

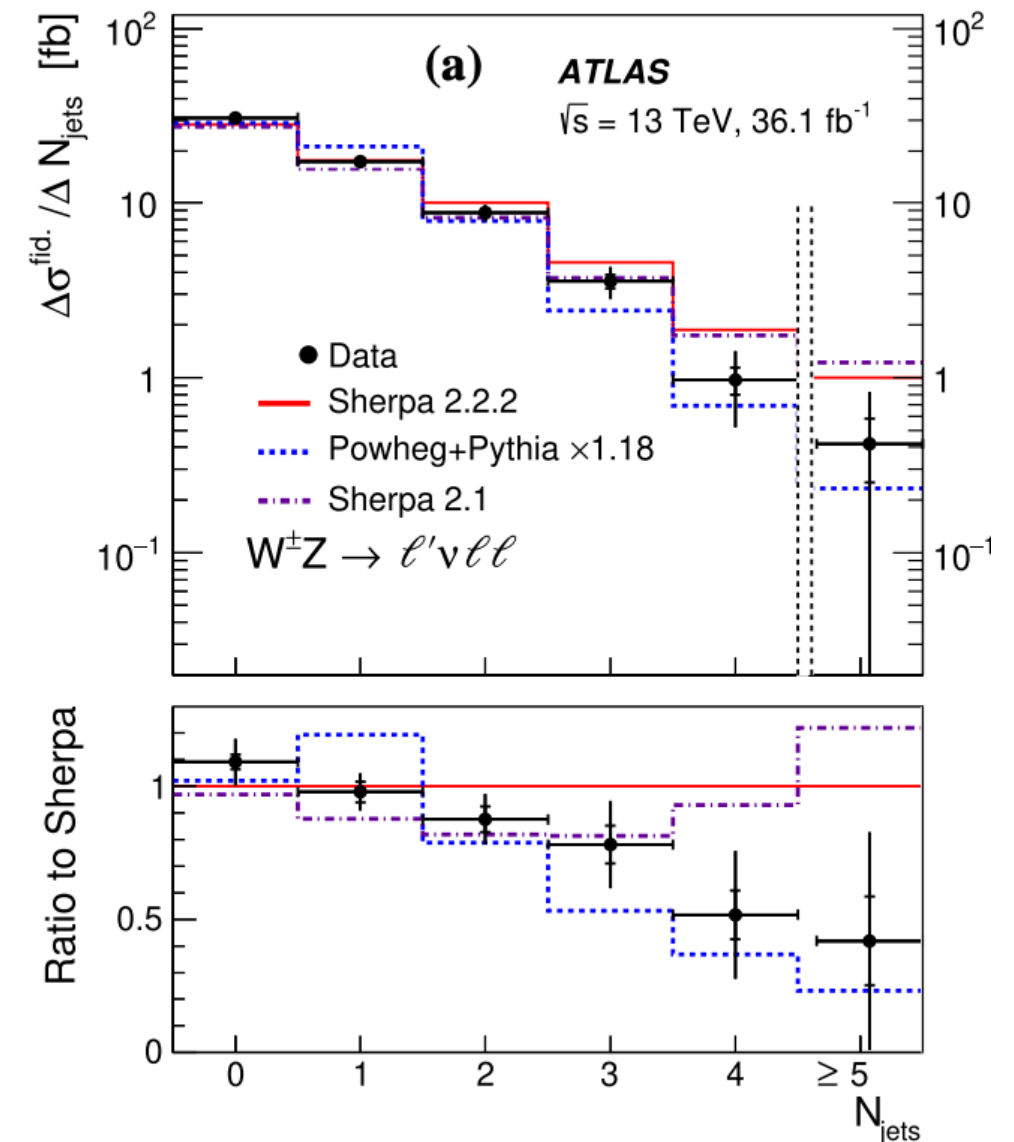
Weekly Report

Shuiting Xin

Diboson background

- ◆ Showing the Preliminary VV CR result.
- ◆ As been shown by Angela, there are two main components to be checked.
 - For WZ process, the njets distribution is mis-modeled.
 - For $W^\pm W^\pm jj$ production, the fiducial cross section is underestimated by the Sherpa. 36.1 fb⁻¹ study observed 2.89 fb, MC predicted 2.01 fb.

