Search for W'→μν with the ATLAS detector

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National and Kapodistrian
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HEP 2014
Genesis@LHC

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EDUCATION AND LIFELONG LEARNING
investing in knowledge society
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MANAGING AUTHORITY

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Thalis Genesis@LHC contribution to Higgs discovery and properties study in 2013-14

- Optimization of event selection criteria of W'→μν
- Study of systematic uncertainties concerning muon and missing momentum reconstruction
- Study of background modeling uncertainties
- Production of several signal and background sets of simulated events
- Application of preselection criteria for the production of the final skimmed data sets (real and simulated)

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Publication for Run I data in final stage

More than 10 internal presentations in ATLAS WGs

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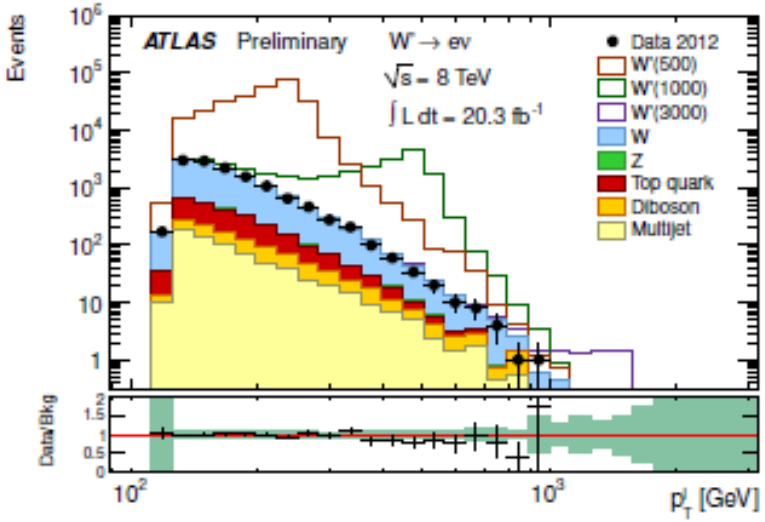
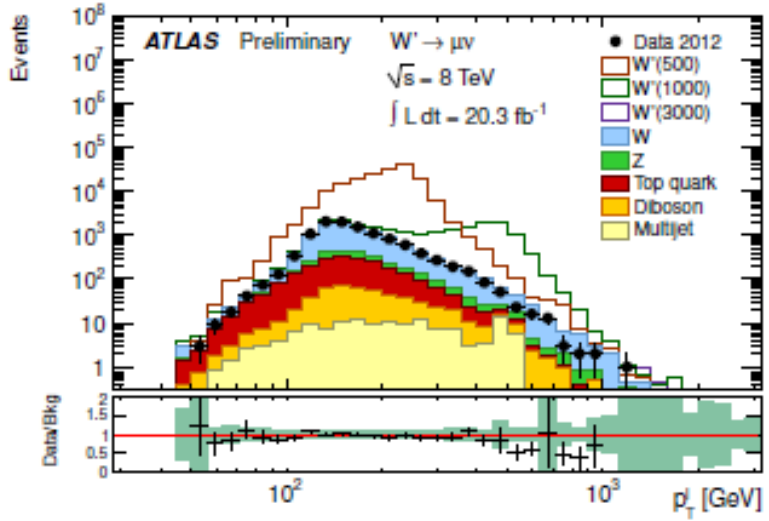
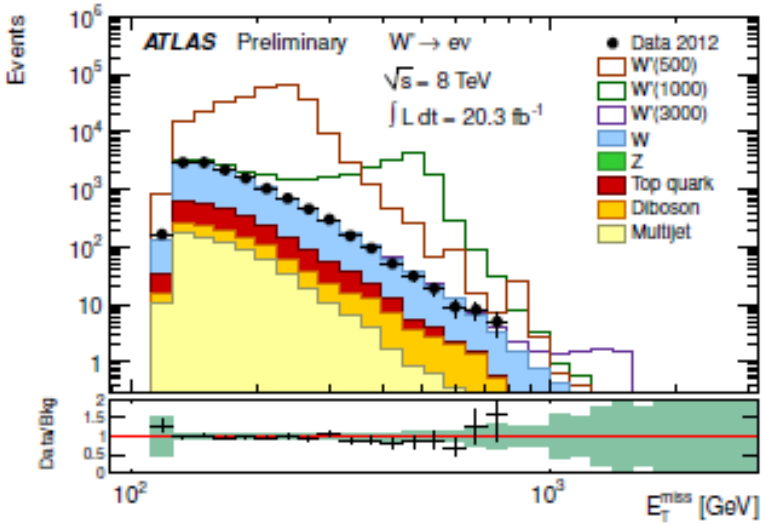
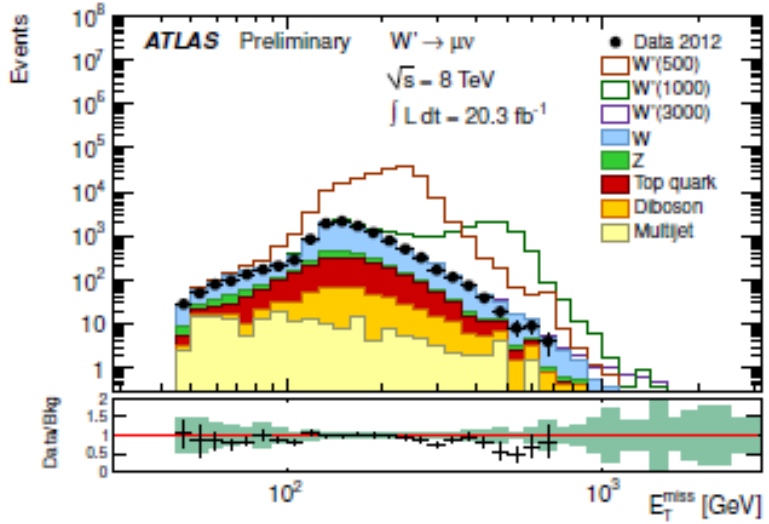
lepton pT









