$W_L W_L$ scattering :
(i) The effect of the Underlying Event (UE).
(ii) First comparisons with Full Simulation.

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- A small bug in calculating the statistical error gave big statistical error for all the processes. The average value **is not** affected.
- New errors on the cross-sections:

Cross-section σ (fb)	Signal	$t\bar{t}$	W+jets	Significance for $L = 30\ fb^{-1}$
Generated	44	15640	62600	0.88
Cuts				
P_T Leptonic W	3.31±0.01	422.81±1.46	2889.37±7.58	0.33
P_T Hadronic W	2.59±0.01	191.96±0.99	1816.92±6.07	0.33
η Hadronic W	2.59±0.01	191.96±0.99	1816.92±6.07	0.33
Mass Hadronic W	2.04±0.01	88.80±0.68	209.29±2.09	0.66
Y Scale	1.74±0.01	72.29±0.61	113.95±1.54	0.71
Top Veto	1.57±0.01	4.10±0.15	53.13±1.05	1.15
P_T, E, η Tag Jets	0.45±0.01	0.05±0.02	0.38±0.09	3.73
P_T hard scatter	0.44±0.01	0.03±0.01	0.21±0.07	4.93
Number of Mini-jets	**0.44±0.01**	**0.03±0.01**	**0.21±0.07**	**4.93**

- Statistical error compared to the average value: (i)2.3% for Signal (ii) 33.3% for $t\bar{t}$ and W+jets
- I have doubled the generated events: 1.2M events for Signal and 6.0M events for the Backgrounds. Error expected to be reduced by $1/\sqrt{2}$.

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Effect of the UE

- Underlying Event (Rome Tuning): MSTP(82)=4
  which means (taken from Pythia Manual): *Multiple interactions assuming a varying impact parameter and a hadronic matter overlap consistent with a double Gaussian matter distribution...*
- No Underlying Event: MSTP(81)=0
- 1.2M events each