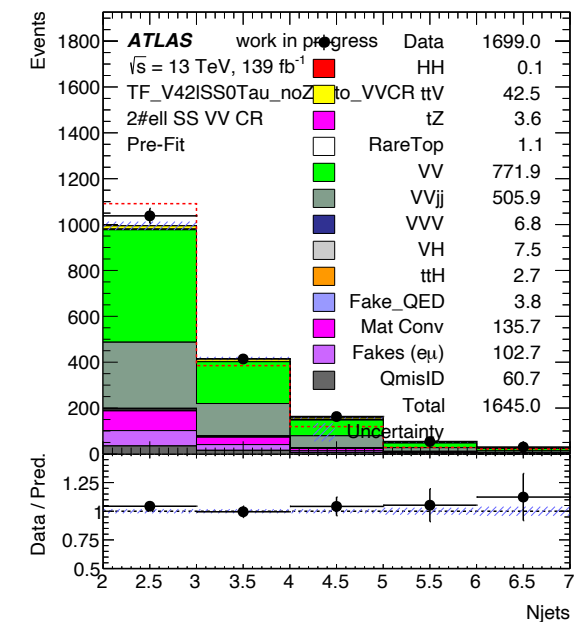
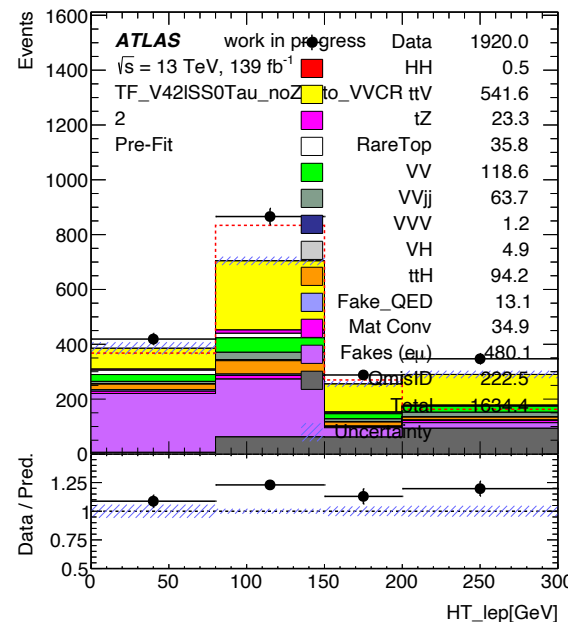
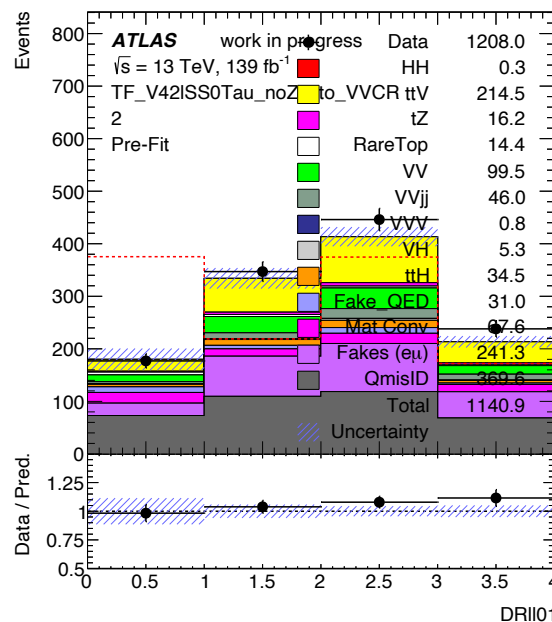
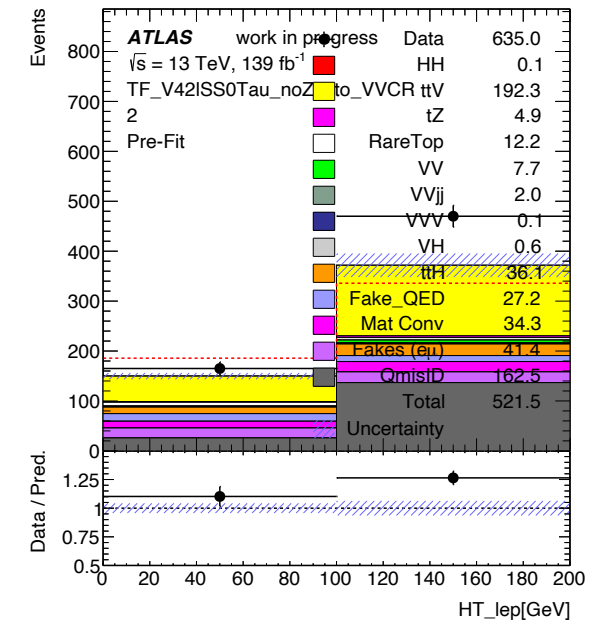
