

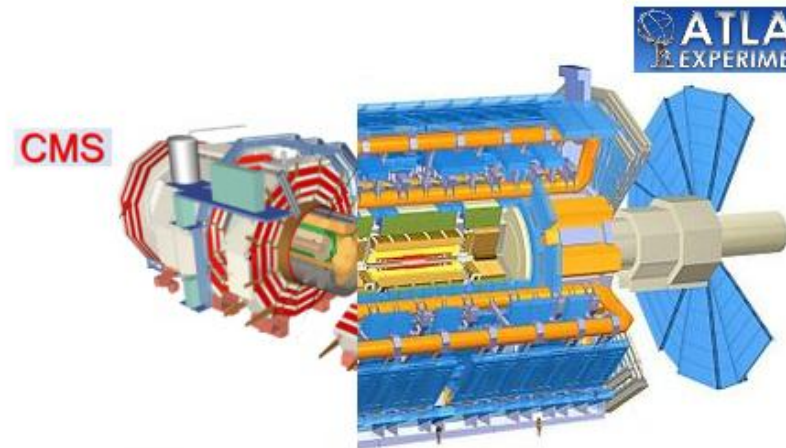
Single Top, Wprime and KKg snowmass 2013



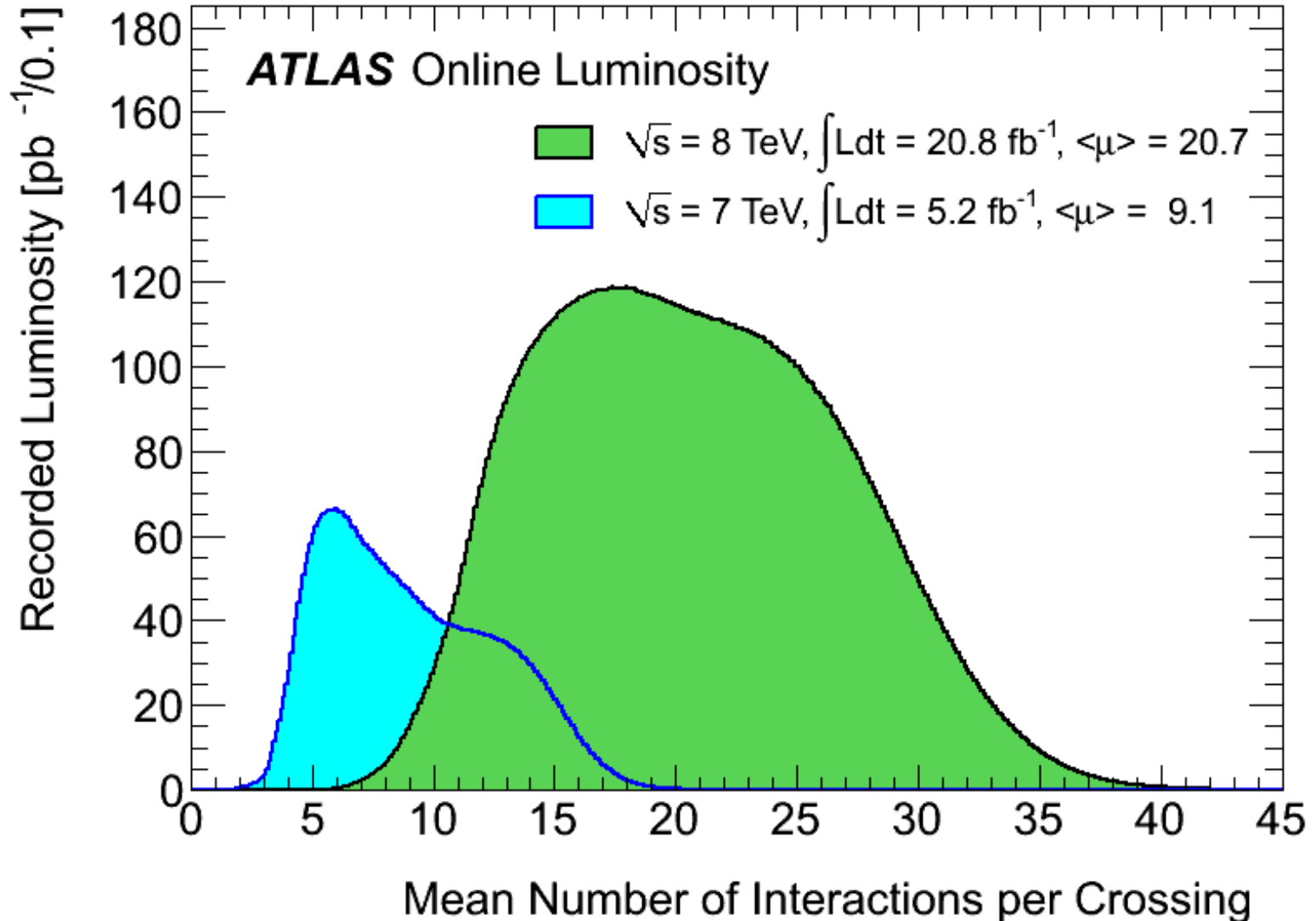
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The machines