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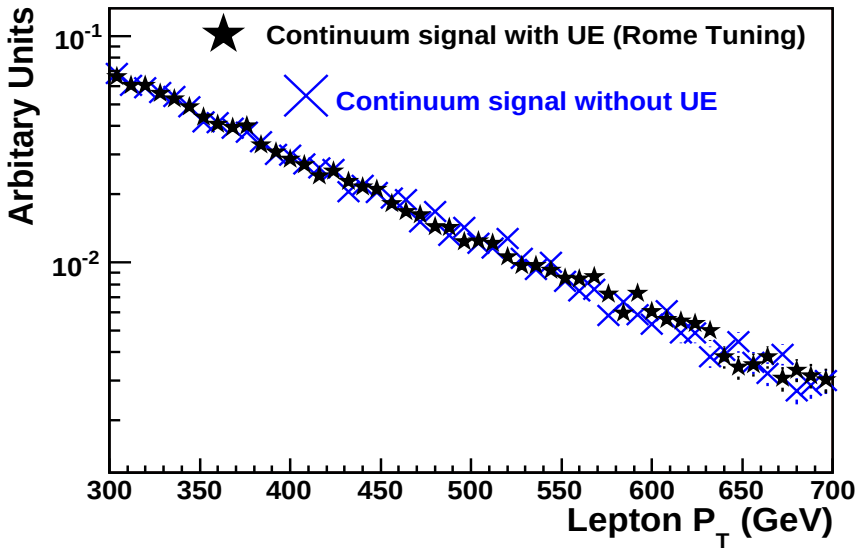
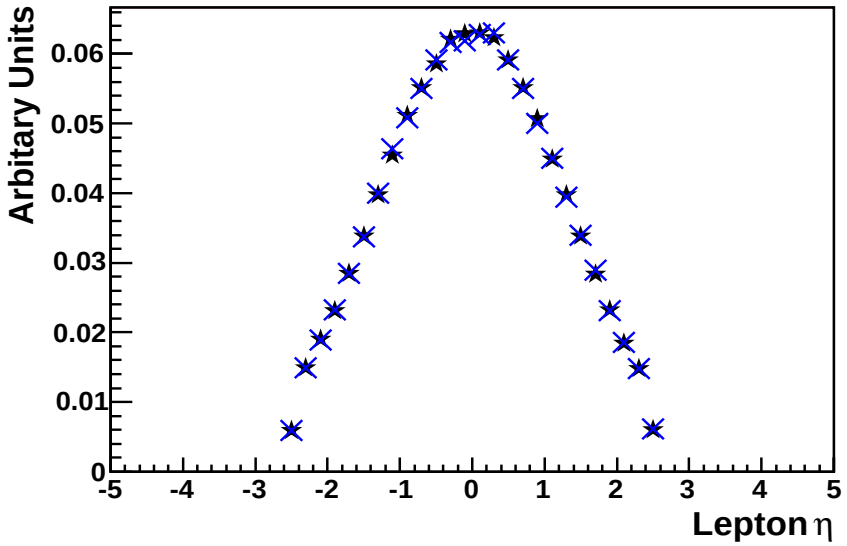
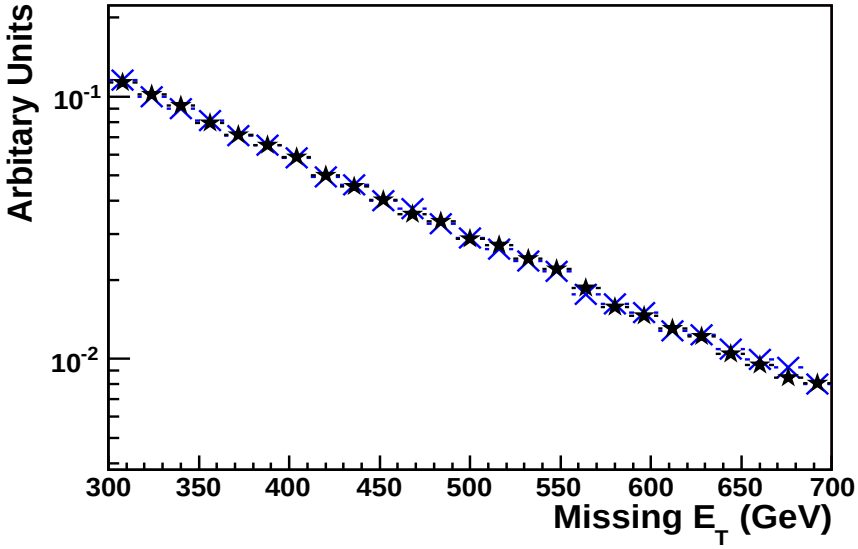
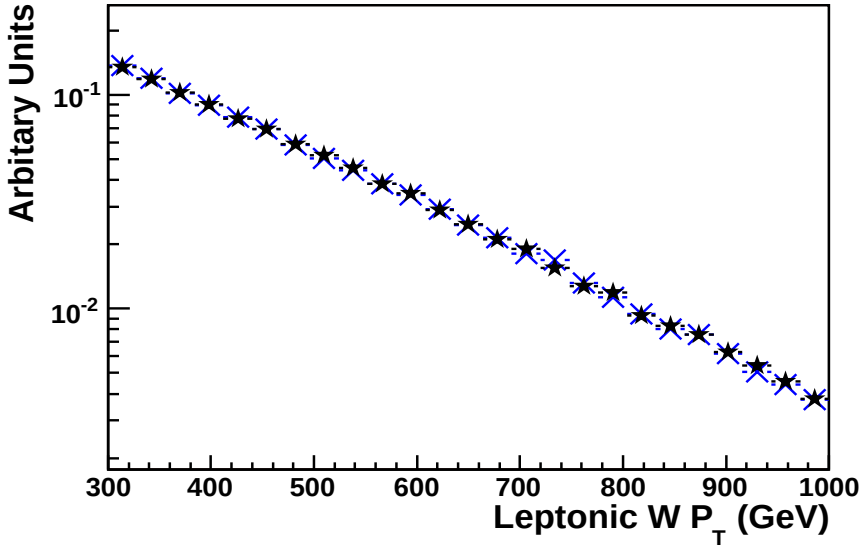
Effect of the UE on the Leptonic sector









