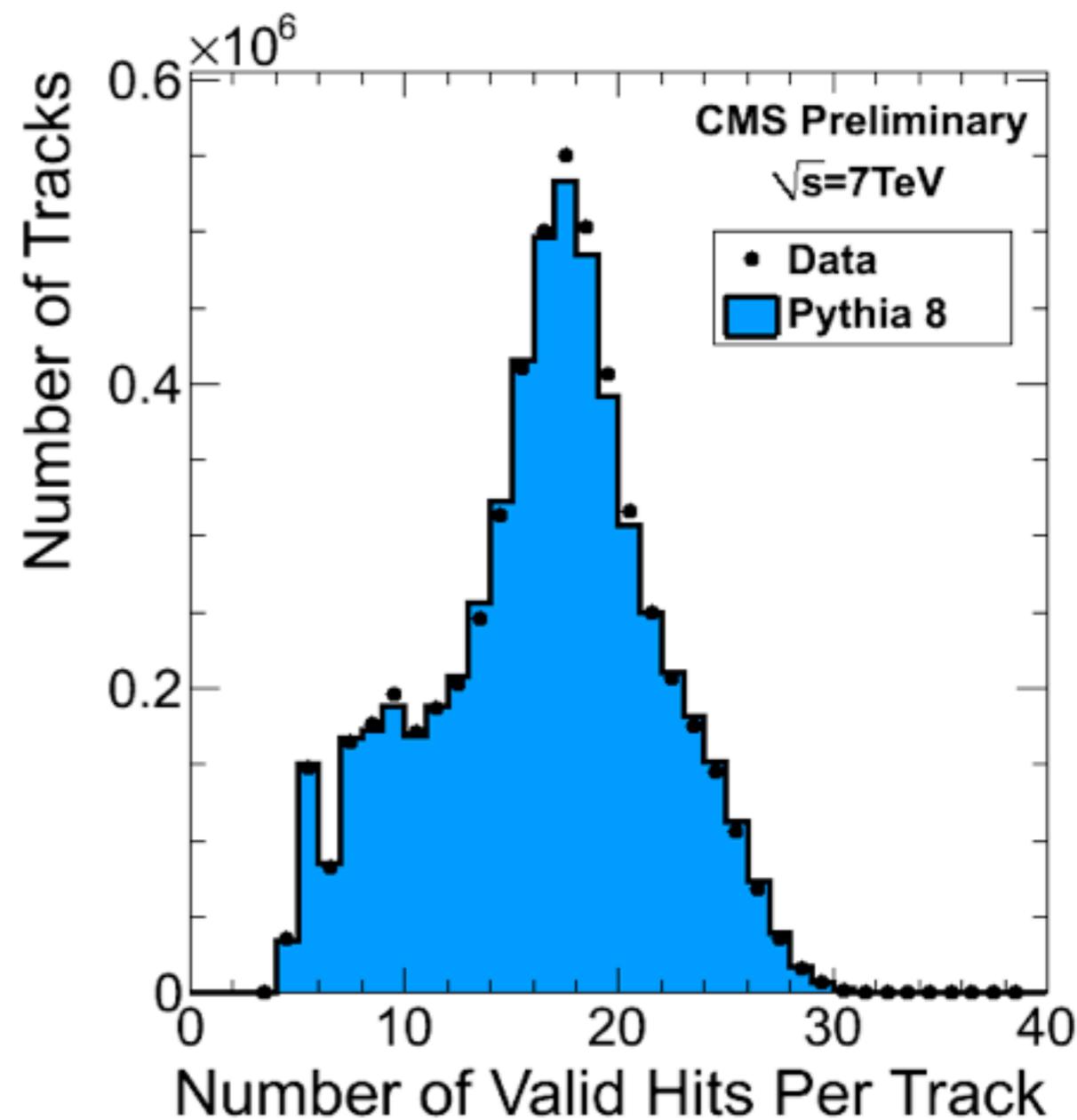
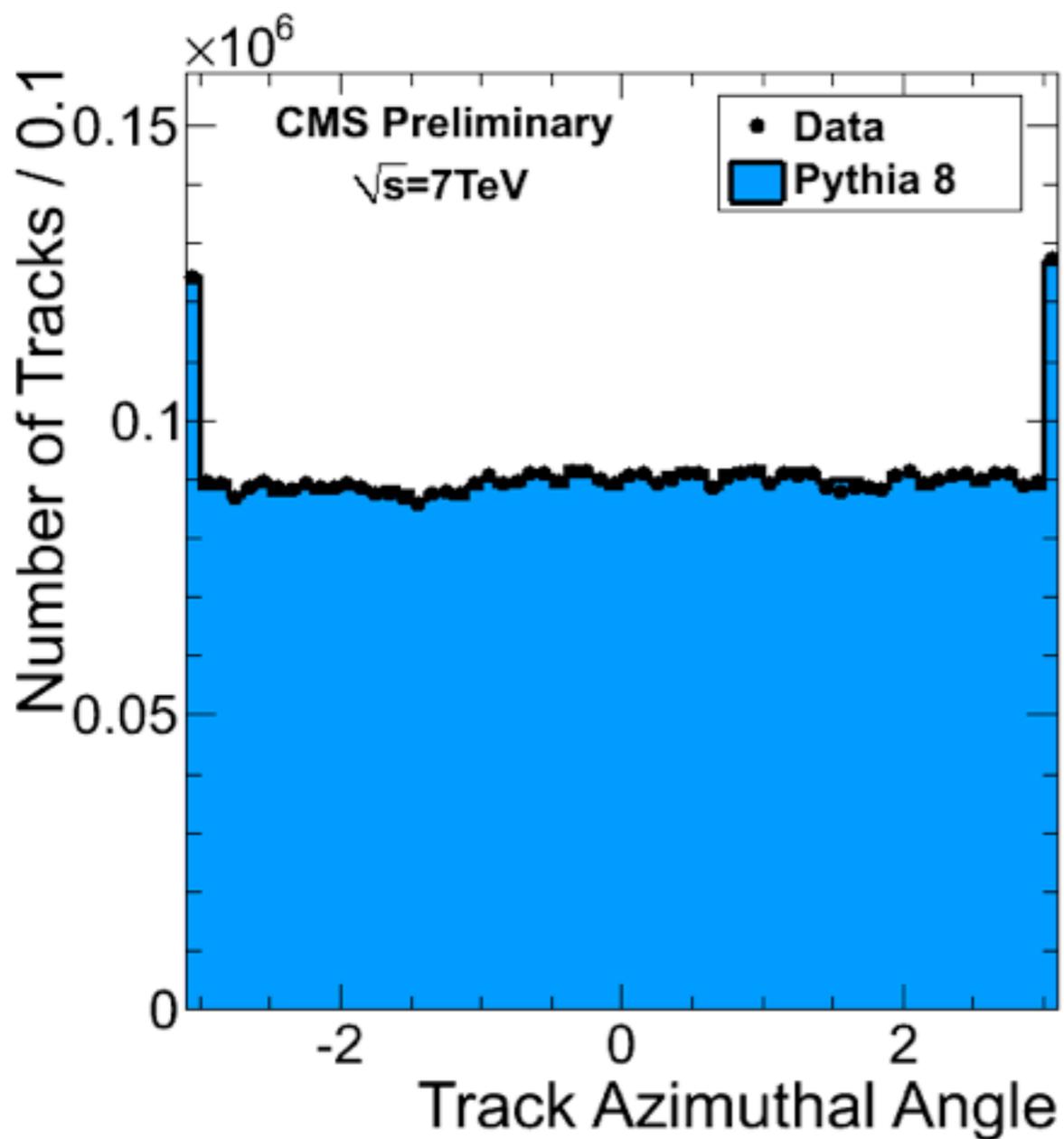