- Study the conditions for top physics at the LHC and beyond at the (33TeV) VLHC at 0, 50, 140 pileup
- Using Snowmass Combined LHC detector simulated in Delphes



Pile Up conditions



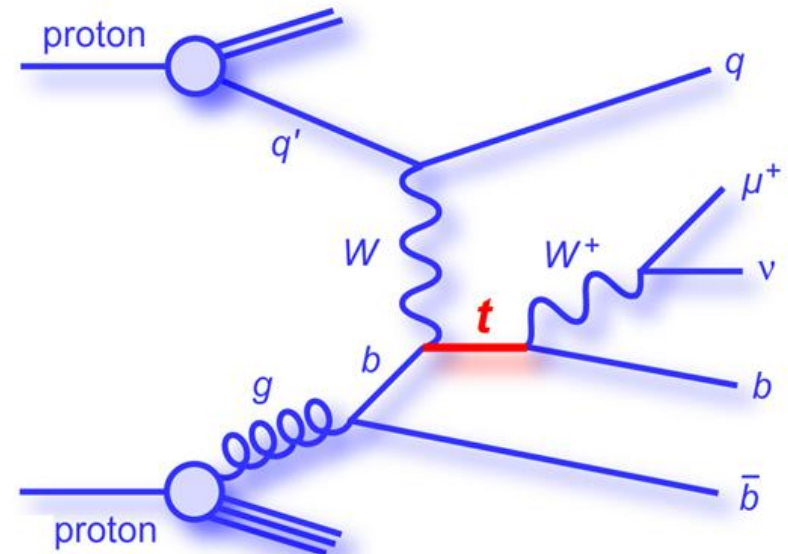
The samples

- Using Snowmass background samples
- Generated our own signal samples
 - Single top T channel
 - W prime
 - Kaluza Klein Gluon (KKg)
- All samples were generated with the madgraph-pythia-Delphes trio



Single Top T-channel

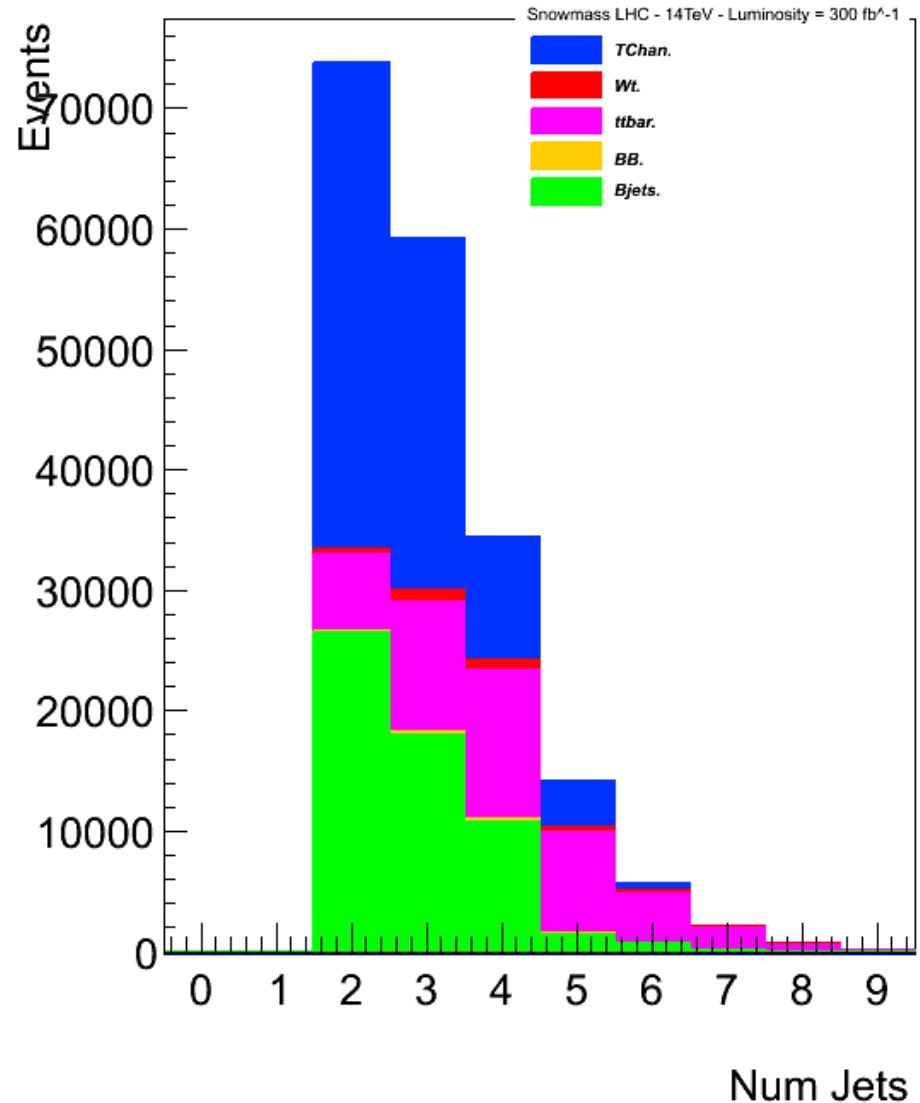
- Final state
 - Single lepton
 - MET
 - Two or three jets
 - One b-tag
- Selection cuts
 - Forward jet $\eta > 3.0$
 - B jet and leading jet $p_t > 50 \text{ GeV}$
 - Top mass 160-180
 - Top polarization Optimal basis > 0



