

Status of 4Top analysis

Huiling Hua¹, Fabio lemmi¹, Duncan Leggat², Hongbo Liao¹, Hideki Okawa², Yu Zhang²

1,IHEP, 2,Fudan University

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Selection and sample

Selection

- GoldenJson on data
- METFilter
- Trigger
- Preselection
 - $HT > 500$ GeV
 - one loose tau
 - at least 6 jets
 - $pT_{jet6} > 40$ GeV
 - two loose b jets

	N_τ	N_{lep}	N_{jet}	N_{bjet}
1Tau0L	== 1	== 0	≥ 8	≥ 2
1Tau1L	== 1	== 1	≥ 6	≥ 2
1Tau2L	== 1	== 2	≥ 6	≥ 2
2Tau0L	== 2	== 0	≥ 8	≥ 2
2Tau1L	== 2	== 1	≥ 6	≥ 2

Sample

- signal mc : 2016/mc/tttt/outTree_0.root, first 10k events
- data : 2016/data/jetHT_2016F/out_0.root, first 500k events

Scale factors

- Prefire
- Pile-up
- Trigger
- Lepton
 - Electron RECO, ID
 - Muon RECO, ID
- Tau
- BTag
- JER

TTTT

tttt test	Nentries	Weighted	sumOfWeight	cross section	Lumi	yield
1Tau0L	191	1.040	79.543	11.970	19.500	3.052
1Tau1L	107	0.845	95.695	11.970	19.500	2.062
1Tau2L	17	0.091	95.695	11.970	19.500	0.223
1Tau3L	0	0.000	79.543	11.970	19.500	0.000
2Tau0L	10	0.087	79.543	11.970	19.500	0.256
2Tau1L	3	0.046	95.695	11.970	19.500	0.112
2Tau2L	0	0.000	95.695	11.970	19.500	0.000

Table: raw entries, weighted entries, sumOfWeight, cross section in categories

- sumOfWeight is $\sum genWeight$ in 1Tau0L and 2Tau0L or $\sum genWeight * W_{btag}$ in 1Tau1L, 1Tau2L and 2Tau1L.

	raw entries	weighted	step-by-step eff	overall eff
Initial	10000.0	69.651	1.00000	1.00000
METFilter	9975.0	69.512	0.99801	0.99801
Trigger	9310.0	64.443	0.92707	0.92522
HT > 500 GeV	8277.0	55.889	0.86727	0.80242
$N_{\text{loose}} - \tau$	2101.0	14.199	0.25405	0.20386
$N_{\text{jet}} \geq 6$	1962.0	13.154	0.92641	0.18885
$pT_{\text{jet}6} > 40$ GeV	1579.0	10.350	0.78682	0.14859
$N_{\text{loose}} - b_{\text{jet}} \geq 2$	1563.0	10.344	0.99942	0.14851
N_{τ}	392.0	2.545	0.24606	0.03654
N_{lep}	256.0	1.555	0.61083	0.02232
N_{jet}	206.0	1.160	0.74610	0.01665
$N_{b_{\text{jet}}}$	191.0	1.040	0.89676	0.01493

Table: cutflow of category 1Tau0L

- "weighted" includes all the scale factors.

	raw entries	weighted	step-by-step eff	overall eff
Initial	10000.0	69.651	1.00000	1.00000
METFilter	9975.0	69.512	0.99801	0.99801
Trigger	9310.0	64.443	0.92707	0.92522
HT > 500 GeV	8277.0	55.889	0.86727	0.80242
$N_{\text{loose}} - \tau$	2101.0	14.199	0.25405	0.20386
$N_{\text{jet}} \geq 6$	1962.0	13.154	0.92641	0.18885
$pT_{\text{jet}6} > 40$ GeV	1579.0	10.350	0.78682	0.14859
$N_{\text{loose}} - b_{\text{jet}} \geq 2$	1563.0	10.344	0.99942	0.14851
N_{τ}	392.0	2.545	0.24606	0.03654
N_{lep}	115.0	0.876	0.34411	0.01257
N_{jet}	115.0	0.876	1.00000	0.01257
$N_{b_{\text{jet}}}$	107.0	0.845	0.96525	0.01214

Table: cutflow of category 1Tau1L

- "weighted" includes all the scale factors.

	raw entries	weighted	step-by-step eff	overall eff
Initial	10000.0	69.651	1.00000	1.00000
METFilter	9975.0	69.512	0.99801	0.99801
Trigger	9310.0	64.443	0.92707	0.92522
HT > 500 GeV	8277.0	55.889	0.86727	0.80242
$N_{\text{loose}} - \tau$	2101.0	14.199	0.25405	0.20386
$N_{\text{jet}} \geq 6$	1962.0	13.154	0.92641	0.18885
$pT_{\text{jet}6} > 40$ GeV	1579.0	10.350	0.78682	0.14859
$N_{\text{loose}} - b_{\text{jet}} \geq 2$	1563.0	10.344	0.99942	0.14851
N_{τ}	392.0	2.545	0.24606	0.03654
N_{lep}	21.0	0.115	0.04506	0.00165
N_{jet}	21.0	0.115	1.00000	0.00165
$N_{b_{\text{jet}}}$	17.0	0.091	0.79585	0.00131