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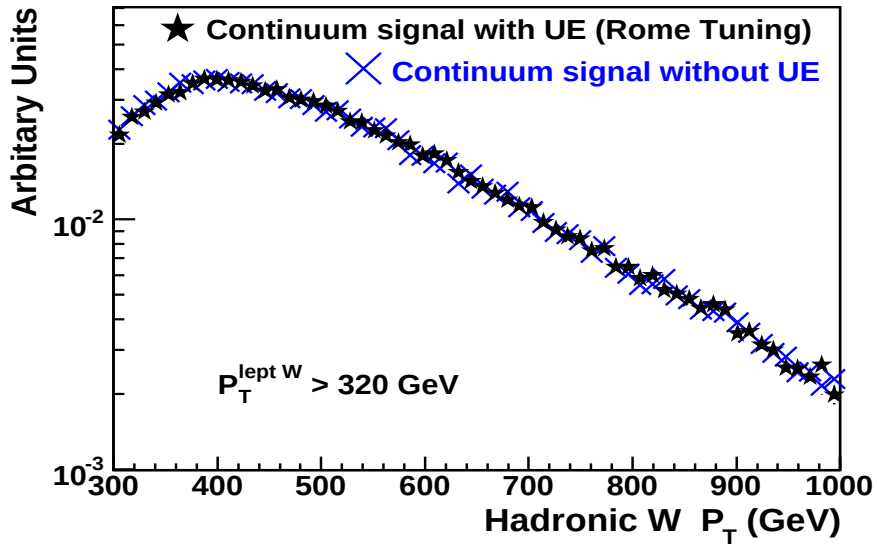
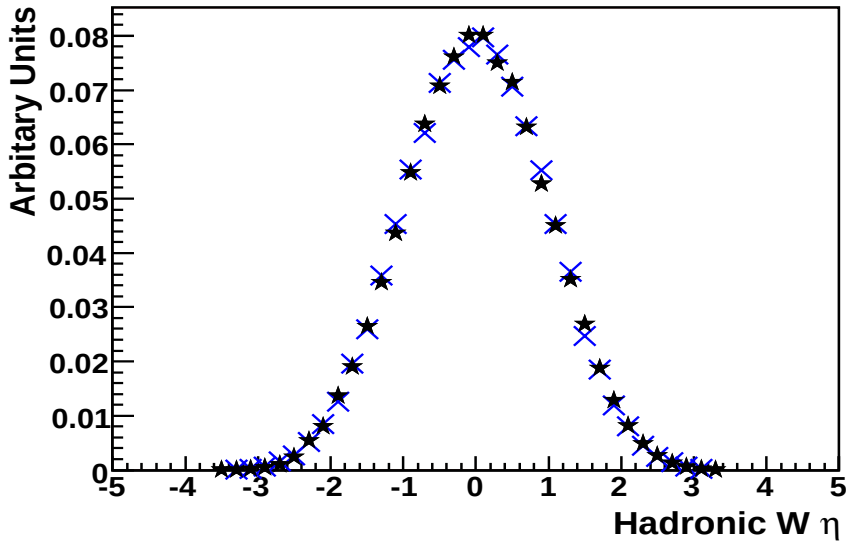
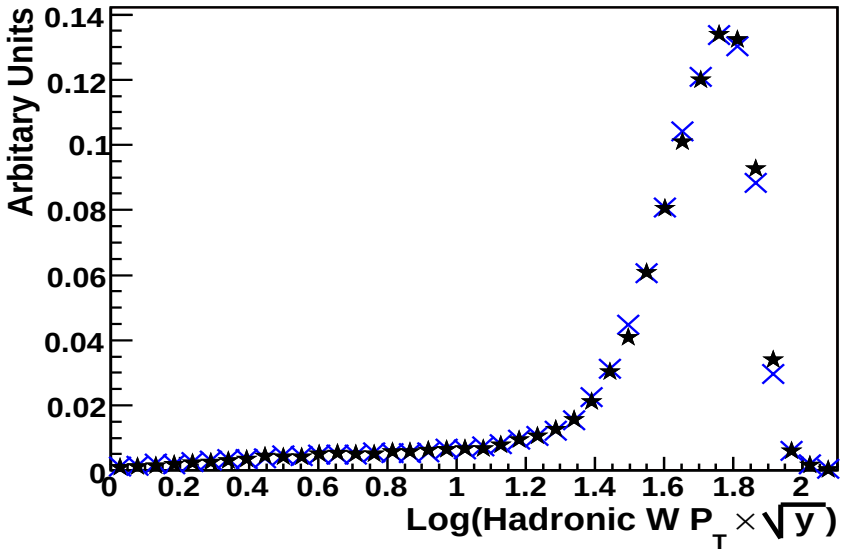
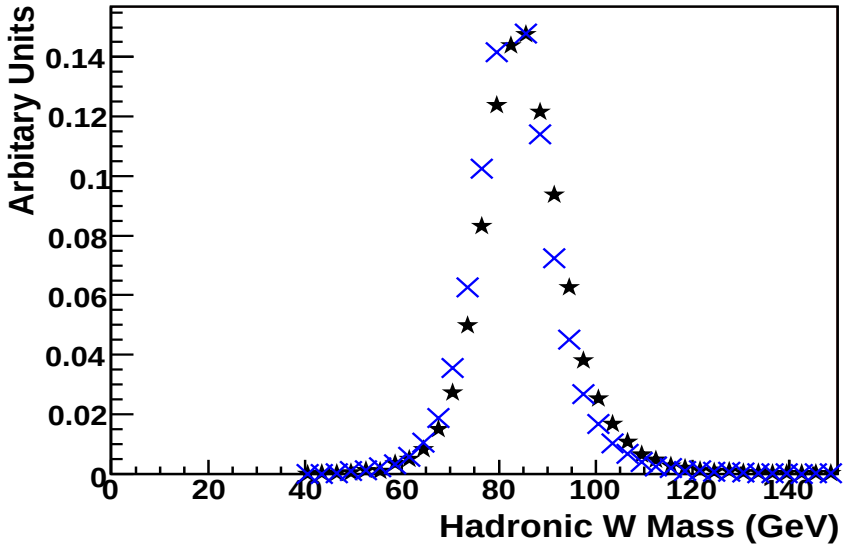
Effect of the UE on the Hadronic sector