T-channel @ 50PileUp (preliminary)

- Corresponds to 300 fb^{-1}
- S:B $\sim 1:1$

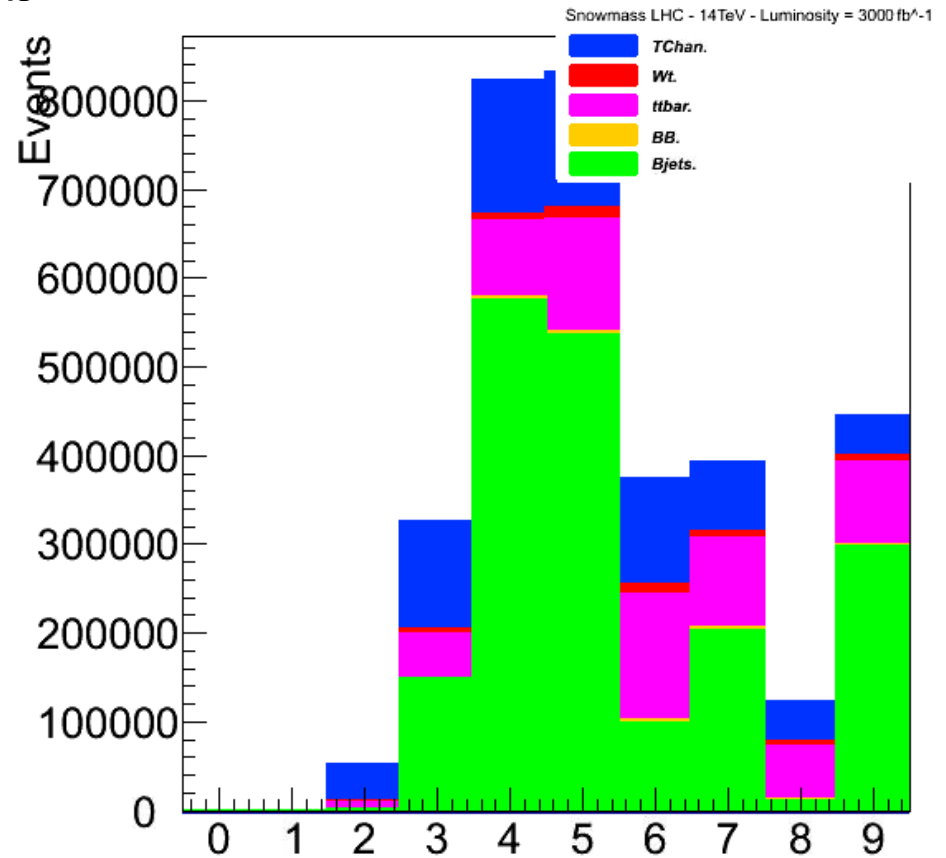
	yield
t-channel	69540
Background	62140



T-channel @ 140PileUp (preliminary)