# Data/Pythia 8 Track Distributions ( $p_T > 0$ )



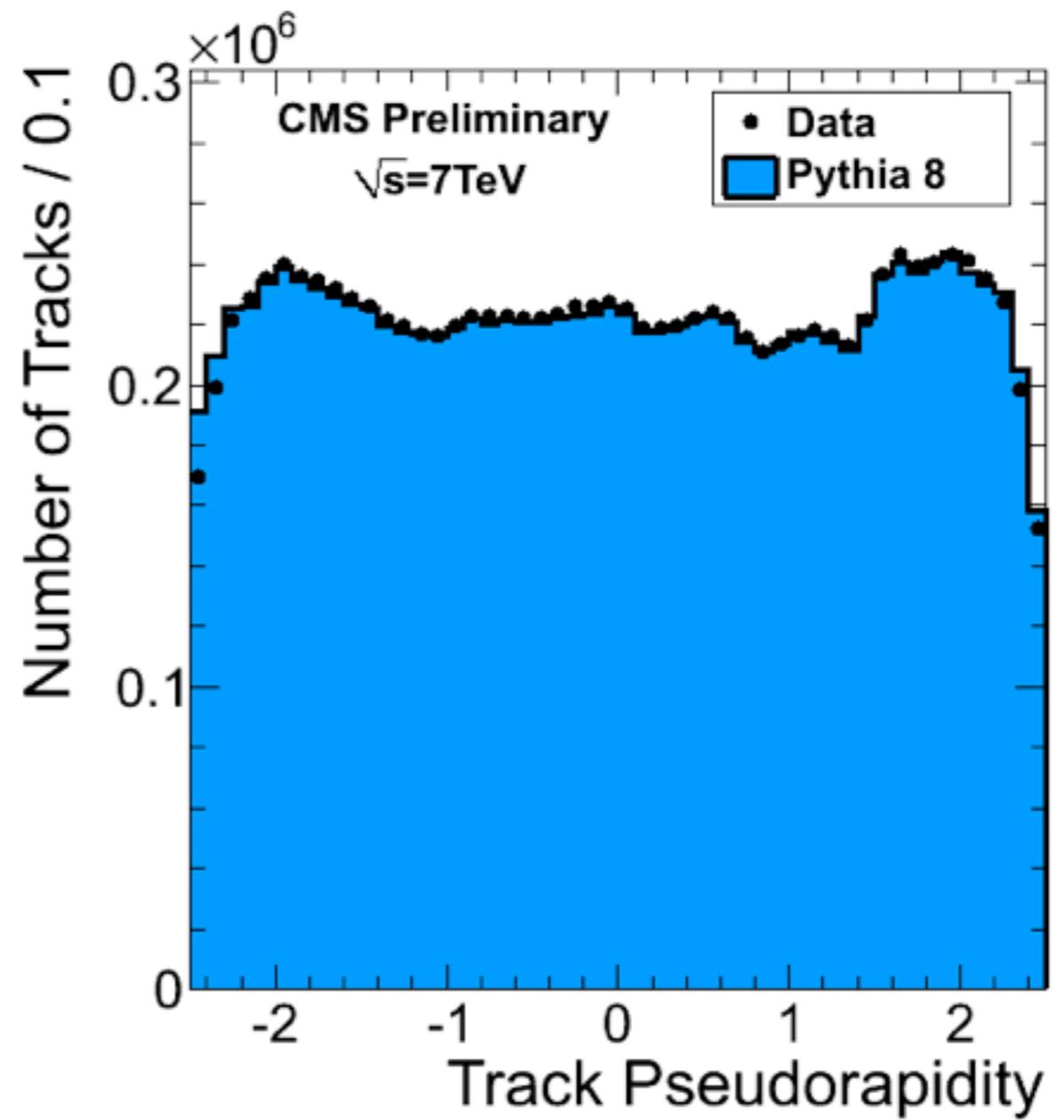
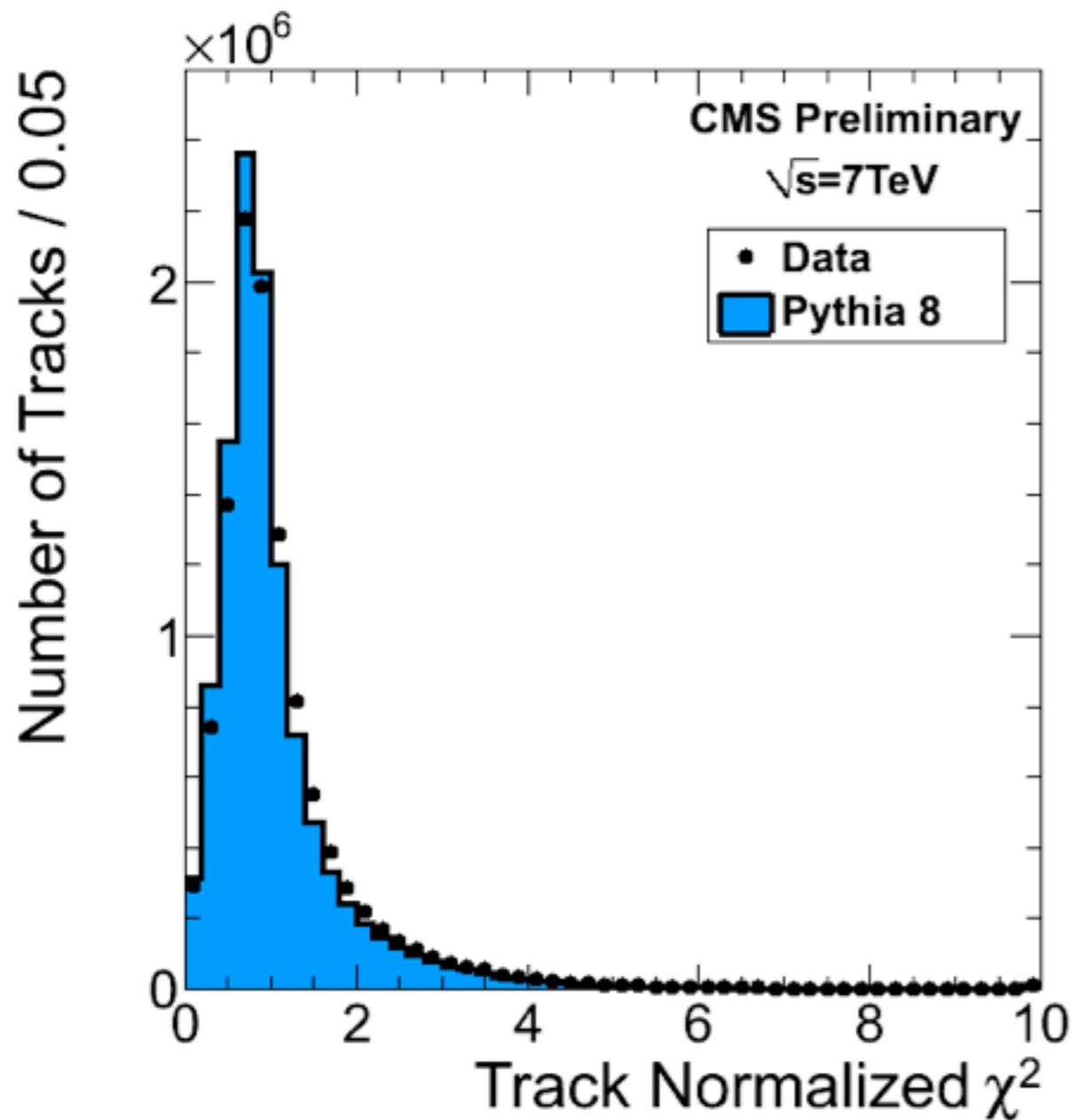
- The disagreement in the low nHit bins are mainly due to low  $p_T$  tracks
- The dip at  $\phi \sim -1.5$  is due to the inactive material in the tracker. It affects mainly for the low  $p_T$  tracks