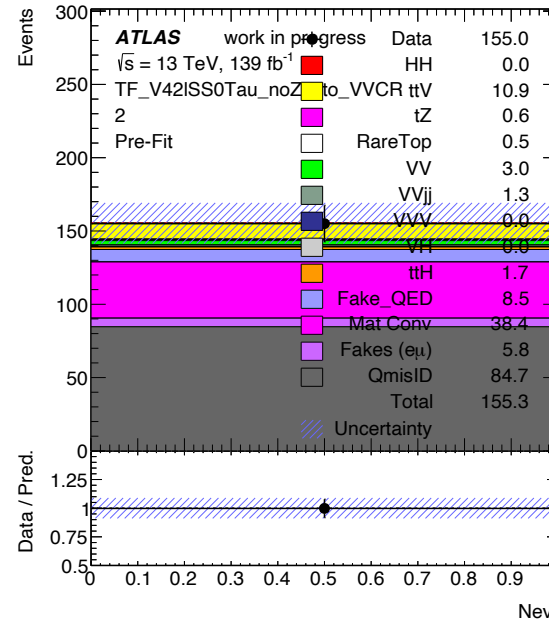
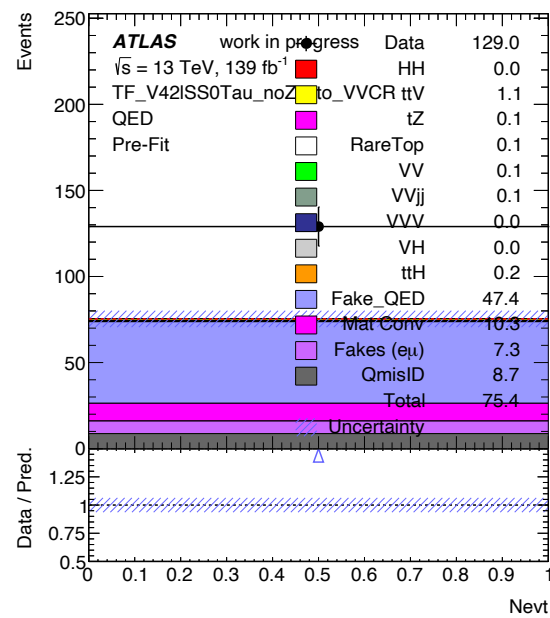
BDTG_2l_all < 0.5
BDTG_2l_Vjets > 0
abs(m_ll - 91.2) > 10 GeV