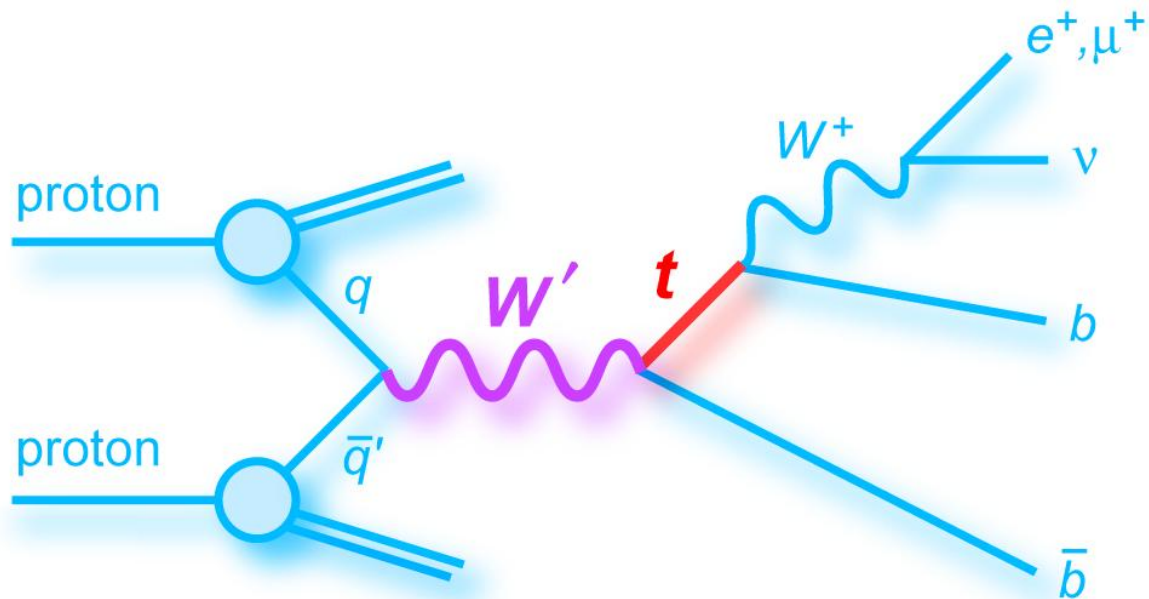
- Corresponds to 3000 fb^{-1}
- S:B $\sim 1:1.3$