# Data/Pythia 8 Track Distributions ( $p_T > 0.5 \text{ GeV}$ )

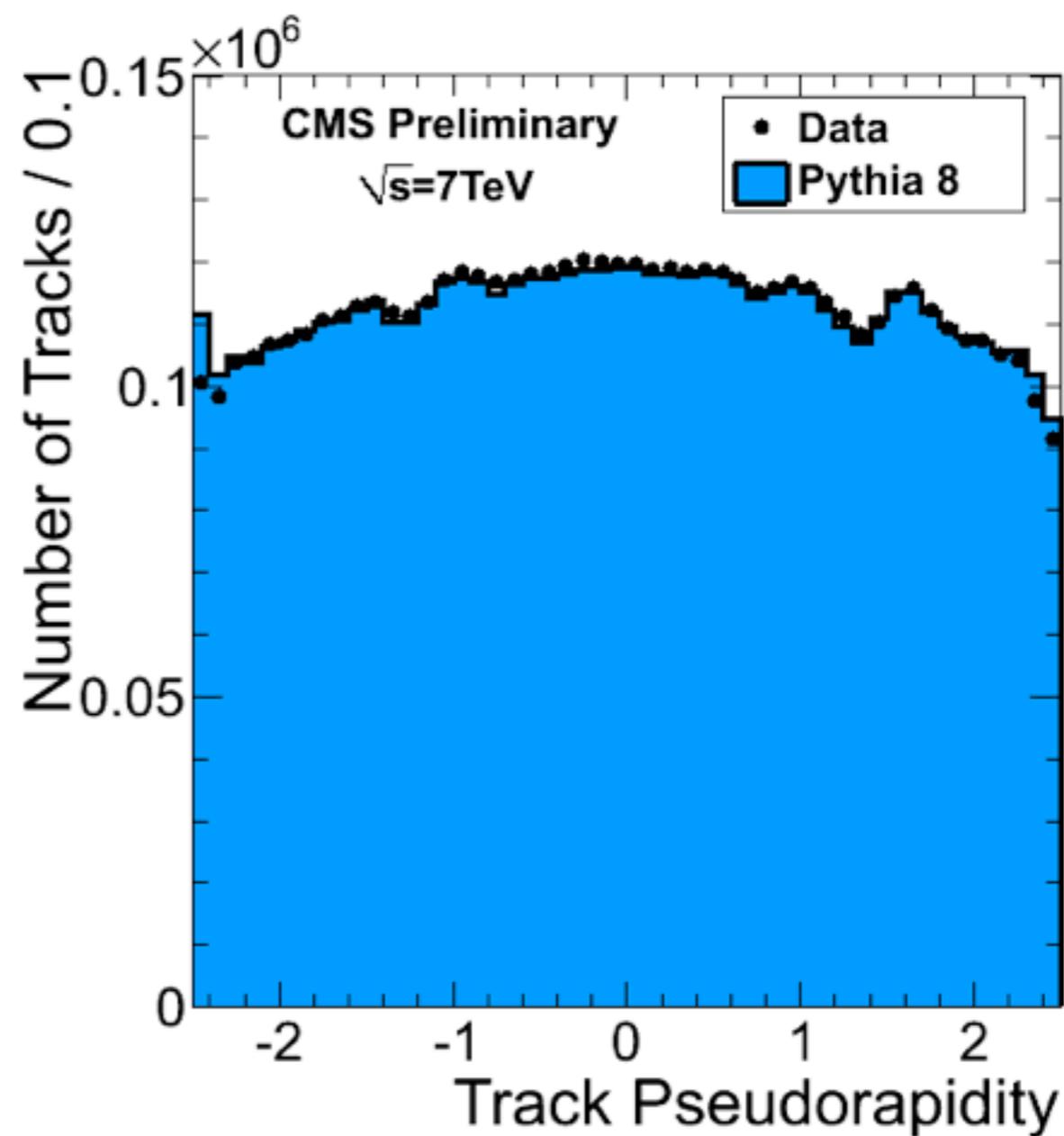
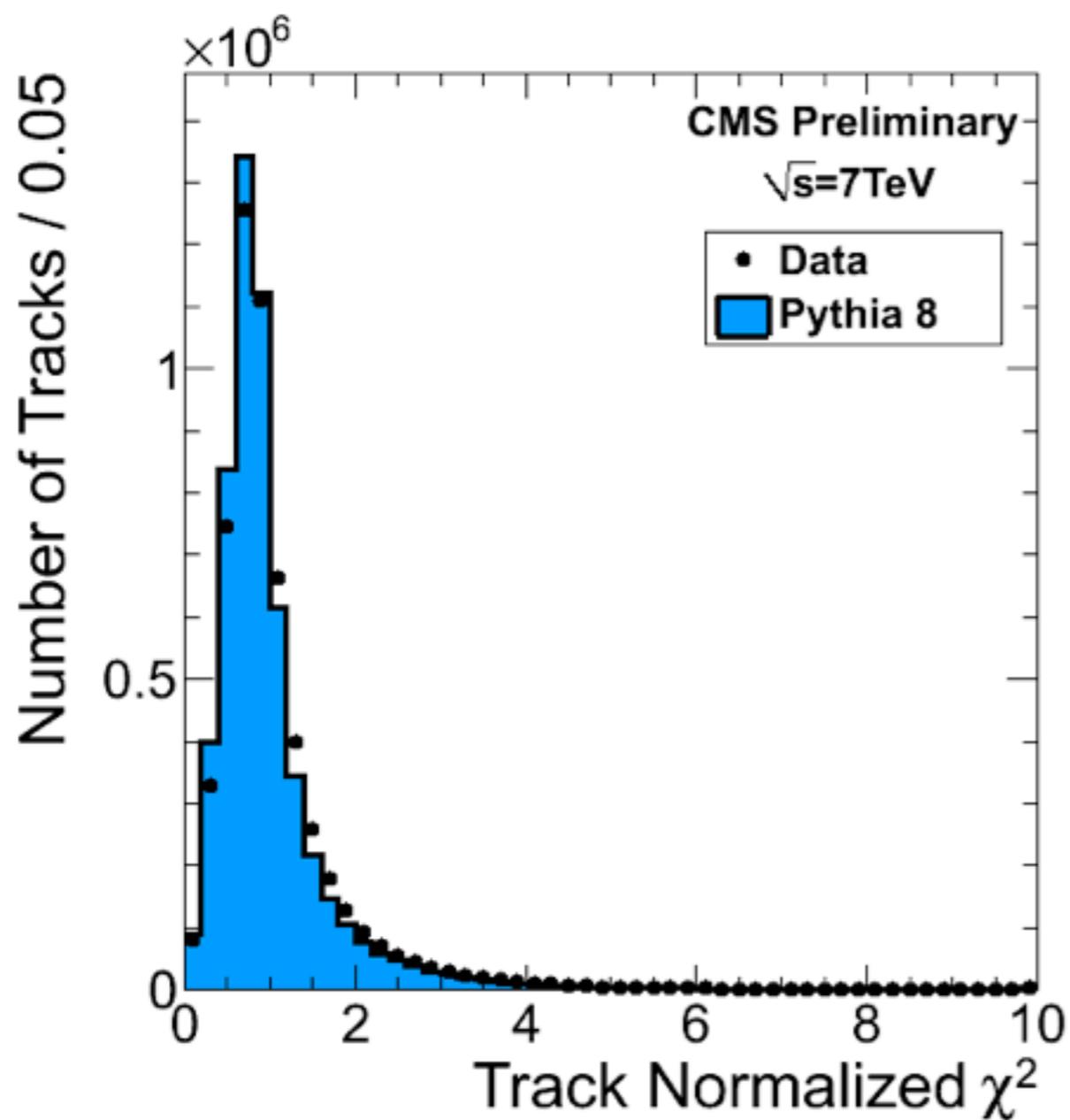


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# Data/Pythia 8 Track Distributions ( $p_T > 0$ )

