atlas_conf_2012_147 Validation

Signal Region	SR1		SR2	
Source	ATLAS	CheckMATE	ATLAS	CheckMATE
$Z(\to \nu\bar{\nu})$+jets	173600 ± 5700	164100 ± 5900	15600 ± 600	17100 ± 1900
$W(\to \tau\nu)$+jets	87400 ± 3800	81100 ± 2700	5580 ± 360	4890 ± 640
$W(\to e\nu)$+jets	36700 ± 1600	40500 ± 1900	1880 ± 150	2970 ± 540
$W(\to \mu\nu)$+jets	34200 ± 1650	30500 ± 1600	2050 ± 165	1740 ± 320

Table 1: Comparison of number of events predicted to be observed from ATLAS Monte-Carlo prediction and CheckMATE in atlas_conf_2012_147. 1×10^6 events were generated for each W sample and 2.6×10^5 events were generated for the Z sample.

Monojet search, [1]
Energy: 8 TeV
Luminosity: 10.5 fb^{-1}
Validation notes:

- Validation was performed against standard model W and Z samples in both signal region event numbers, Table 1 and distributions of leading jet p_{T} and $\not{E}_T$, Figures 1 and 2.
  - The Monte-Carlo generator for both W and Z production was Sherpa 1.4.3 [2] with upto 2 matched QCD partons in the final state using the CKKW algorithm [3].
  - Cross-sections calculated at NNLO with FEWZ 2.0 [4, 5]
  - SUSY spectrum generated with SOFTSUSY 3.3.9 [6].
- The validation finishes with the hardest jet $p_{\mathrm{T}} < 600$ GeV due to finite Monte-Carlo statistics.
- CheckMATE overestimates events with hard electrons in the final state due to a veto on events containing jets with an anomalously high charged fraction. The analysis is currently unable to replicate this behaviour and signal models where high energy electrons are expected to be produced should not be constrained with this analysis.
- Trigger is fully efficient for signal regions.

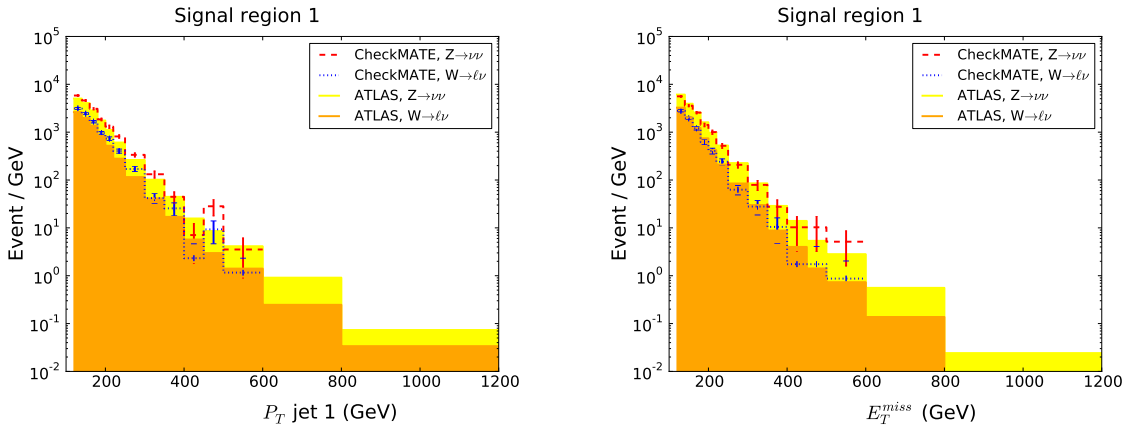

Figure 1: Distributions for leading jet p_{T} (left) and $\not{E}_T$(right) for standard model production of W and Z plus jets in signal region 1 of atlas_conf_2012_147. The ATLAS W/Z plus jets backgrounds are estimated using Monte-Carlo event samples normalised using data in control regions.

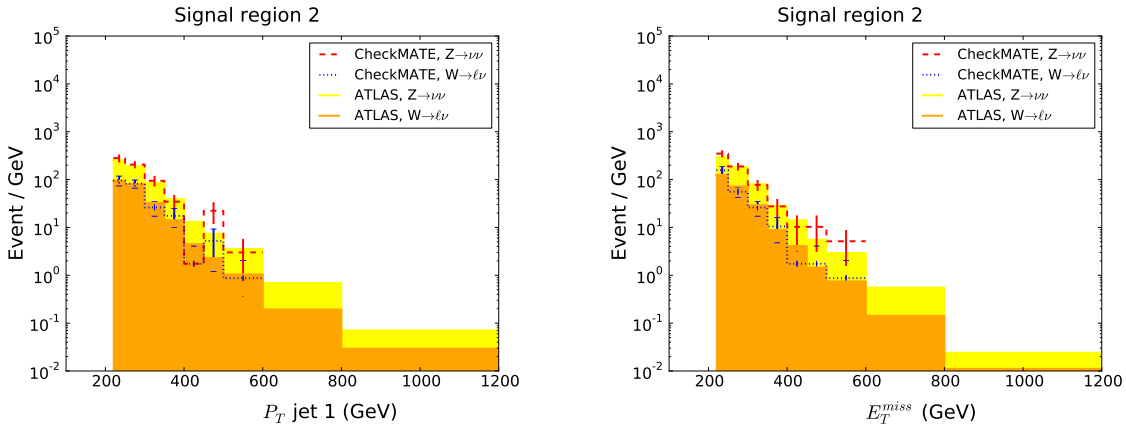

Figure 2: Distributions for leading jet p_{T} (left) and $\not{E}_T$(right) for standard model production of W and Z plus jets in signal region 2 of atlas_conf_2012_147. The ATLAS W/Z plus jets backgrounds are estimated using Monte-Carlo event samples normalised using data in control regions.

References

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