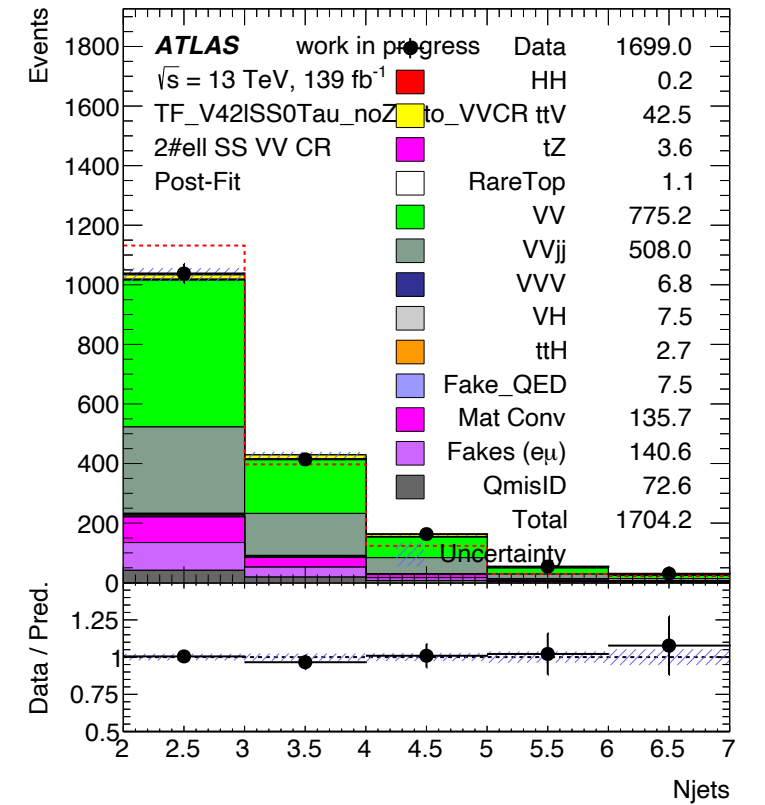
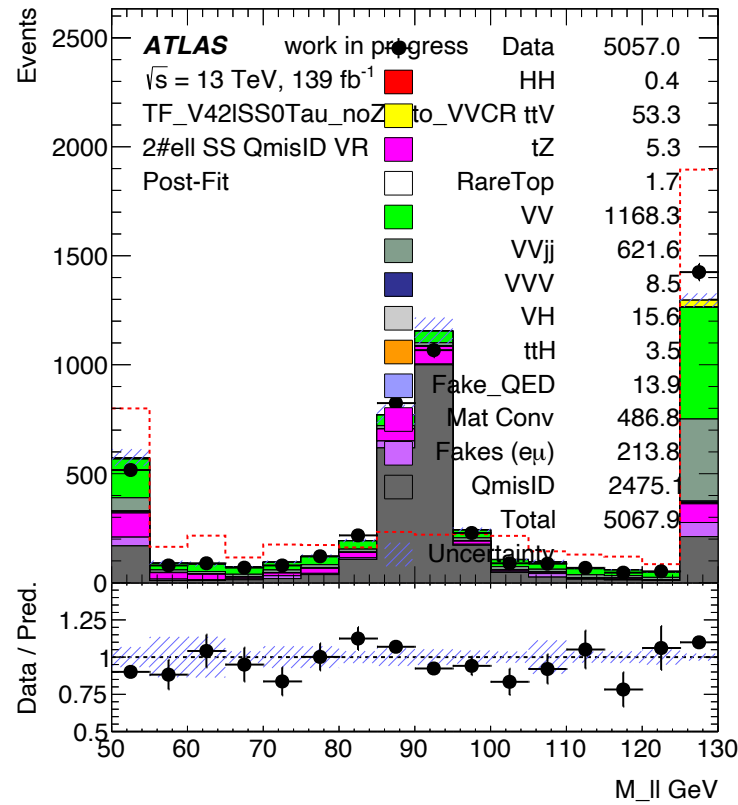