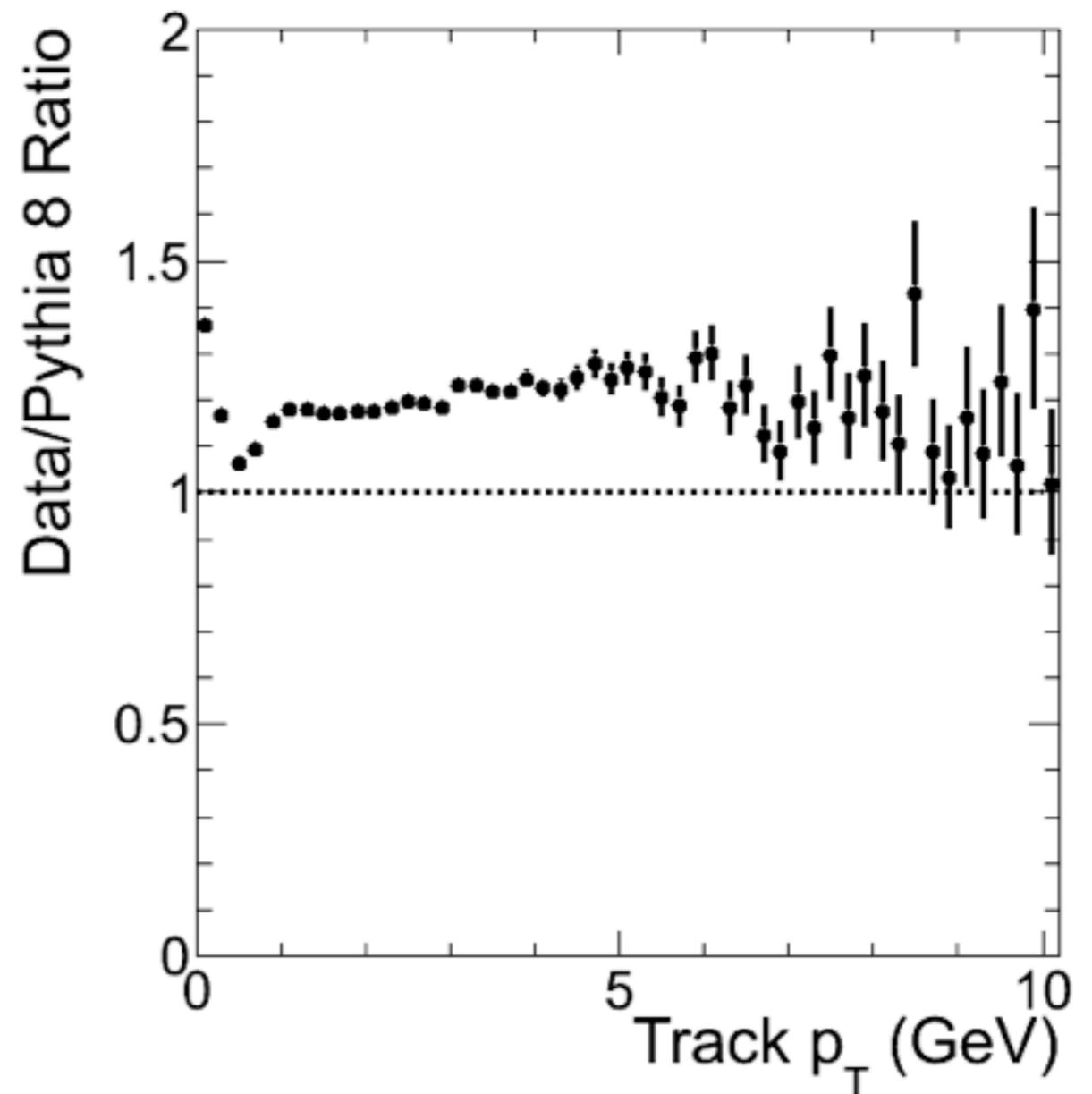
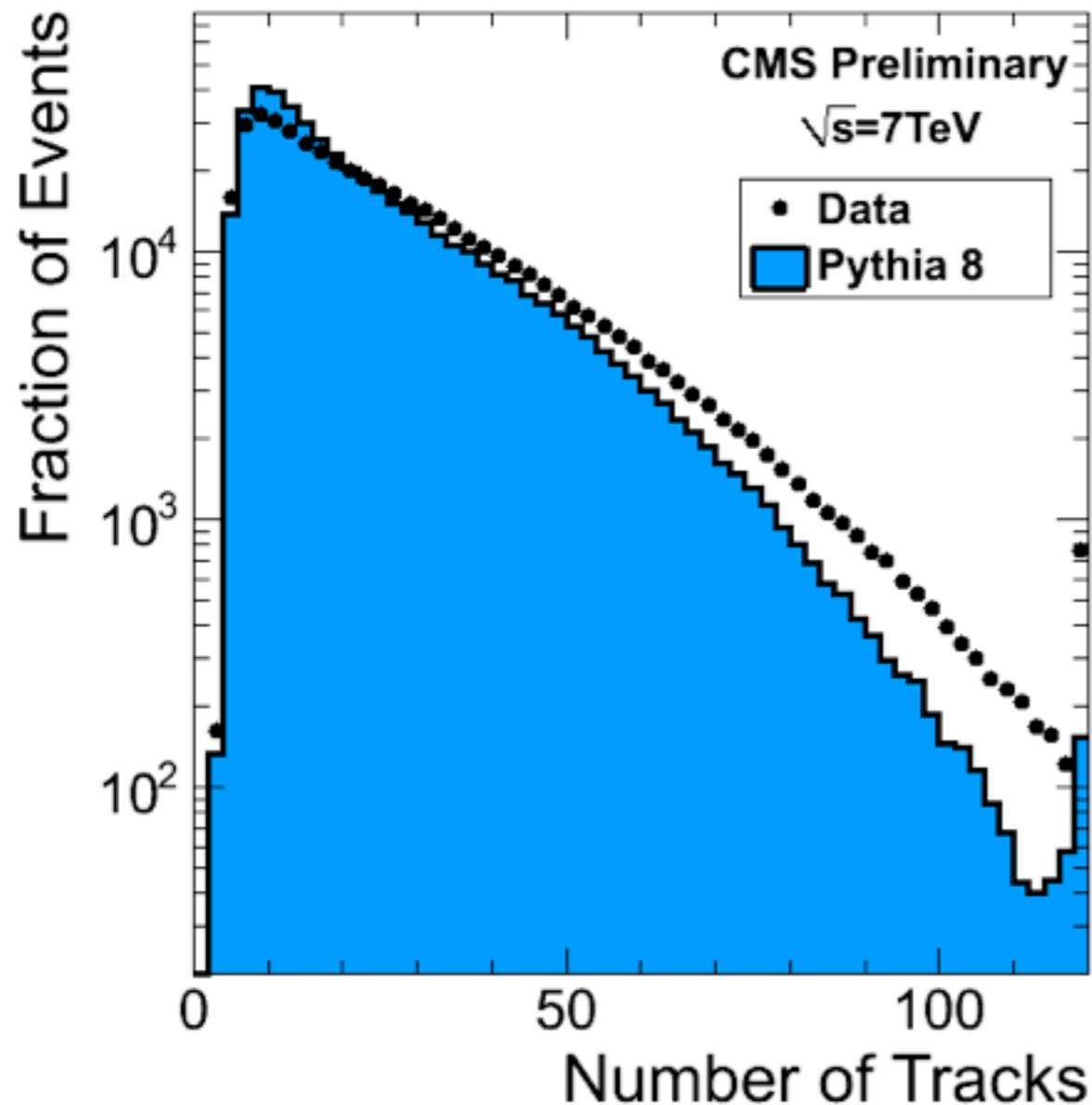


