Weekly Report

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Contents

- Slimmed mc samples and data for temporary study. Need more variables
- Correct bkg samples overlapped
  Asked tthml gn1 person, gave me a detailed TrexFitter config file they actually used …

  https://gitlab.cern.ch/atlasHTop/ttHML-fits/blob/master/configs/v9fit_Newdef.config Merve Nazlım's work

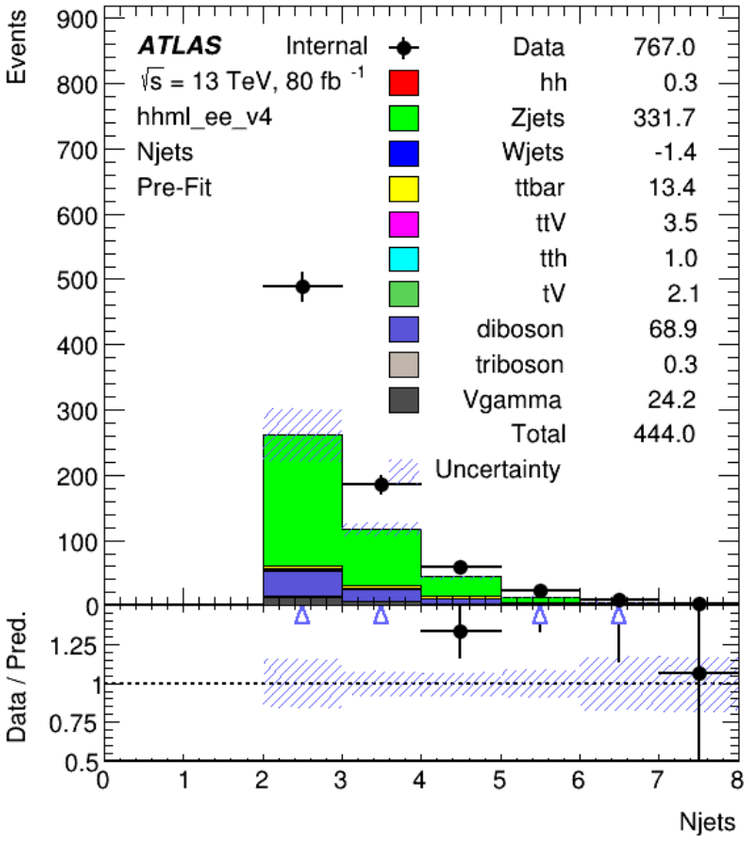
- Fake background study: old framework

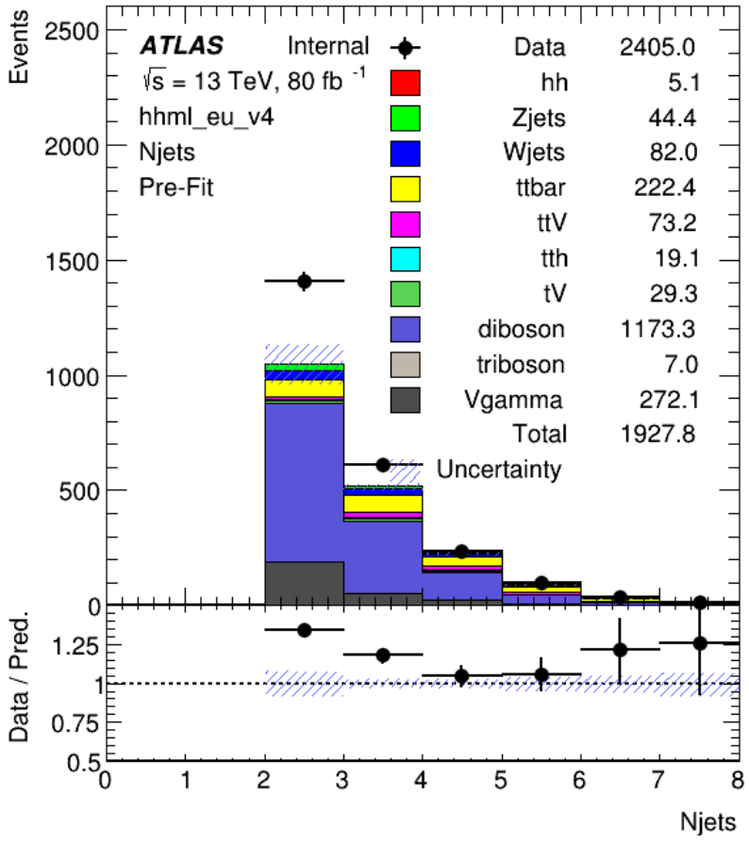
Background estimation of 2LSS

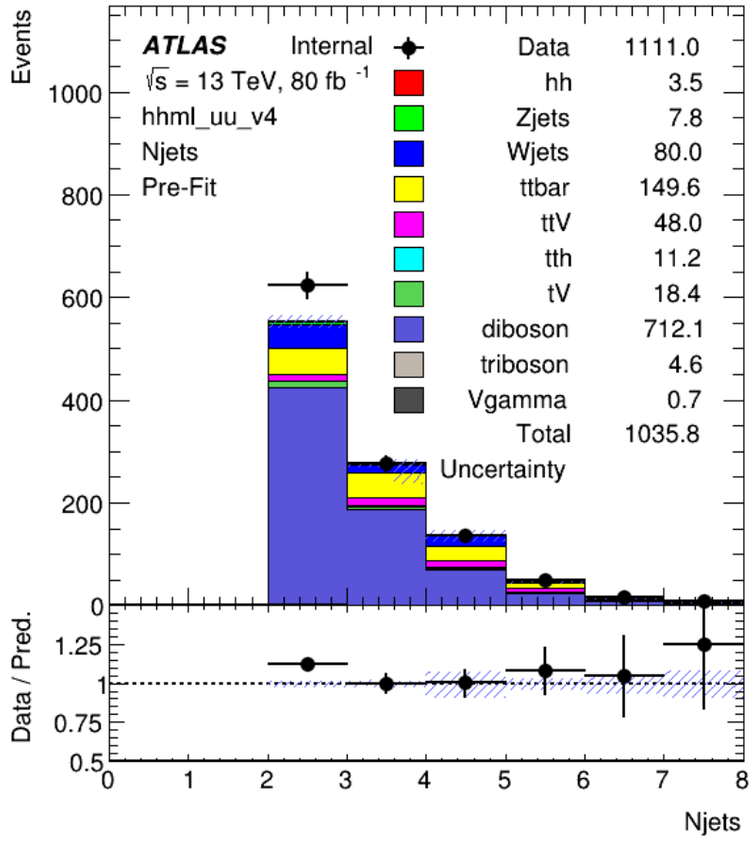
At pre-selection level