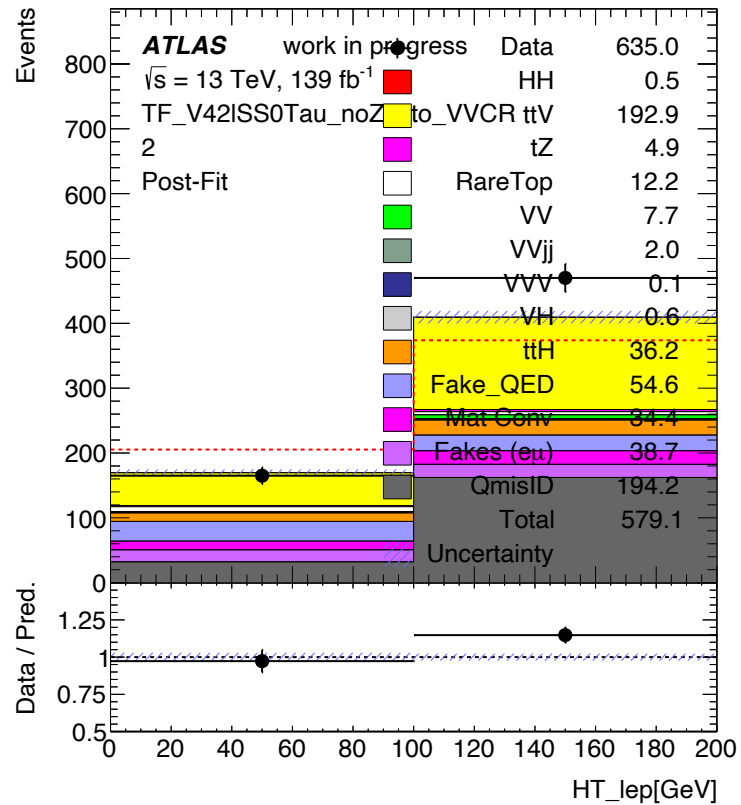
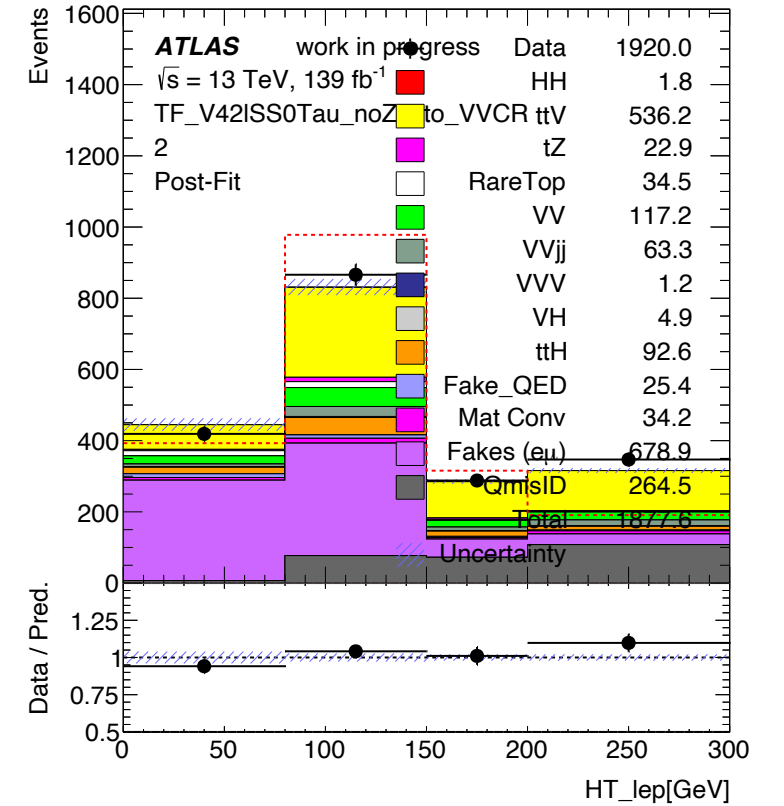