# Data/Pythia 8 Track Distributions ( $p_T > 0.5 \text{ GeV}$ )



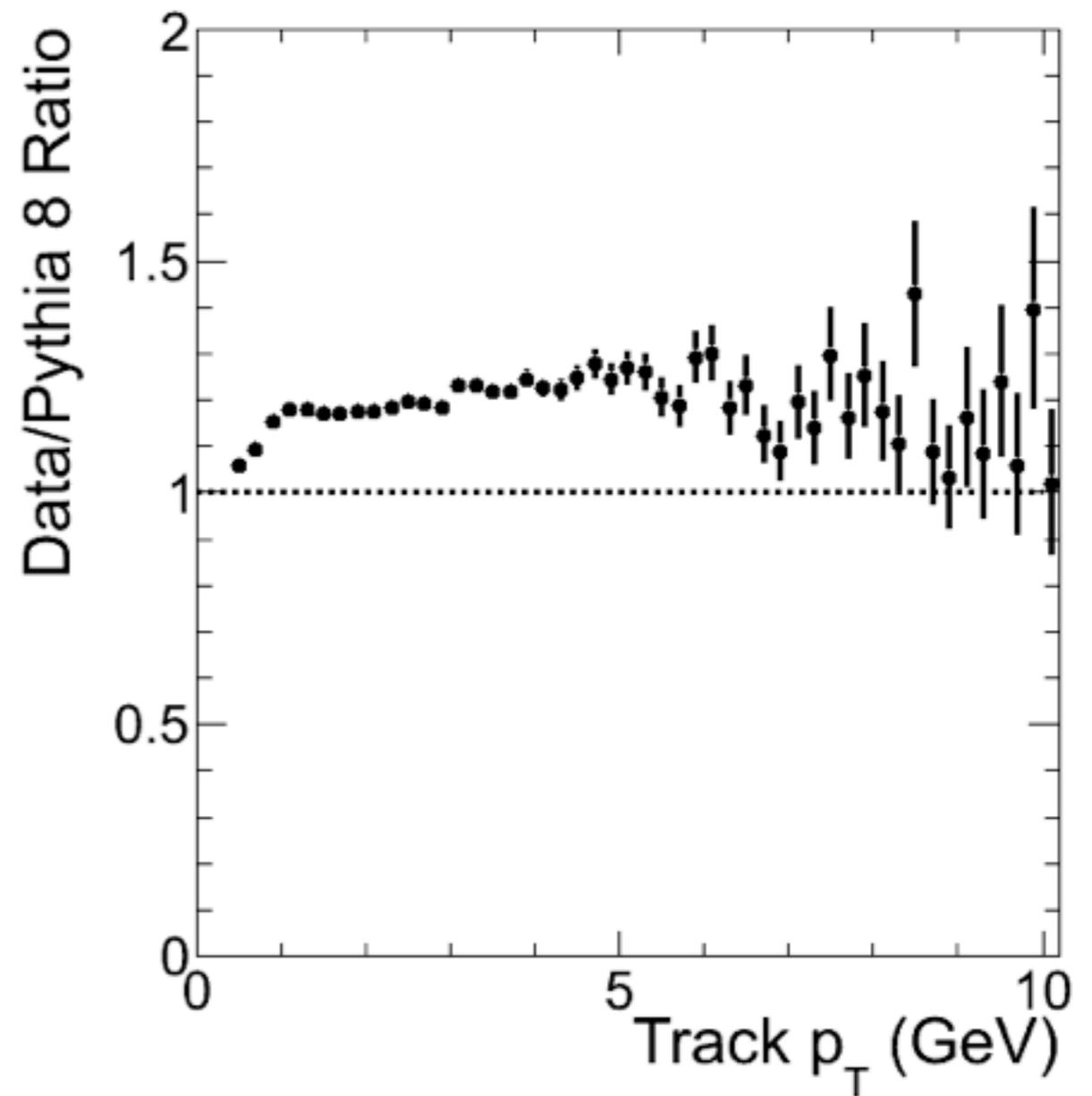
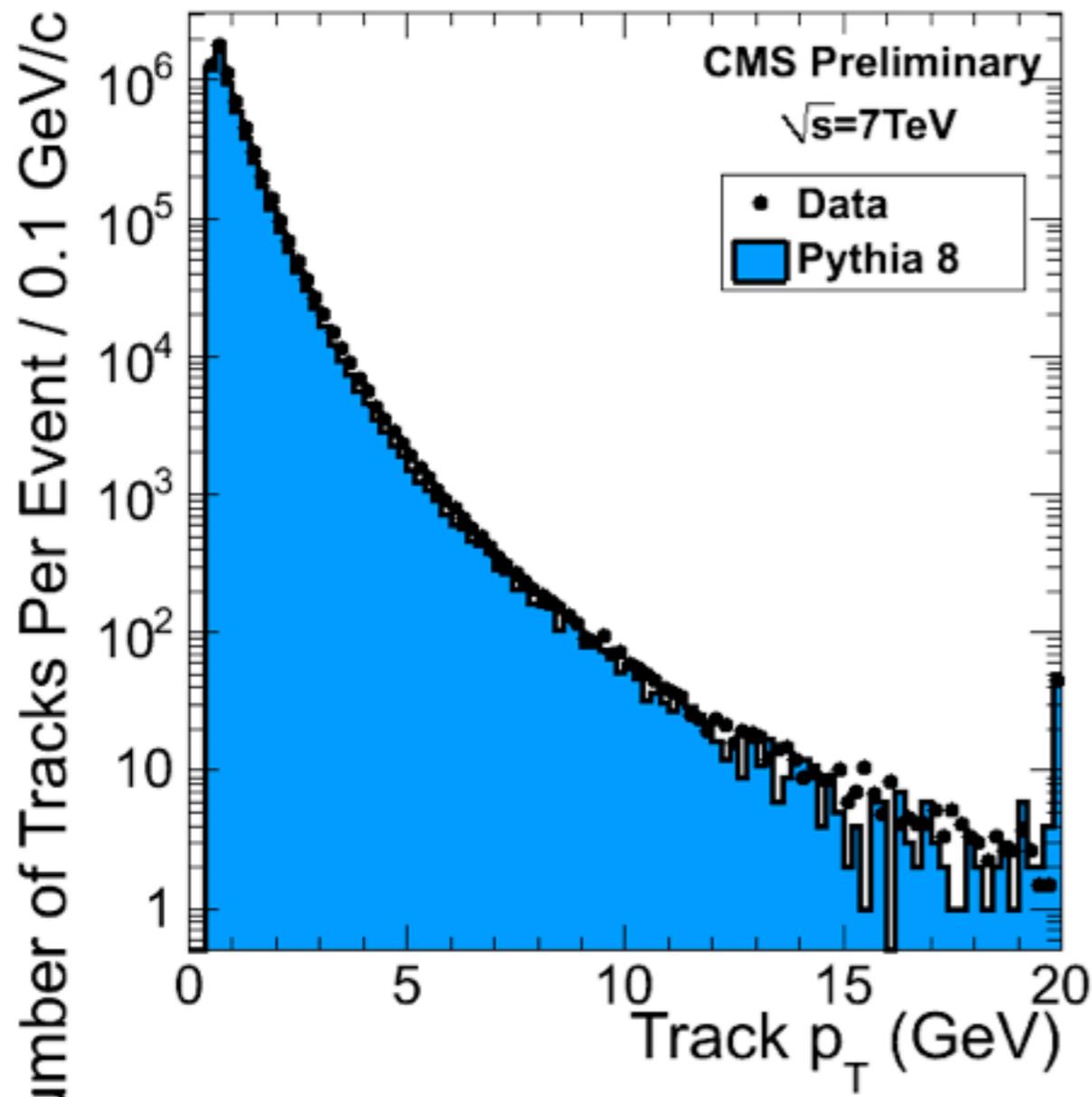
# Backup Slides