2 BDT variable added : PLV, QmisID

Data/MC plot







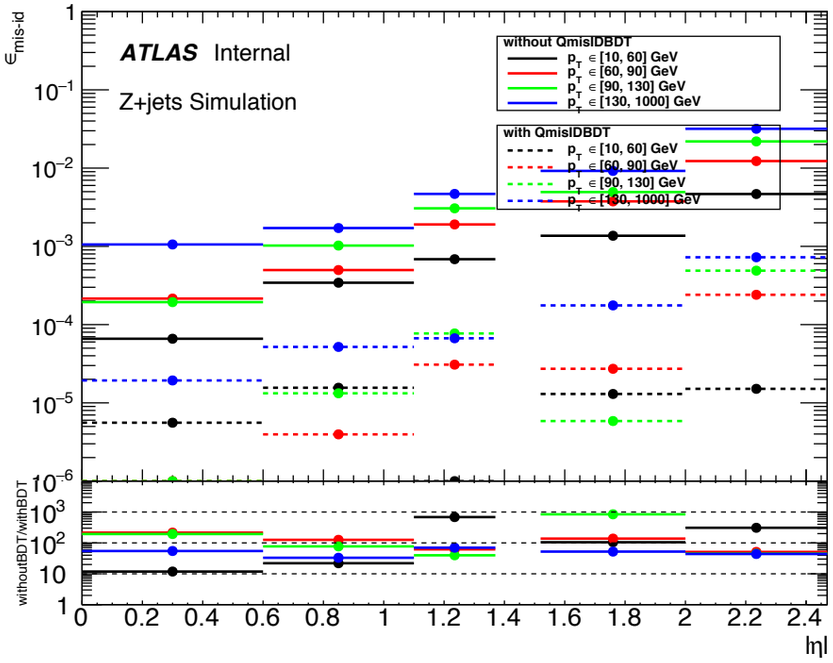
pt*>15GeV, PLV<-0.4,QmisID>0.3

Strategy

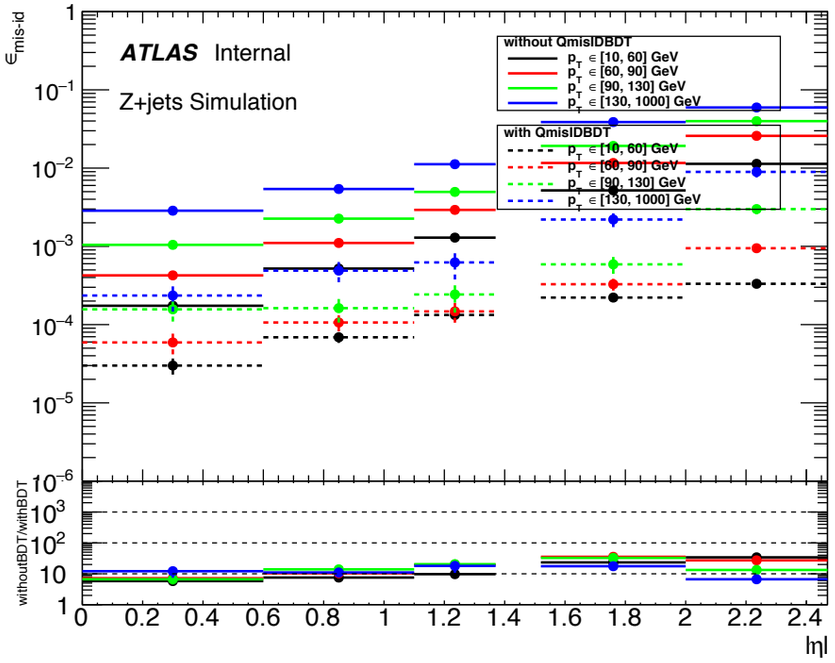
- promptSS, Vgamma : MC
- QmisID, **fake**: data driven

QmisID

BDT improvement



MC ~100



Data ~ 10

For Fake lepton input

Fake factor estimation

- fake factor $\theta_\ell = \frac{N_{\ell\ell}}{N_{\ell\not\ell}}$
- Definition

e
- tight:TightLH,isolationFixedCutTight,ChargeIDBDTTight>0.3
- Anti-tight: Fail TightLH,ChargeIDBDTTight>0.3

muon
- tight:Tight,isolationFixedCutTightTrackOnly
- Anti-tight: Fail isolationFixedCutTightTrackOnly

Fake factor in CR

$$\theta_e(1 \le N_{\text{jet}} \le 2) = \frac{N_{ee}^{\text{data}} - N_{ee}^{\text{promptSS}} - N_{ee}^{V\gamma} - N_{ee}^{\text{QmisID}}}{N_{e\not e}^{\text{data}} - N_{e\not e}^{\text{promptSS}} - N_{e\not e}^{V\gamma} - N_{e\not e}^{\text{QmisIDMC}}} \quad \theta_\mu(1 \le N_{\text{jet}} \le 2) = \frac{N_{\mu\mu}^{\text{data}} - N_{\mu\mu}^{\text{promptSS}} - N_{\mu\mu}^{V\gamma} - N_{\mu\mu}^{\text{QmisID}}}{N_{\mu\not\mu}^{\text{data}} - N_{\mu\not\mu}^{\text{promptSS}} - N_{\mu\not\mu}^{V\gamma} - N_{\mu\not\mu}^{\text{QmisIDMC}}}$$