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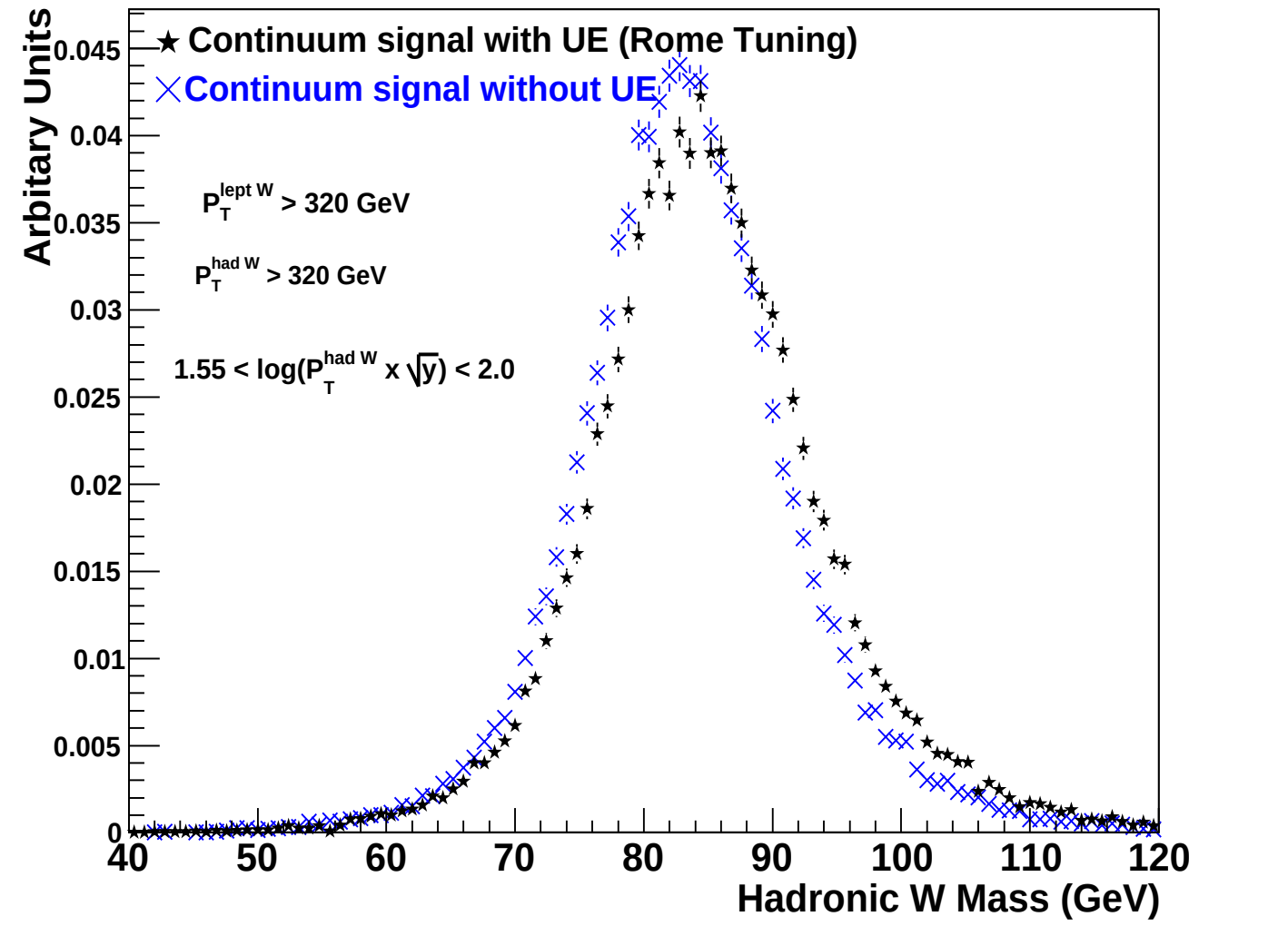

Gaussian fit in the range 70-95 GeV gives a rise of **1.7% on the mean value** (82.91 GeV→84.35 GeV) and **5.9% on the sigma** (6.99 GeV→7.40 GeV) of the distribution.