# Data/Pythia 8 Tracking Distributions ( $p_T > 0$ )



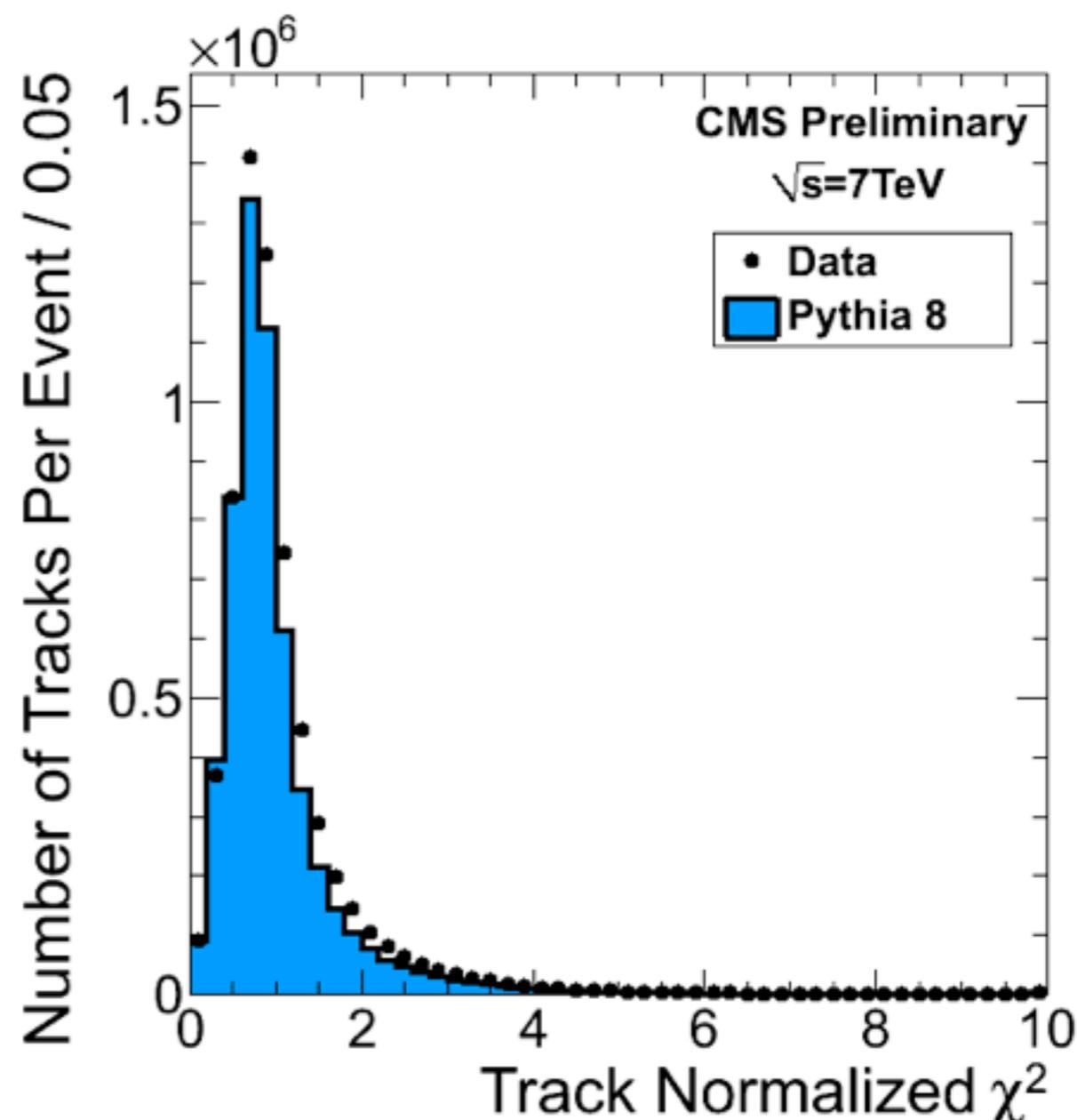
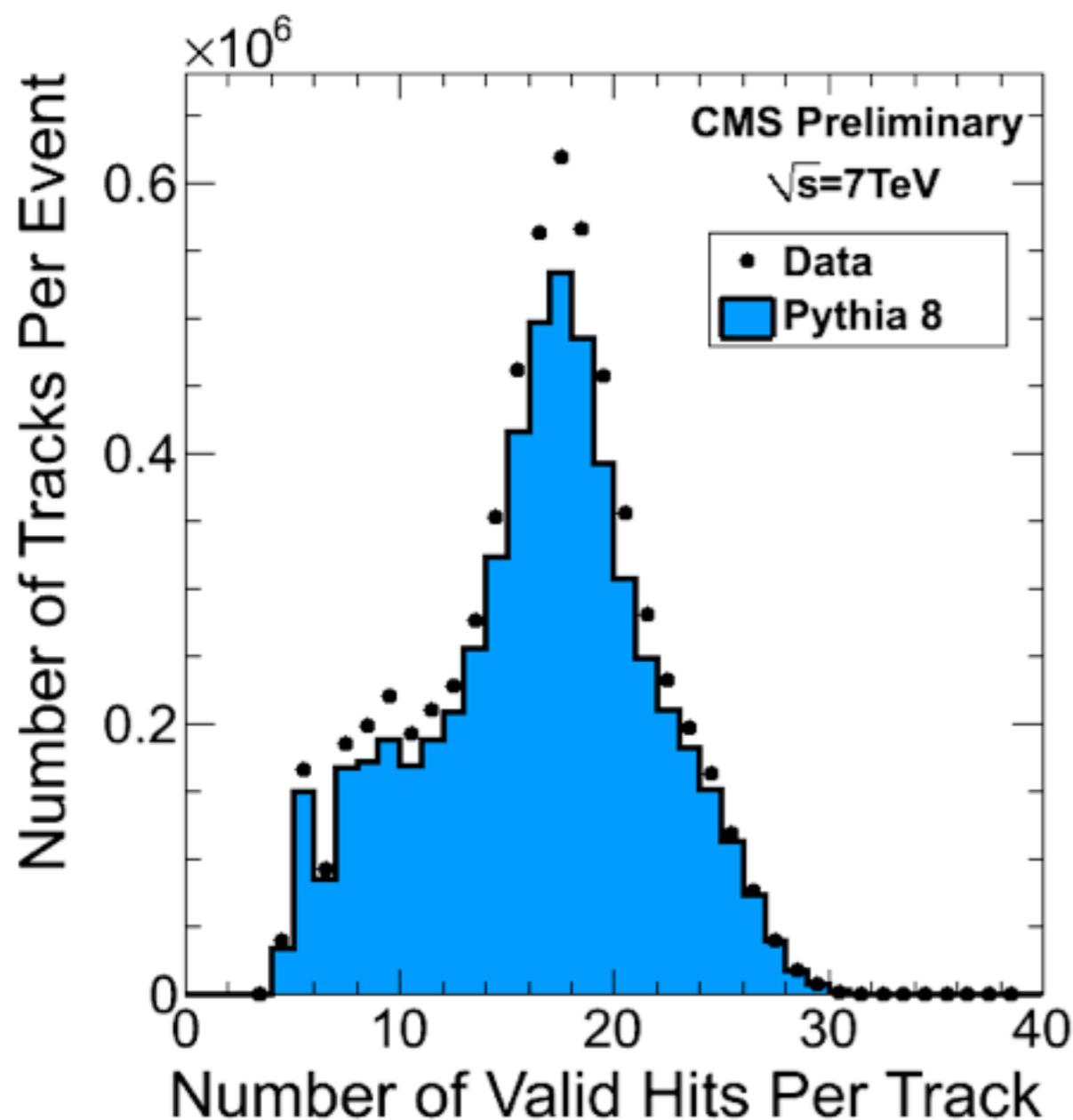
- The data/MC ratio is based on the individual  $p_T$  distributions normalized by number of events