	yield
t-channel	160944
Background	215440

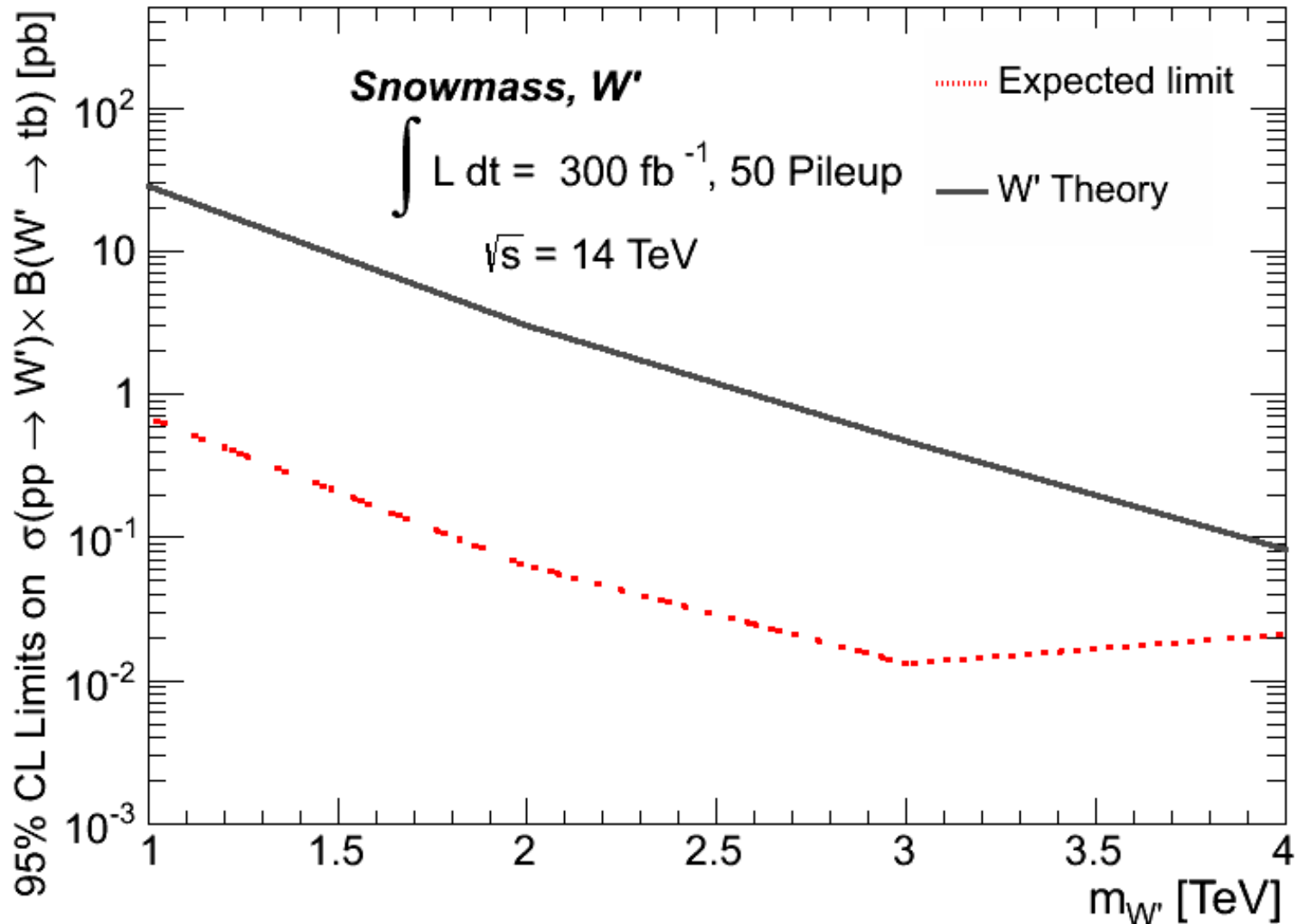


W prime

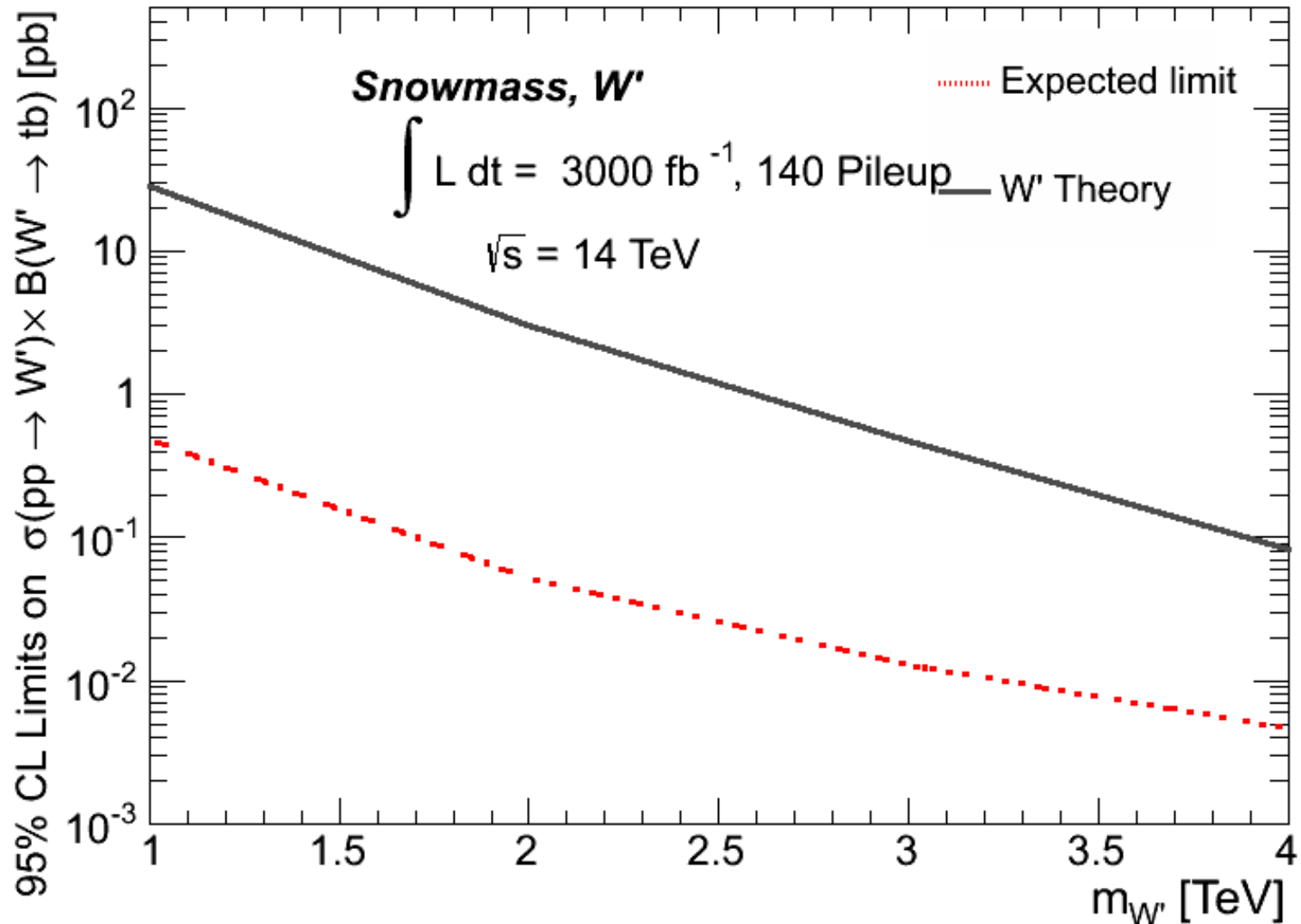
- Final state
 - Single lepton
 - MET
 - At least two jets
 - At least one b-tag
- studied 1,2,3&4 TeV masses