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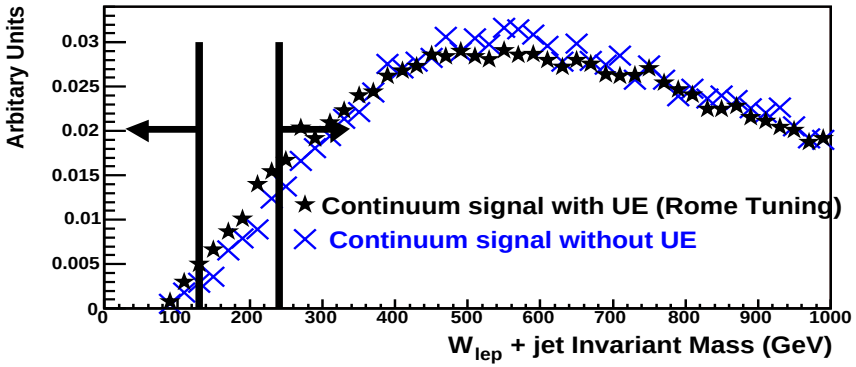
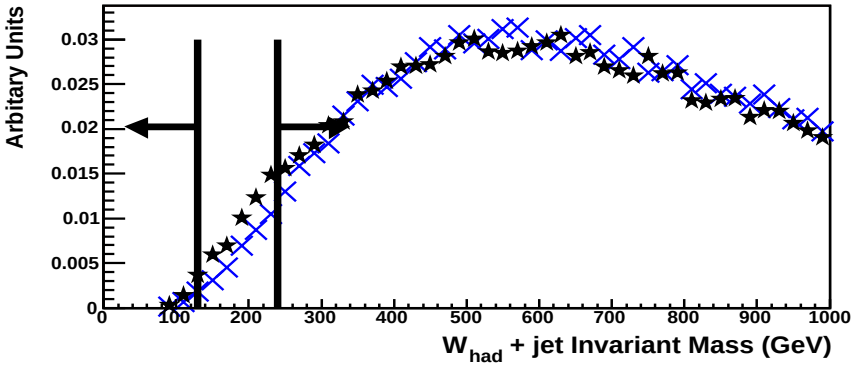
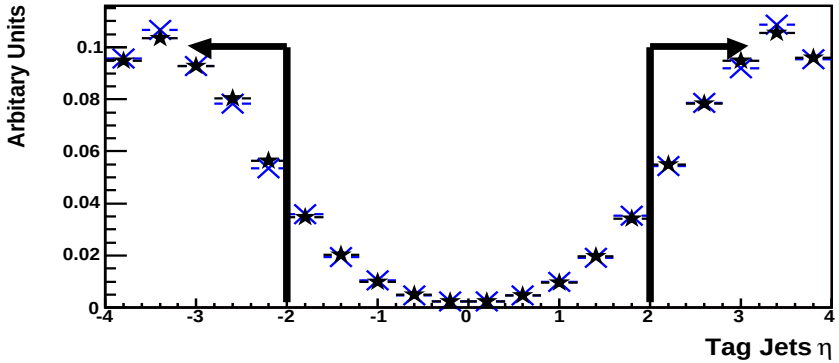
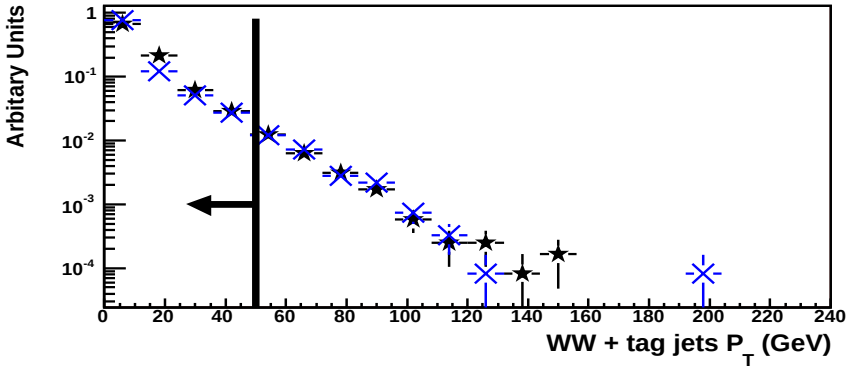
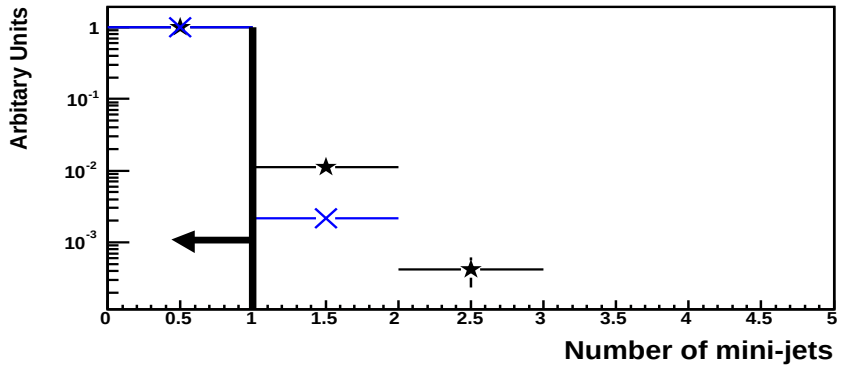
Effect of the UE on the Hadronic Features