# Data/Pythia 8 Tracking Distributions ( $p_T > 0.5 \text{ GeV}$ )



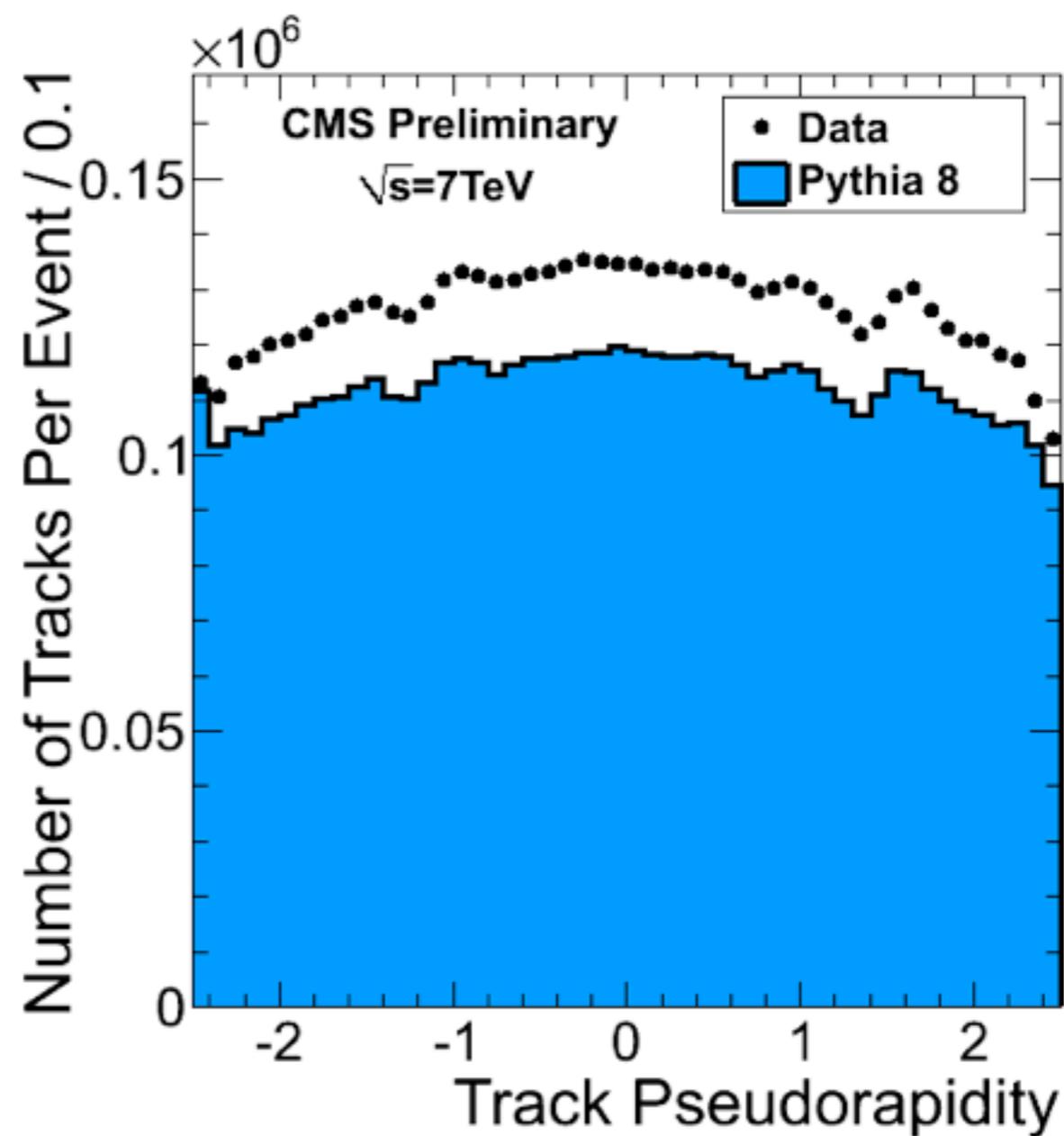
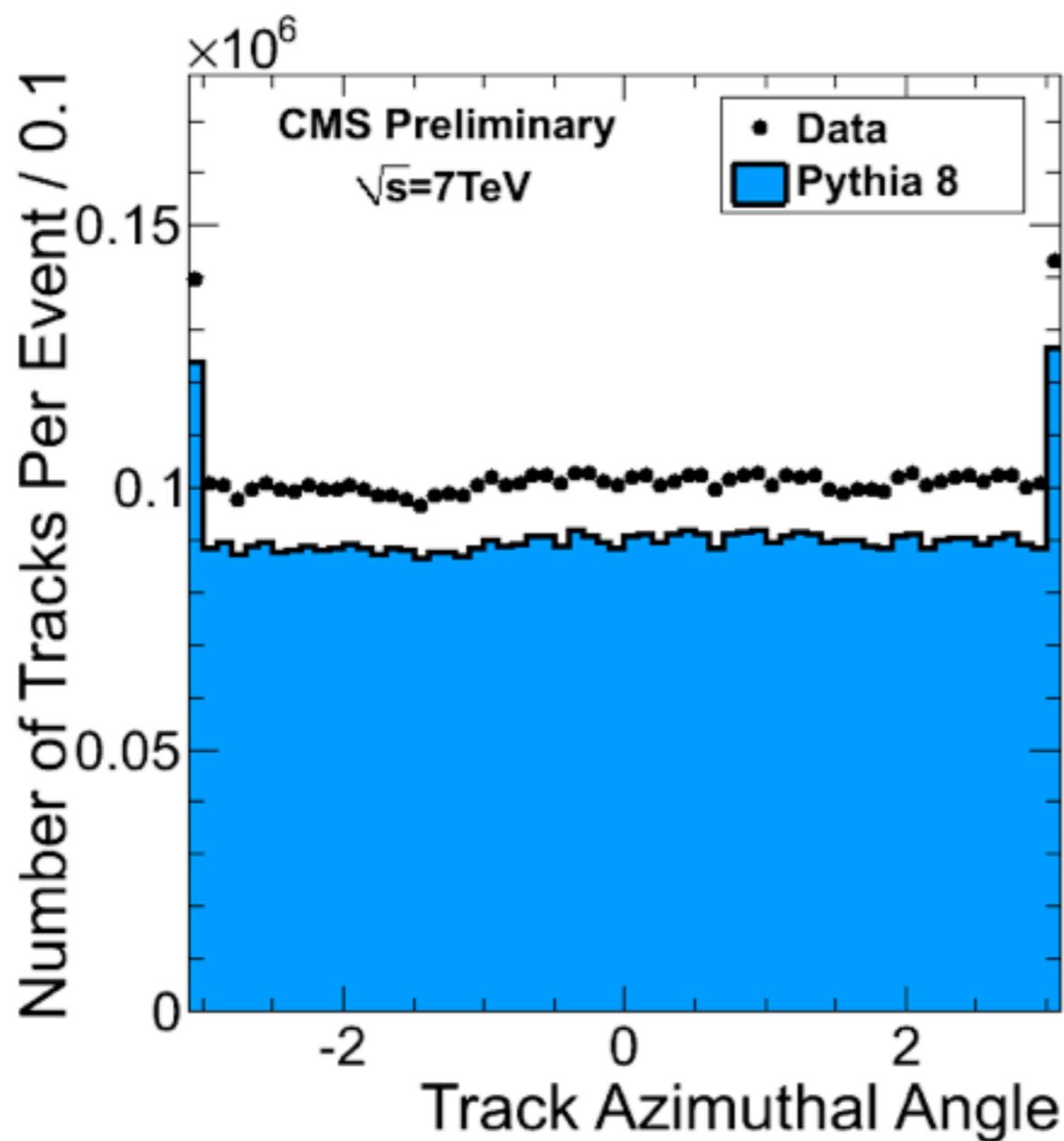
- The  $p_T$  distribution is normalized by number of events
- The data/MC ratio is based on the individual  $p_T$  distributions normalized