Detection/Exclusion Limits

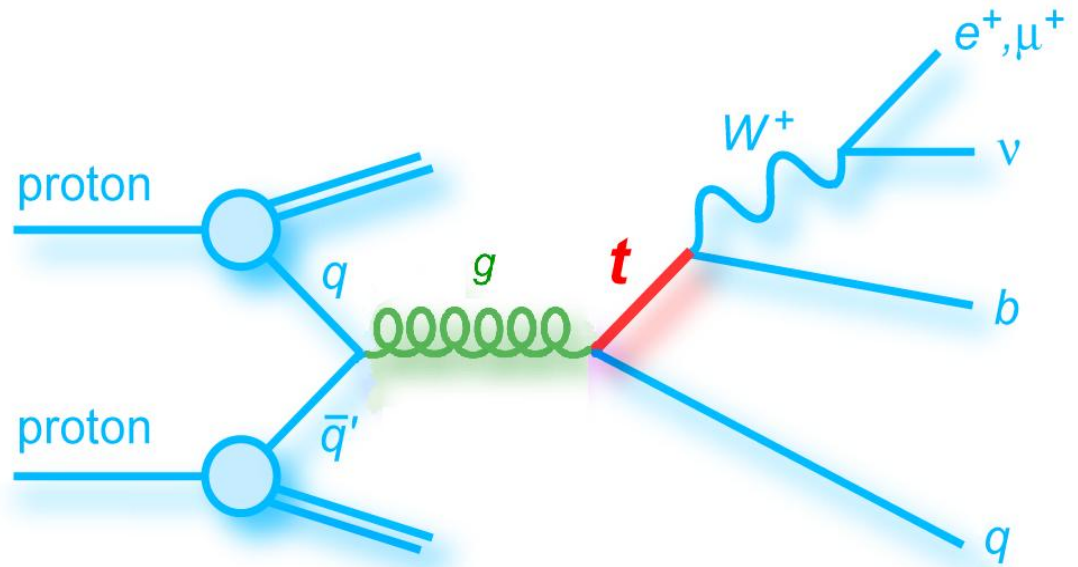


Detection/Exclusion Limits

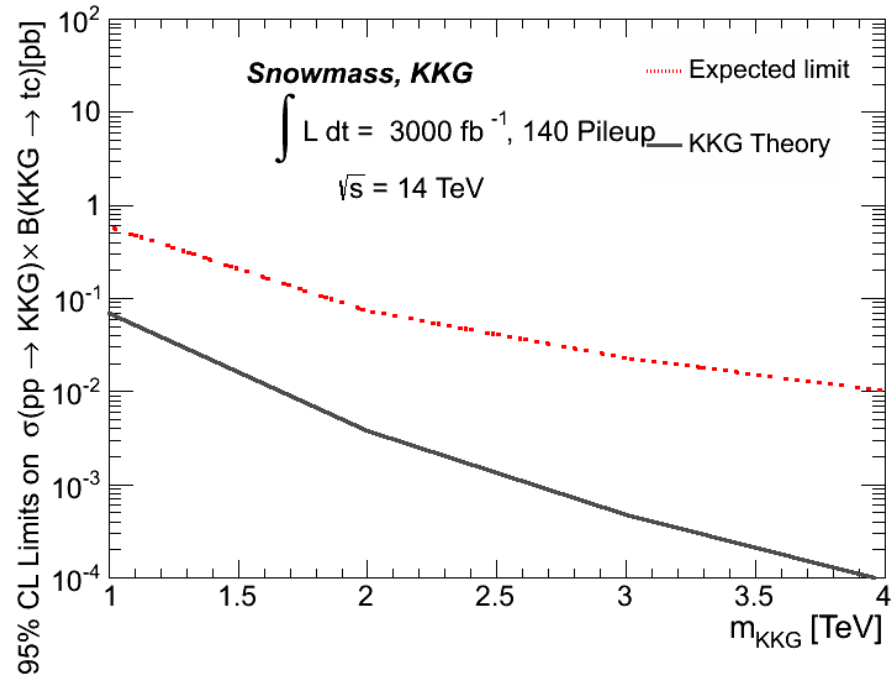
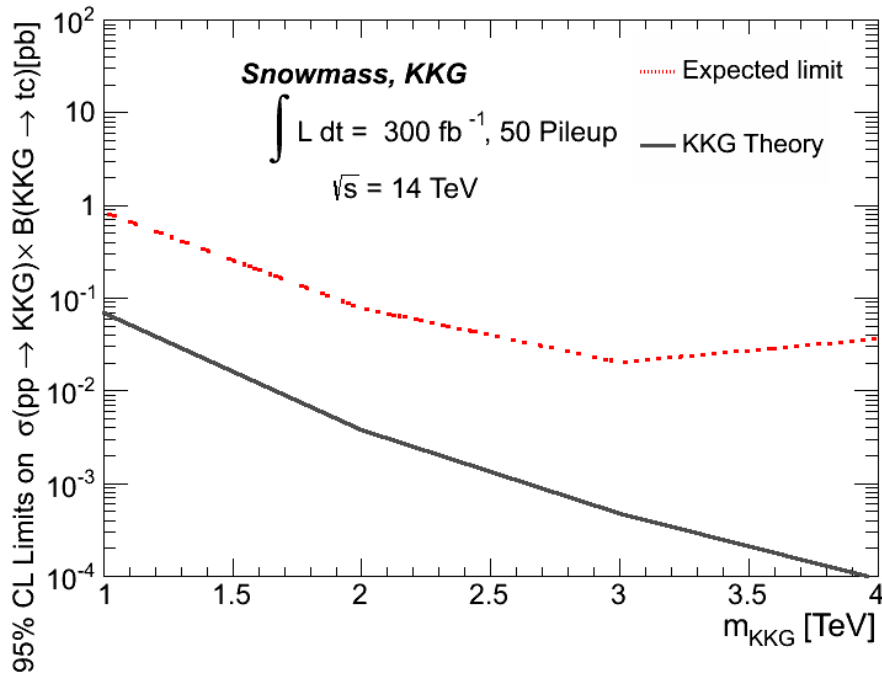


KKg