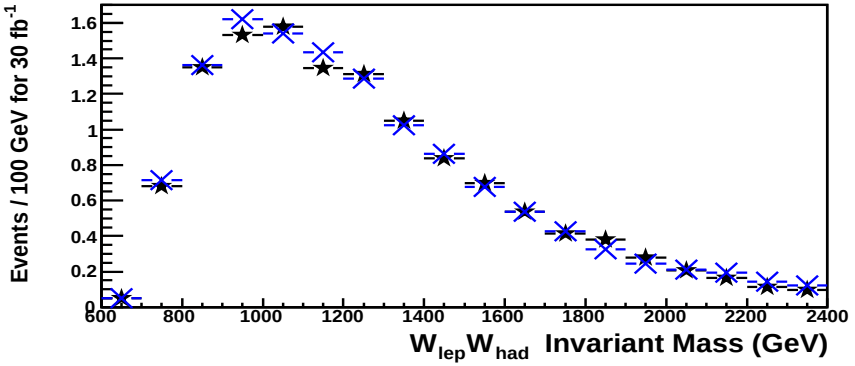












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Effect of the UE on the final cross-sections

Cross-section σ (fb)	Signal with UE	Signal without UE
Generated	44.00	44.00
Cuts		
P_T Leptonic W	3.30±0.01	3.34±0.01
P_T Hadronic W	2.58±0.01	2.61±0.01
η Hadronic W	2.58±0.01	2.61±0.01
Mass Hadronic W	2.04±0.01	2.08±0.01
Y Scale	1.74±0.01	1.76±0.01
Top Veto	1.57±0.01	1.64±0.01
P_T, E, η Tag Jets	0.44±0.00	0.45±0.00
P_T hard scatter	0.43±0.00	0.44±0.00
Number of Mini-jets	0.43±0.00	0.44±0.00

Conclusion: The understanding/tuning of the UE will be better done with the LHC data. But, without big suprises, the choice UE seems to affect the final cross-sections at the order of 2% . Another choice of UE (preferably with another generator) whould be also usefull to be tried.

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Comparison between Full & Fast Simulation

- Proceedure:
  - Apply a **Filter** on the **initial generated signal** events: Require at least 1 lepton, with $P_T > 10\ GeV$ and $|\eta| < 2.5$
  - Copy the Filtered Output on the GRID.
  - Simulate-Digitize-Reconstruct ESD-Reconstruct AOD bunches of 50 events from the Filtered Generated Sample.
  - Release 11.0.4 was used for the whole chain.
  - Copy the Digits file (approx. 115 MB/file) and the AODs (approx. 6 MB/file).
  - Perform the WW analysis.
- The Digits files will be usefull if there is a need for a reconstruction with a different release.
- 8k events collected till now.
- The Subjet analysis **can not** be applied, since the constituents of the jets are not saved in the AODs..