# Data/Pythia 8 Track Distributions ( $p_T > 0.5 \text{ GeV}$ )



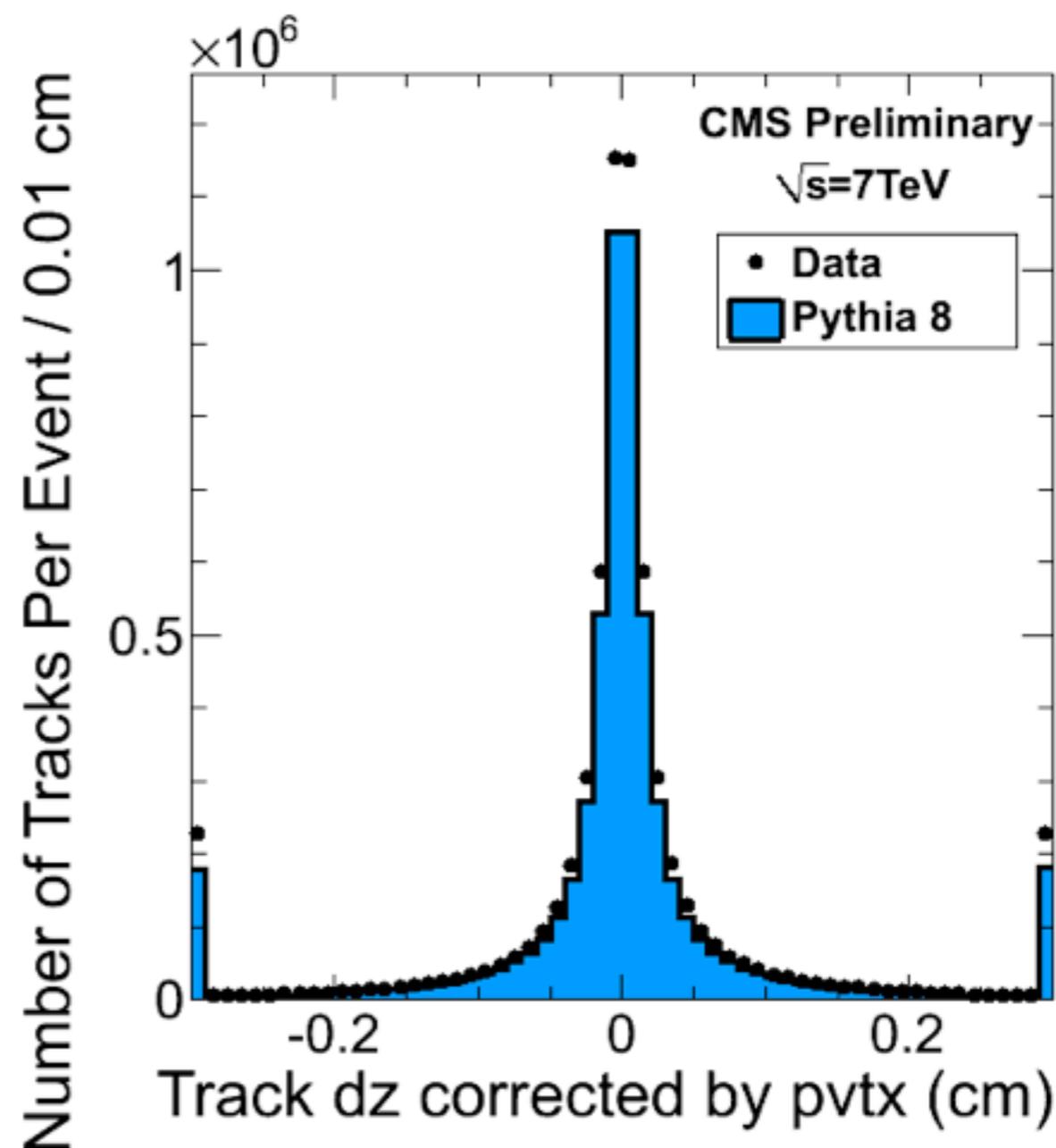
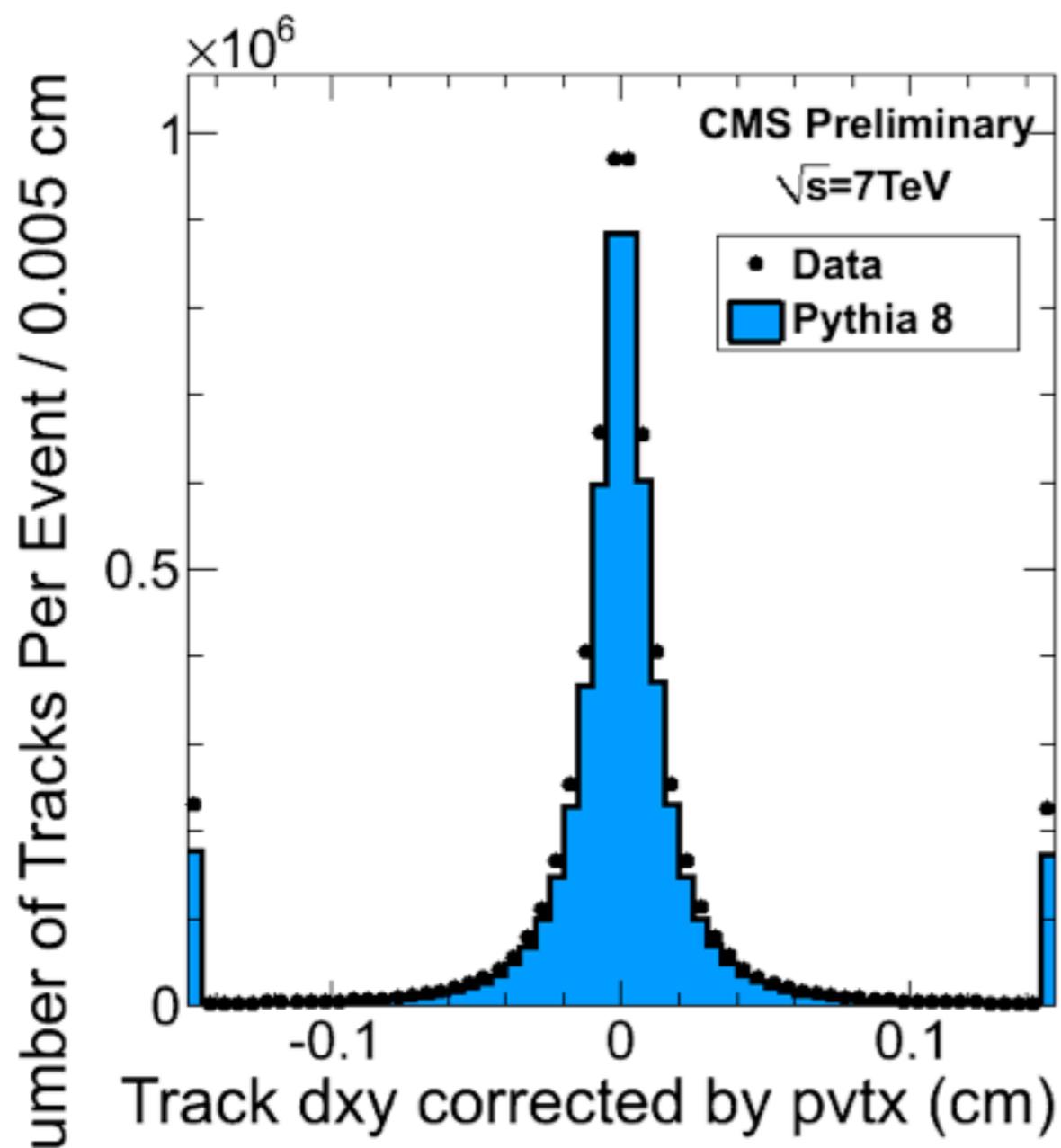
- The distributions are normalized by number of events

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