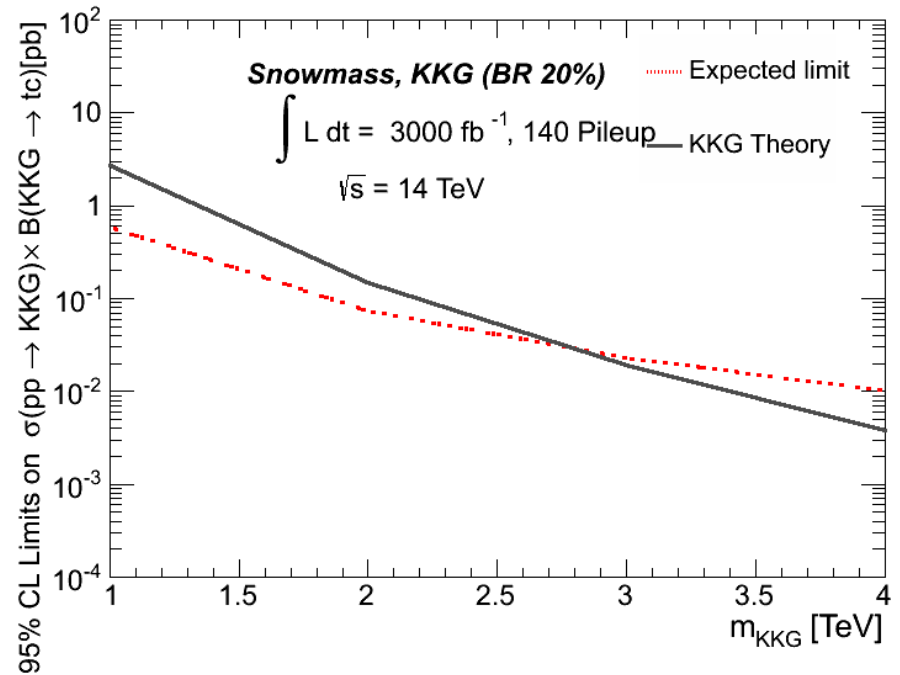
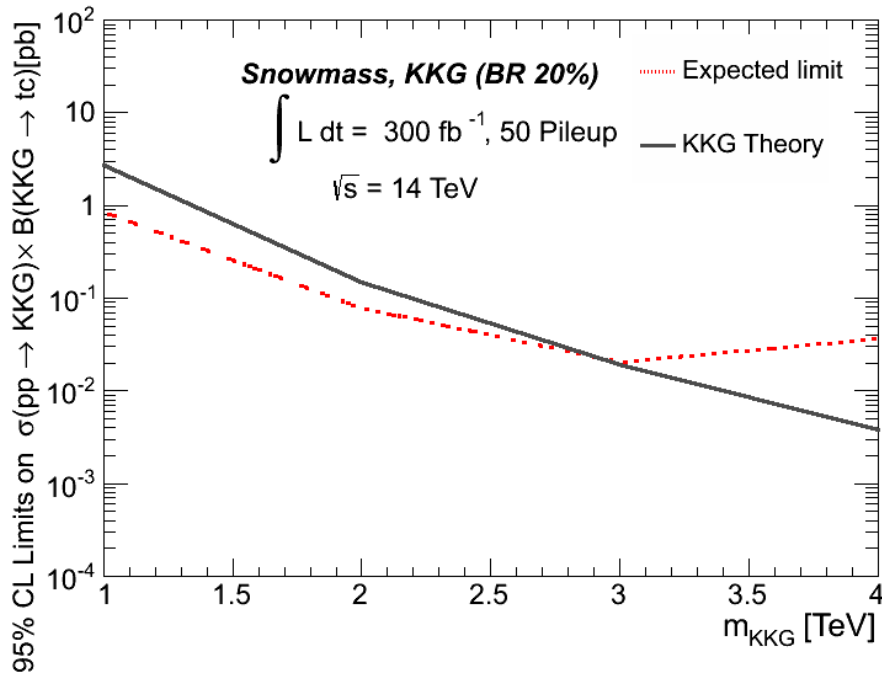
- Final state
 - Single lepton
 - MET
 - At least two jets
 - At least one b-tag
- Studied 1,2,3,&4 TeV masses