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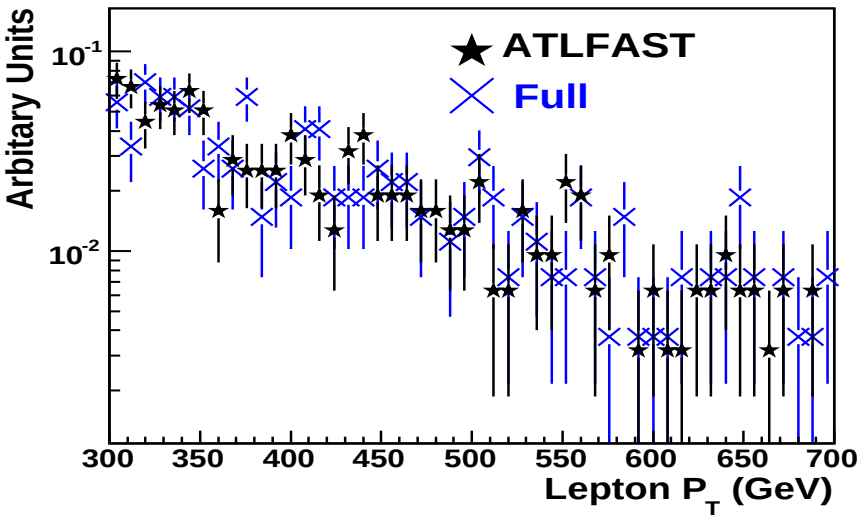
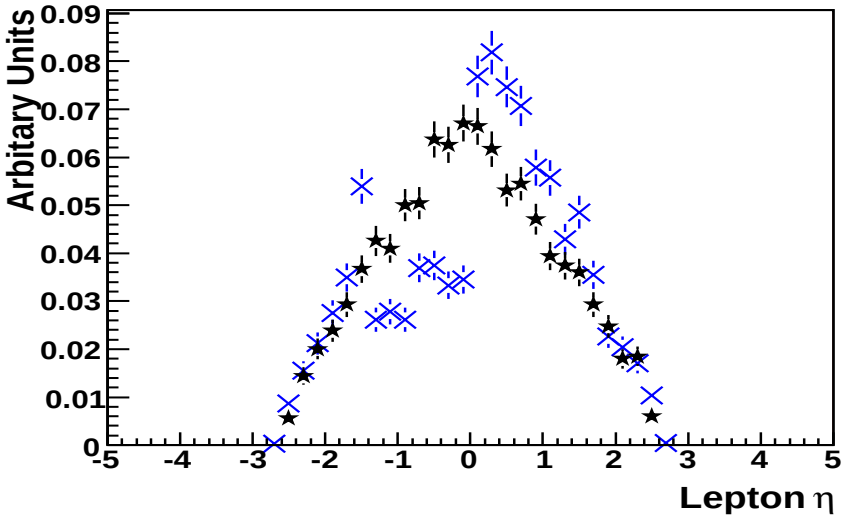
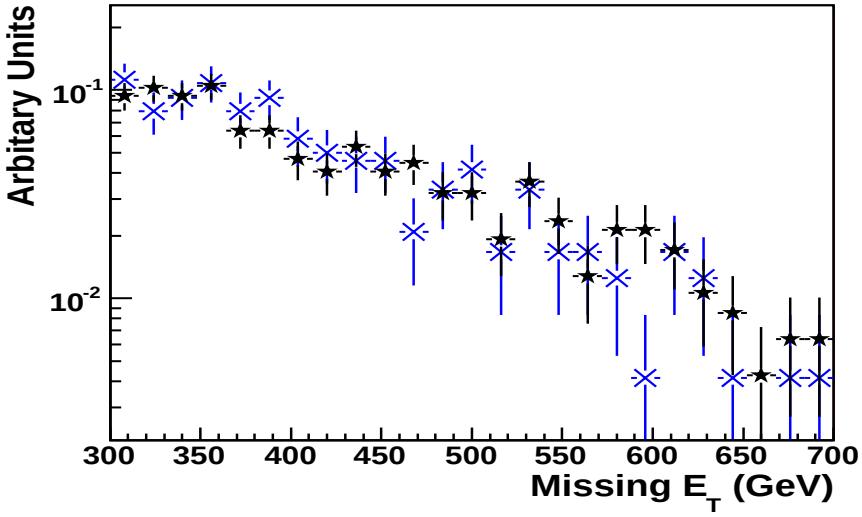
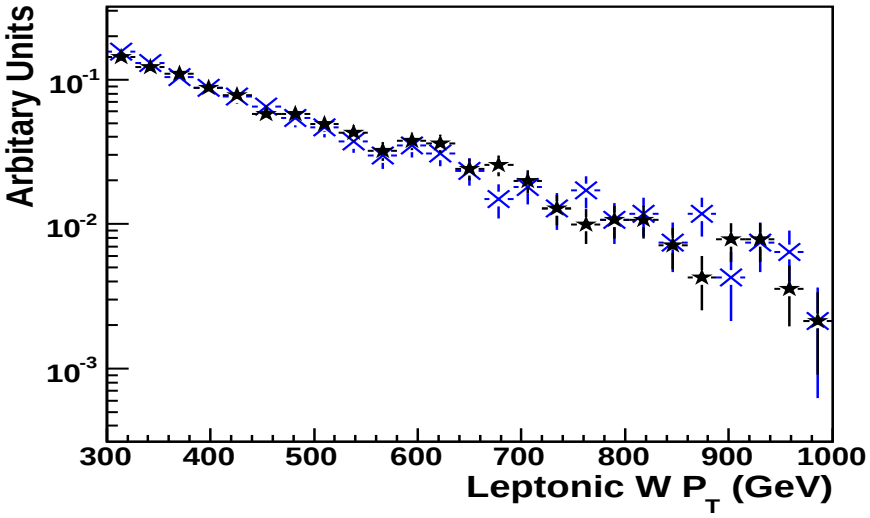
Comparison between Full & Fast Simulation: The Leptonic Sector









