

Gap fraction

Gap fraction vs Δy (FB) ($180 < p_T < 210$)

- ATLAS
- - □ Herwig 7.2.0 default
- - ▲ Pythia 8.170 default

2

1.5

1

0.5

0

Rivet 3.1.0, $\geq 100k$ events

mcplots.cern.ch [arXiv:1306.3436]

ATLAS_2011_S9126244

Ratio to ATLAS

2

1

0.5

2

1

0.5

0 2 4 6 $|\Delta y|$

0

2

4

6

The figure consists of two vertically stacked panels sharing a common x-axis representing the absolute rapidity difference $|\Delta y|$ from 0 to 6. The top panel shows the 'Gap fraction' on the left y-axis (0 to 2) and the number of events on the right y-axis ($\geq 100k$). It displays ATLAS data points (black squares) and two Monte Carlo model predictions: Herwig 7.2.0 default (green dashed line with open squares) and Pythia 8.170 default (blue solid line with solid triangles). Both models show a decreasing trend in gap fraction as $|\Delta y|$ increases, with Pythia generally predicting a lower gap fraction than Herwig. The bottom panel shows the 'Ratio to ATLAS' on the left y-axis (0.5 to 2) and the number of events on the right y-axis ($\geq 100k$). It uses the same data and model lines as the top panel. A horizontal line is drawn at a ratio of 1.0. The Herwig model (green) shows a significant peak in the ratio above 1.0 for $|\Delta y| > 4$, while the Pythia model (blue) shows a dip below 1.0 around $|\Delta y| = 4$. Two shaded regions, yellow and green, are present in the bottom panel, likely representing uncertainty bands or specific model variations.

$ \Delta y $	ATLAS Gap Fraction	Herwig 7.2.0 Gap Fraction	Pythia 8.170 Gap Fraction	Herwig Ratio to ATLAS	Pythia Ratio to ATLAS
0.2	0.95	0.95	0.95	1.0	1.0
0.8	0.80	0.85	0.80	1.05	1.0
1.4	0.65	0.65	0.65	0.95	1.0
1.8	0.55	0.50	0.55	0.9	0.95
2.2	0.45	0.45	0.40	1.0	0.85
2.6	0.35	0.30	0.35	0.85	1.15
3.2	0.28	0.25	0.28	0.9	0.95
3.8	0.20	0.15	0.15	0.55	0.75
4.2	0.15	0.35	0.15	2.5	1.45
4.6	0.08	0.05	0.15	0.85	0.85
5.0	0.05	0.25	0.15	2.5	2.5
5.6	0.0	-	-	2.5	2.5