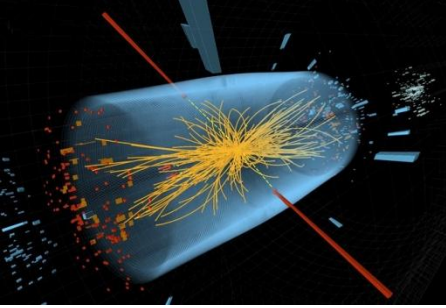


Detection/Exclusion limits



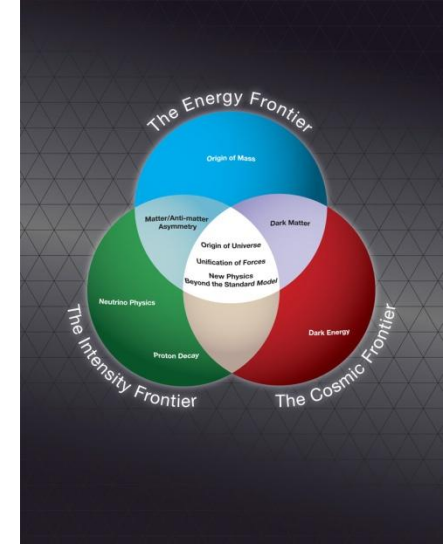
Detection/Exclusion limits





Conclusions

- T channel looks promising!
 - xsec measurement with 5% error
 - V_{tb} measurement with 2.5% error
- We will be able to probe deep into the W prime mass range ($>4\text{TeV}$) for discovery/exclusions
- KKg exclusions will be challenging in the most optimistic situations.



Backup



Yields Wprime @ 50 pile up 14TeV

Yields	1TeV	2TeV	3TeV	4TeV
wprime	763792	29996.7	709.239	15.0049
Background	112945	3778	81.2	3.72

Yields Wprime @ 140 pile up 14TeV

Yields	1TeV	2TeV	3TeV	4TeV
wprime	2.74326e+06	106941	2488.1	72.198
Background	280808	11294	363	6.17

Yields KKg @ 50 pile up 14TeV

Yields	1TeV	2TeV	3TeV	4TeV
KKg	377	74.6	7.4664	2.0e-03
Background	112945	3778	81.2	3.72

Yields KKg @ 140 pile up 14TeV

Yields	1TeV	2TeV	3TeV	4TeV
KKg	1337.7	23.8435	0.3553	9.8e-03
Background	280808	11294	363	6.17

T channel 14 vs. 33 TeV

- Plot 14
- Plot 33

