

7000 GeV pp

Jets

Gap fraction

Gap fraction vs  $\Delta y$  (LJ) ( $240 < p_T < 270$ )

- ATLAS
- △ Pythia 6.428 370
- Pythia 6.428 atlas-csc
- \* Pythia 6.428 d6t
- Pythia 6.428 default
- ▽ Pythia 6.428 dw
- Pythia 6.428 p0

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

0.5

0

2

4

6

$|\Delta y|$

The figure consists of two vertically stacked panels sharing a common x-axis representing the rapidity difference  $|\Delta y|$  from 0 to 6. The top panel displays the 'Gap fraction' on the y-axis, ranging from 0 to 2. It compares ATLAS experimental data (black squares) with several Pythia 6.428 models: 370 (red triangles), atlas-csc (red circles), d6t (green asterisks), default (orange squares), dw (green inverted triangles), and p0 (black circles). All models show a decreasing trend in gap fraction as  $|\Delta y|$  increases, starting near 1.0 at  $|\Delta y| \approx 0.5$  and reaching approximately 0.3-0.4 at  $|\Delta y| \approx 4.5$ . The bottom panel shows the 'Ratio to ATLAS' on the y-axis, ranging from 0.5 to 2.0. A horizontal line is drawn at a ratio of 1.0. The same Pythia models are plotted, showing their relative performance compared to the ATLAS data. The 'dw' model (green inverted triangles) shows a significant over-prediction (ratio > 1.5) at  $|\Delta y| \approx 4.2$ . Two shaded regions, yellow and green, are present in the bottom panel, highlighting specific  $|\Delta y|$  ranges. A single black square data point is also shown at  $|\Delta y| \approx 5.8$  with a gap fraction of 0.