

1800 GeV ppbar

Soft QCD

Average p_T vs N_{ch} ($|\eta| < 1$, $p_T > 0.4$ GeV)

- CDF
- Herwig 7.2.0 default
- ▲--- Pythia 8.135 default
- ◆--- Sherpa 1.4.3 default

2

1.8

1.6

1.4

1.2

1.0

0.8

0.6

0.4

Rivet 3.1.0, ≥ 5.7 M events

mcplots.cern.ch [arXiv:1306.3436]

CDF_2002_S4796047

Ratio to CDF

2

1

0.5

2

0.5

0

10

20

N_{ch}

The figure consists of two vertically stacked panels sharing a common x-axis representing the number of charged particles, N_{ch} , ranging from 0 to 25. The top panel displays the average transverse momentum, $\langle p_T \rangle$, in GeV, on the y-axis, ranging from 0.4 to 2.0. It compares experimental data from CDF (black squares) with three Monte Carlo models: Herwig 7.2.0 (green dashed line with open squares), Pythia 8.135 (blue solid line with solid triangles), and Sherpa 1.4.3 (red dotted line with solid diamonds). All models show an increasing trend of $\langle p_T \rangle$ with N_{ch} , starting around 0.65 GeV at $N_{ch} \approx 1$ and reaching approximately 1.0 GeV at $N_{ch} \approx 25$. The CDF data points are generally the highest, followed by Herwig, then Pythia, and Sherpa is the lowest. The bottom panel shows the 'Ratio to CDF' on the y-axis, ranging from 0.5 to 2.0. This panel plots the same four data series, showing how well each model reproduces the CDF data. The CDF data points are a horizontal line at a ratio of 1.0. Herwig and Pythia models are slightly above 1.0, while the Sherpa model is consistently below 1.0, around 0.85-0.9. A light yellow shaded region highlights the area around the CDF data points in the bottom panel.