Missing ET

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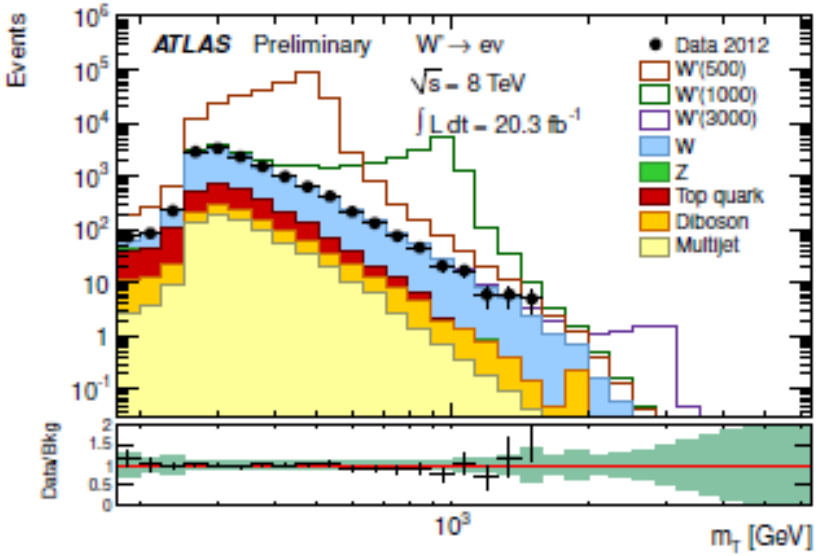
Transverse Mass



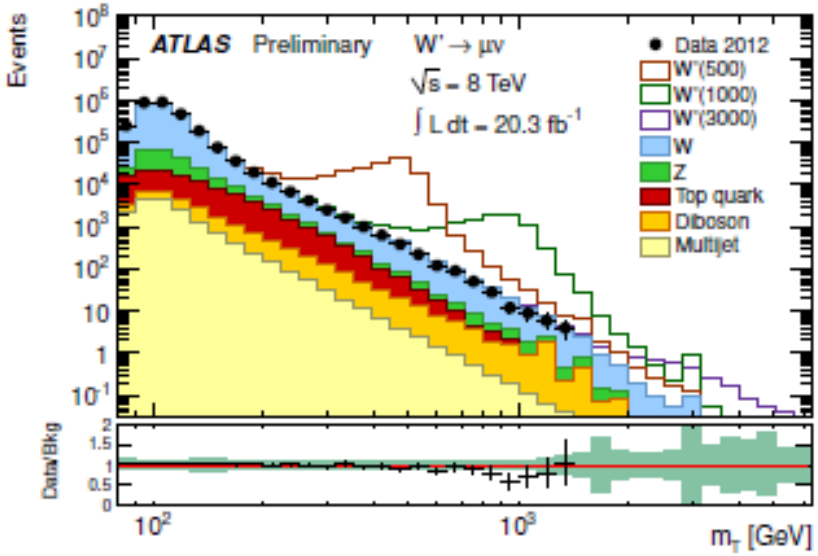


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Table 4: Expected numbers of events from the various background sources in each decay channel for $m_T > 1500$ GeV, the region used to search for a W' with a mass of 2000 GeV. The $W \to \ell\nu$ and $Z \to \ell\ell$ rows include the expected contributions from the τ-lepton. The uncertainties are statistical.

