

Average p_T vs N_{ch} ($N_{ch} > 1, p_T > 0.1$ GeV)

- ATLAS
- - □ Herwig 7.2.0 default
- - ▲ Pythia 8.108.p1 default
- - ◆ Sherpa 1.4.0 default

Rivet 3.1.0, ≥ 5.5 M events

mcplots.cern.ch [arXiv:1306.3436]

ATLAS_2010_S8918562

Ratio to ATLAS

1.2

1

0.8

0.6

0.4

0.2

2

1

0.5

2

1

0.5

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 100. The top panel displays the average transverse momentum, $\langle p_T \rangle$ [GeV], on the y-axis, ranging from 0.2 to 1.2. It compares experimental data from ATLAS (black squares) with three Monte Carlo models: Herwig 7.2.0 (green dashed line with squares), Pythia 8.108.p1 (blue solid line with triangles), and Sherpa 1.4.0 (red dotted line with diamonds). The ATLAS data shows a slight increase in $\langle p_T \rangle$ from approximately 0.45 GeV at $N_{ch} \approx 5$ to 0.6 GeV at $N_{ch} \approx 95$. The Herwig model is the lowest, starting at ~0.4 GeV and ending at ~0.48 GeV. Pythia and Sherpa are higher, starting at ~0.4 GeV and ~0.68 GeV respectively, and both converge towards the ATLAS data at high N_{ch} . The bottom panel shows the 'Ratio to ATLAS' on the y-axis, ranging from 0.5 to 2.0. This panel uses the same color scheme and markers as the top panel. The ATLAS data points are at a ratio of 1.0. The Herwig model starts at a ratio of ~0.9 and ends at ~0.85. Pythia starts at ~0.9 and ends at ~1.05. Sherpa starts at ~1.6 and ends at ~1.0. Shaded horizontal bands in yellow, green, and blue are present in the bottom panel, likely representing uncertainty bands for the models.

N_{ch}