Election Njets ==1, ff= 1.05 pm 0.06

	VV	ttV	tV	ttH	Vgam	QmisID	Data
ee	&348.67$\pm$3.81	&2.54$\pm$0.13	&4.33$\pm$0.99	&0.39$\pm$0.14	&211.99$\pm$18.34	&14318.03$\pm$119.63	&1991.00
e+antiide	&74.46$\pm$1.77	&0.38$\pm$0.06	&5.30$\pm$1.14	&0.06$\pm$0.01	&128.20$\pm$12.86	&383.94$\pm$71.05	&1559.00

Election Njets ==2, ff= 1.04 pm 0.05

	VV	ttV	tV	ttH	Vgam	QmisID	Data
ee	&574.45$\pm$4.39	&7.75$\pm$0.23	&10.60$\pm$1.52	&1.16$\pm$0.14	&281.54$\pm$21.31	&18176.08$\pm$0.00	&2818.00
e+antiide	&122.20$\pm$2.24	&1.48$\pm$0.11	&10.36$\pm$1.58	&0.37$\pm$0.12	&183.07$\pm$15.29	&534.06$\pm$76.57	&2174.00

muon Njets ==1, ff= 3.36pm0.62

	VV	ttV	tV	ttH	Vgam	Data
mumu	&671.34$\pm$4.47	&12.10$\pm$0.29	&8.16$\pm$1.18	&1.36$\pm$0.14	&0.03$\pm$0.03	&852.00
mu+antiidmu	&19.47$\pm$0.72	&0.34$\pm$0.05	&1.47$\pm$0.59	&0.05$\pm$0.01	&1.03$\pm$1.03	&78.00

muon Njets ==2, ff= 2.85pm0.44

	VV	ttV	tV	ttH	Vgam	Data
mumu	&403.42$\pm$3.96	&4.05$\pm$0.17	&3.13$\pm$0.68	&0.31$\pm$0.02	&0.00$\pm$0.00	&538.00
mu+antiidmu	&12.30$\pm$0.65	&0.11$\pm$0.03	&0.79$\pm$0.41	&0.01$\pm$0.00	&0.00$\pm$0.00	&51.00

- Wrong number about QmisID
- Unexpected fake factor value.

Todo

- Add more branch in Data and MC to construct optimization variables for MVA method.

- Not convert to SR yet due to strange ff. To Solve the bug and get whole Events yields. Prepare Wednesday’s ATLAS meeting.

Backup

Previous 36.1fb result

Selections		VV	$t\bar{t}V$	tV	$t\bar{t}H$	$V\gamma$	QmisID	Data
N_{jet} ==1	ee	204.64±19.13	1.09±0.08	5.08±0.93	0.03±0.01	135.94±12.84	164.46±0.65	976
	$e\not{e}$	44.26±3.51	0.13±0.03	8.25±1.32	0.00±0.00	67.33±10.49	135.54±71.62	1116

Selections		VV	$t\bar{t}V$	tV	$t\bar{t}H$	$V\gamma$	Data
N_{jet} ==1	$\mu\mu$	296.37±9.72	1.92±0.11	5.91±1.01	0.02±0.02	0.00±0.00	455
	$\mu\not{\mu}$	56.84±5.00	0.13±0.03	20.80±2.34	0.00±0.00	0.63±0.45	378

Selections		VV	$t\bar{t}V$	tV	$t\bar{t}H$	$V\gamma$	QmisID	Data
$1 \leq N_{\text{jet}} \leq 2$	ee	309.38±19.75	3.67±0.16	11.27±1.47	0.10±0.02	213.30±17.29	230.40±0.81	1434
	$e\not{e}$	66.58±5.19	0.39±0.06	15.85±1.89	0.02±0.01	104.00±12.71	187.16±78.65	1591

Selections		VV	$t\bar{t}V$	tV	$t\bar{t}H$	$V\gamma$	Data
$1 \leq N_{\text{jet}} \leq 2$	$\mu\mu$	463.01±11.61	6.14±0.21	15.20±2.26	0.17±0.03	0.01±0.01	729
	$\mu\not{\mu}$	74.30±5.40	0.45±0.06	43.59±3.37	0.02±0.01	1.62±0.74	658