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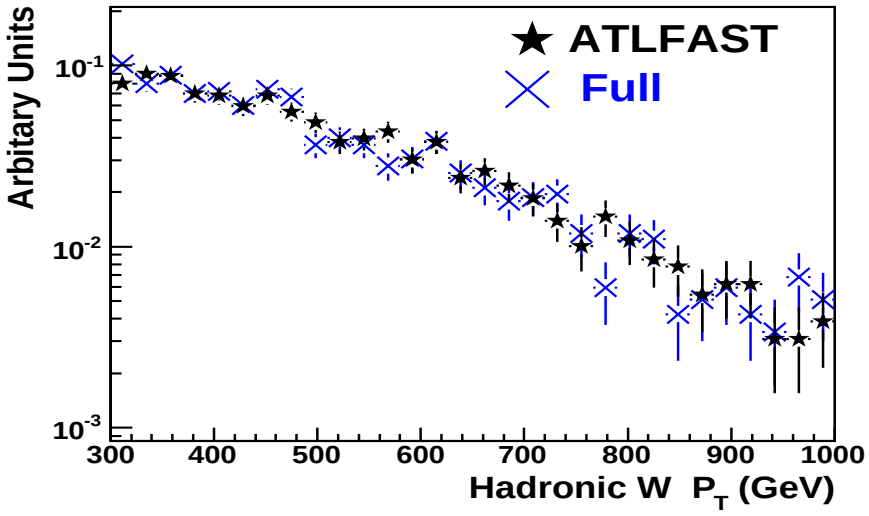
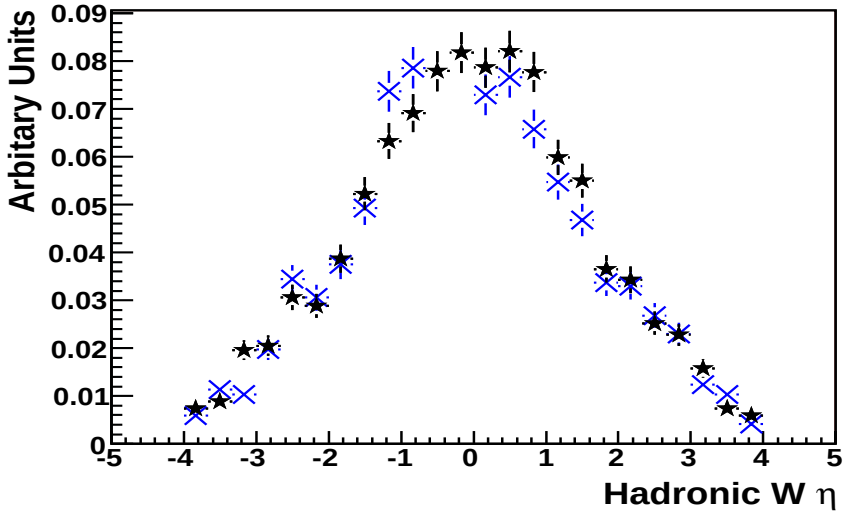
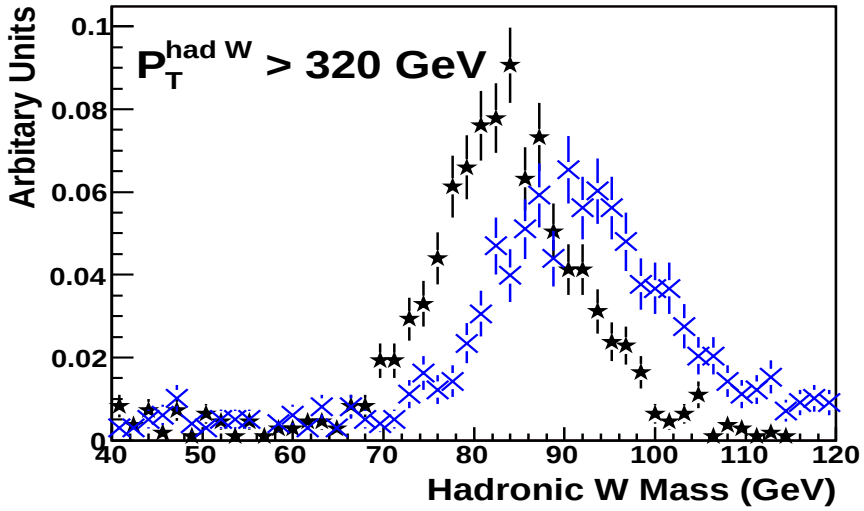
Comparison between Full & Fast Simulation: The Hadronic Sector







Jet Clustering with $k_\perp$

R-parameter = 0.5 (bug into account)

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