	$e\nu$	$\mu\nu$
$W \to \ell\nu$	2.65 ± 0.10	2.28 ± 0.21
$Z \to \ell\ell$	0.00163 ± 0.00022	0.232 ± 0.005
diboson	0.27 ± 0.23	0.46 ± 0.23
top	0.0056 ± 0.0009	0.0017 ± 0.0001
multijet background	0.066 ± 0.019	0.046 ± 0.039
Total	2.99 ± 0.25	3.02 ± 0.31

$m_{W'}$ [GeV]	$m_{T\min}$ [GeV]	channel	ε_{sig}	N_{sig}	N_{bg}	N_{obs}
1000	796	$e\nu$	0.398 ± 0.013	9130 ± 290	116 ± 16	101
		$\mu\nu$	0.226 ± 0.010	5190 ± 220	84 ± 11	59
2000	1500	$e\nu$	0.431 ± 0.013	183.0 ± 5.6	2.99 ± 0.62	3
		$\mu\nu$	0.231 ± 0.011	98.1 ± 4.8	3.02 ± 0.81	0
3000	1888	$e\nu$	0.425 ± 0.037	5.32 ± 0.46	0.43 ± 0.10	0
		$\mu\nu$	0.234 ± 0.022	2.93 ± 0.27	0.61 ± 0.15	0

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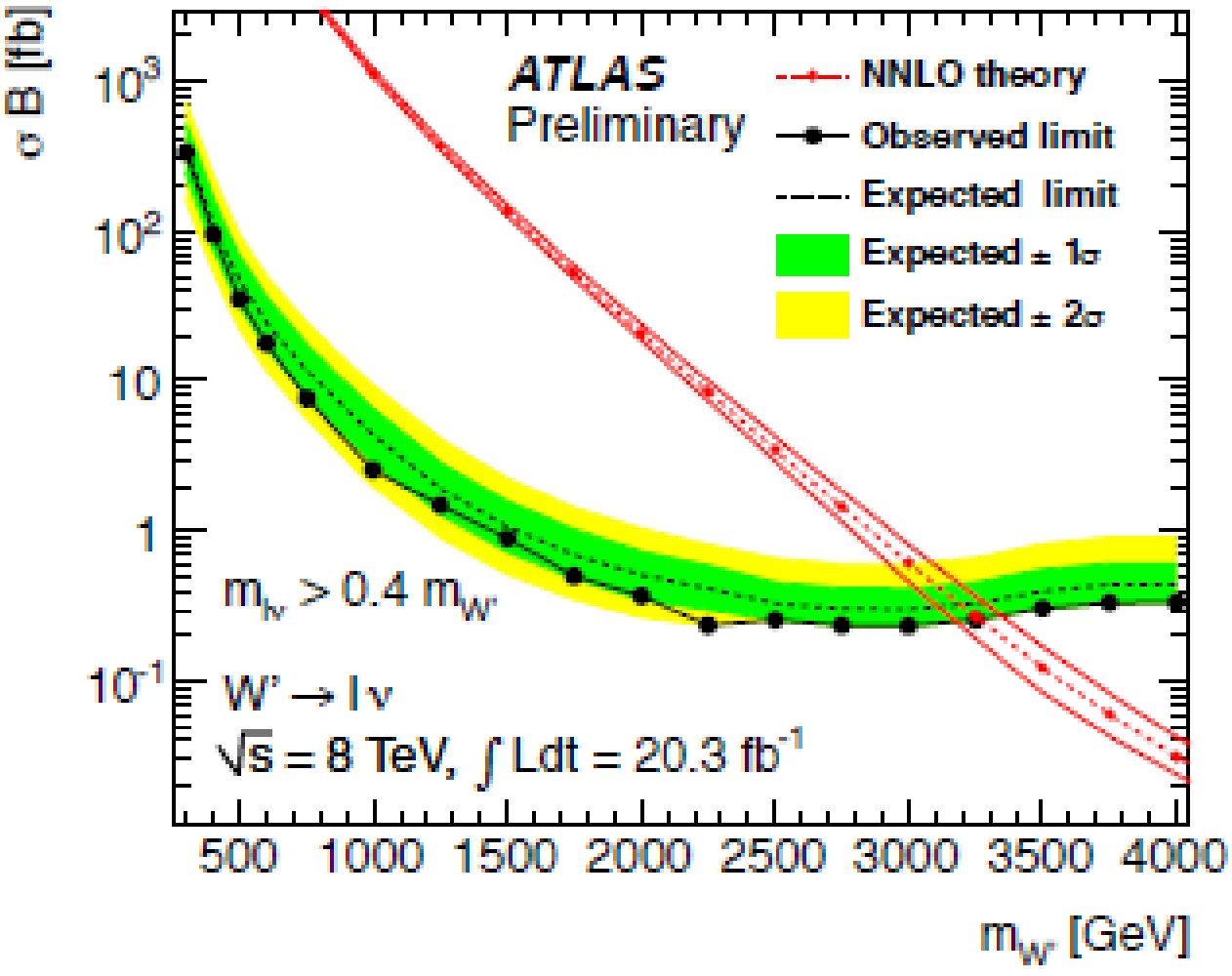

Conclusions – Further Steps

- Work has been released to conferences
- Publication of Run I at final stage
- PhD n. Tsirintanis in progress

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