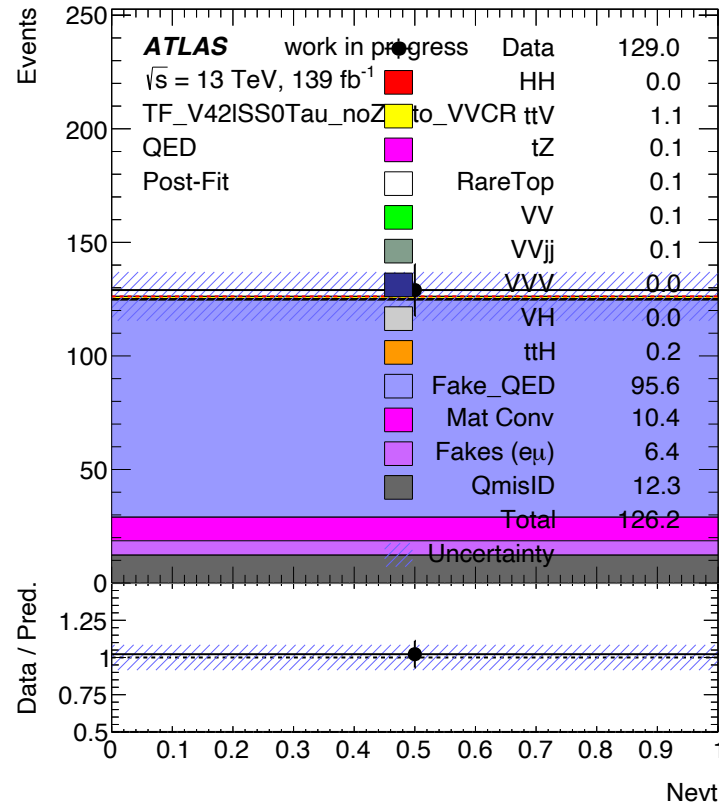
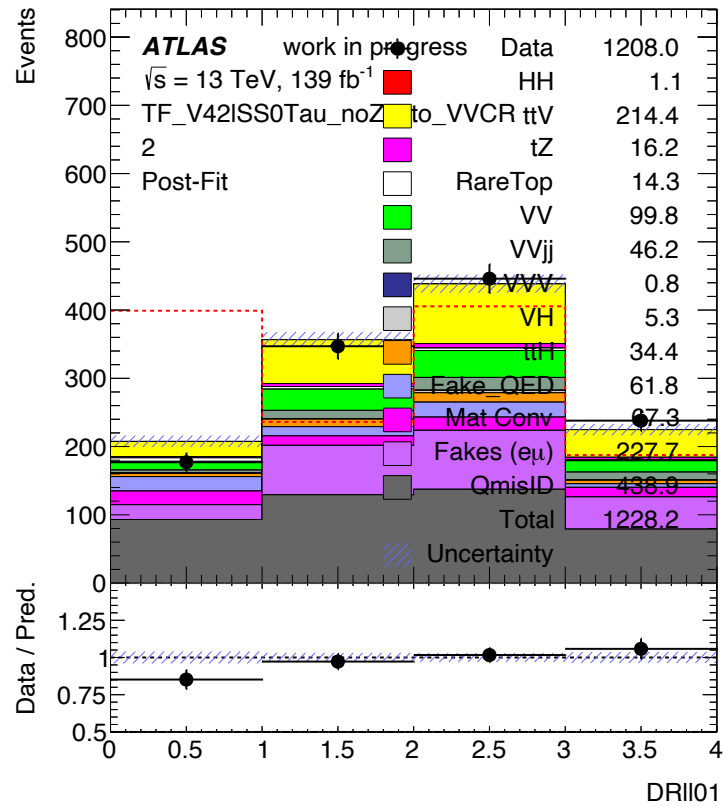
Pre-fit plots

◆ A simplified procedure:

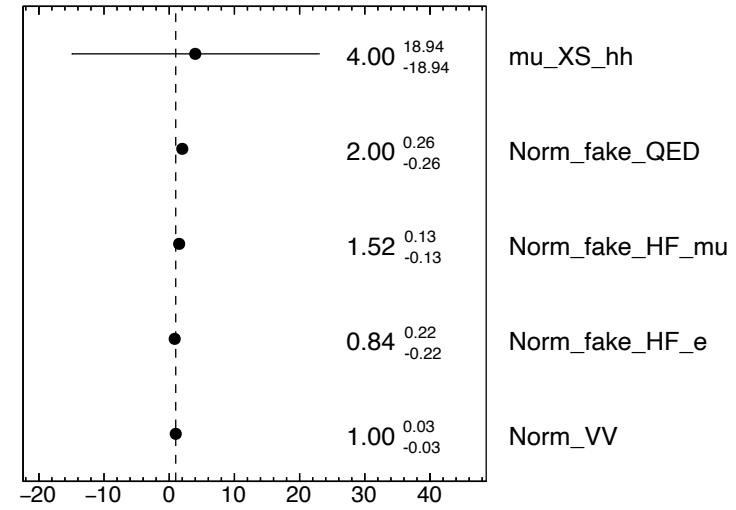
- Use a 3 control region for WZ by requiring an additional lepton. Directly applied a factor to it from 3ℓ . No propagation factor considered yet.
- A k-factor = 1.44 is taken into account before normalizing $W^\pm W^\pm jj$ MC to data.
- The conversion factor is fixed to 1 as the purity looks poor.



Post-fit CR

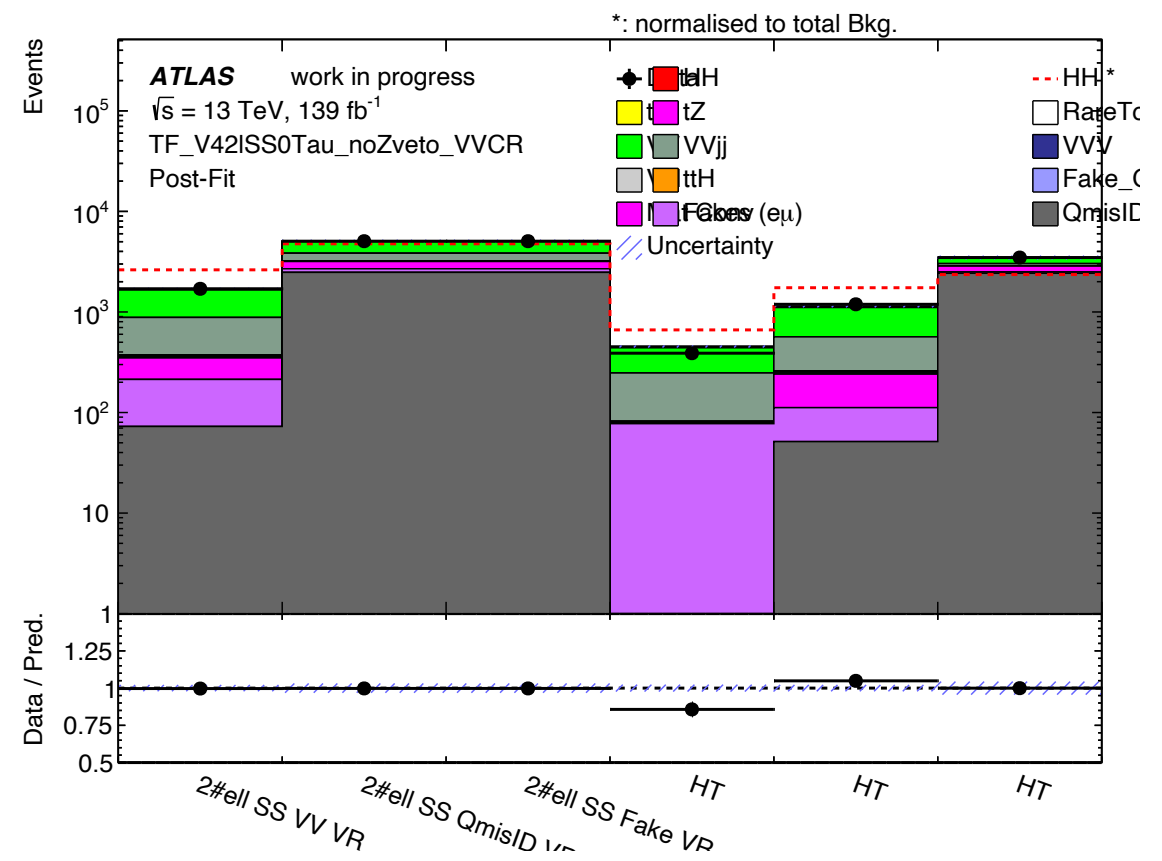


ATLAS work in progress



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Norm_VV	100.0	-20.3	-37.1	6.1	-0.3	-14.4
Norm_fake_HF_e	-20.3	100.0	0.3	-12.0	-58.3	-12.8
Norm_fake_HF_mu	-37.1	0.3	100.0	3.1	-17.6	-30.0
Norm_fake_QED	6.1	-12.0	3.1	100.0	-23.2	-3.3
QmisID	-0.3	-58.3	-17.6	-23.2	100.0	4.3
mu_XS_hh	-14.4	-12.8	-30.0	-3.3	4.3	100.0
	Norm_VV	Norm_fake_HF_e	Norm_fake_HF_mu	Norm_fake_QED	QmisID	mu_XS_hh



Fake uncertainties

Alternative samples for $t\bar{t}$ modeling

- Parton shower, Matrix elements and radiative variation.

Process	Generator	DSID
Nominal $t\bar{t}$	Powheg7 + Pythia8	mc16_13TeV.410470.PhPy8EG_A14_ttbar_hdamp258p75_nonallhad
Alternative PS	Powheg7 + Herwig7.0	mc16_13TeV.410557.PowhegHerwig7EvtGen_H7UE_tt_hdamp258p75_704_SingleLep mc16_13TeV.410558.PowhegHerwig7EvtGen_H7UE_tt_hdamp258p75_704_dil
Alternative PS	Powheg7 + Herwig7.1	mc16_13TeV.411233.PowhegHerwig7EvtGen_tt_hdamp258p75_713_SingleLep mc16_13TeV:mc16_13TeV.411234.PowhegHerwig7EvtGen_tt_hdamp258p75_713_dil
Alternative ME	AMCatNLO + Pythia8	mc16_13TeV.410464.aMcAtNloPy8EvtGen_MEN30NLO_A14N23LO_ttbar_noShWe_SingleLep mc16_13TeV.410465.aMcAtNloPy8EvtGen_MEN30NLO_A14N23LO_ttbar_noShWe_dil

410480-410482

Combination

- Detector systematics are included in partial results (2ℓ , 3ℓ , 4ℓ , $\gamma\gamma$), but not correlated across channels yet.
- If sys is unavailable, combined with stats only.
- Not the final one: Individual updates to be implemented:
 - 3ℓ expected median limit 28.09.
 - $2\ell 2\tau$ expected ~ 40 (not in the table)
 - Tau's data driven bkg and their sys uncertainties.

Channel	Stats. Only (Asimov) $\pm\sigma$	Sys (Asimov) $\pm\sigma$
$2\ell SS$	$32.34^{51.69}_{26.25}$	$35.8^{50.77}_{25.85}$
3ℓ	$34.9^{51.69}_{26.25}$	$35.5^{50.31}_{25.59}$
$4\ell + b\bar{b}$	$28.85^{44.01}_{20.79}$	$28.97^{44.28}_{20.87}$
$2\ell SS 1\tau$	$46.15^{66.60}_{24.77}$	-
$1\ell 2\tau$	$32.7^{49.60}_{23.56}$	-
$\gamma\gamma + \ell s$	$14.98^{21.86}_{10.79}$	$15.00^{21.11}_{10.81}$
Combined	$9.98^{14.33}_{7.19}$	$10.12^{14.54}_{7.29}$