Table: cutflow of category 1Tau2L

- "weighted" includes all the scale factors.

	raw entries	weighted	step-by-step eff	overall eff
Initial	10000.0	69.651	1.00000	1.00000
METFilter	9975.0	69.512	0.99801	0.99801
Trigger	9310.0	64.443	0.92707	0.92522
HT > 500 GeV	8277.0	55.889	0.86727	0.80242
$N_{\text{loose}} - \tau$	2101.0	14.199	0.25405	0.20386
$N_{\text{jet}} \geq 6$	1962.0	13.154	0.92641	0.18885
$pT_{\text{jet}6} > 40$ GeV	1579.0	10.350	0.78682	0.14859
$N_{\text{loose}} - b_{\text{jet}} \geq 2$	1563.0	10.344	0.99942	0.14851
N_{τ}	13.0	0.133	0.01289	0.00191
N_{lep}	10.0	0.087	0.65505	0.00125
N_{jet}	10.0	0.087	1.00000	0.00125
$N_{b_{\text{jet}}}$	10.0	0.087	1.00000	0.00125

Table: cutflow of category 2Tau0L

- "weighted" includes all the scale factors.

	raw entries	weighted	step-by-step eff	overall eff
Initial	10000.0	69.651	1.00000	1.00000
METFilter	9975.0	69.512	0.99801	0.99801
Trigger	9310.0	64.443	0.92707	0.92522
HT > 500 GeV	8277.0	55.889	0.86727	0.80242
$N_{\text{loose}} - \tau$	2101.0	14.199	0.25405	0.20386
$N_{\text{jet}} \geq 6$	1962.0	13.154	0.92641	0.18885
$pT_{\text{jet}6} > 40$ GeV	1579.0	10.350	0.78682	0.14859
$N_{\text{loose}} - b_{\text{jet}} \geq 2$	1563.0	10.344	0.99942	0.14851
N_{τ}	13.0	0.133	0.01289	0.00191
N_{lep}	3.0	0.046	0.34495	0.00066
N_{jet}	3.0	0.046	1.00000	0.00066
$N_{b_{\text{jet}}}$	3.0	0.046	1.00000	0.00066

Table: cutflow of category 2Tau1L

- "weighted" includes all the scale factors.

	raw entries	step-by-step eff	overall eff
Init	24231.0	1.00000	1.00000
pT	18077.0	0.74603	0.74603
eta	18044.0	0.99817	0.74467
ID	3182.0	0.17635	0.13132
ISO(already in ID)	3182.0	1.00000	0.13132
Trig emu (not applied)	3182.0	1.00000	0.13132
IP	2963.0	0.93118	0.12228
convVeto and missingHits	2790.0	0.94161	0.11514

Table: cutflow of Electron

	raw entries	step-by-step eff	overall eff
Init	18338.0	1.00000	1.00000
pT	11506.0	0.62744	0.62744
eta	11499.0	0.99939	0.62706
ID	8245.0	0.71702	0.44961
IP	5443.0	0.66016	0.29682
ISO	3845.0	0.70641	0.20967

Table: cutflow of Muon

	raw entries	step-by-step eff	overall eff
l _{init}	15605.0	1.00000	1.00000
p _T	12191.0	0.78122	0.78122
eta	11840.0	0.97121	0.75873
IP	11611.0	0.98066	0.74406
decayMode	7515.0	0.64723	0.48158
V _{Sjet}	4377.0	0.58244	0.28049
V _{Se}	3642.0	0.83208	0.23339
V _{Smu}	791.0	0.21719	0.05069

Table: cutflow of Tau

	raw entries	step-by-step eff	overall eff
Init	130142.0	1.00000	1.00000
pT	100817.0	0.77467	0.77467
eta	93046.0	0.92292	0.71496
ID	92517.0	0.99431	0.71089
BTag	27683.0	0.29922	0.21271

Table: cutflow of Jet

JetHT 2016F postAPV

jetHT 2016F test	Nentries	Weighted	sumOfWeight	cross section	Lumi	yield
1Tau0L	7	7.000	483375.000	1.000	19.500	0.000
1Tau1L	1	1.000	483375.000	1.000	19.500	0.000
1Tau2L	0	0.000	483375.000	1.000	19.500	0.000
1Tau3L	0	0.000	483375.000	1.000	19.500	0.000
2Tau0L	0	0.000	483375.000	1.000	19.500	0.000
2Tau1L	0	0.000	483375.000	1.000	19.500	0.000
2Tau2L	0	0.000	483375.000	1.000	19.500	0.000

Table: raw entries, weighted entries, sumOfWeight, cross section in categories

	raw entries	weighted	step-by-step eff	overall eff
Initial	483375.0	483375.000	1.00000	1.00000
METFilter	476660.0	476660.000	0.98611	0.98611
Trigger	171694.0	171694.000	0.36020	0.35520
HT > 500 GeV	115715.0	115715.000	0.67396	0.23939
$N_{loose - \tau}$	4448.0	4448.000	0.03844	0.00920
$N_{jet} \geq 6$	2461.0	2461.000	0.55328	0.00509
$pT_{jet6} > 40$ GeV	994.0	994.000	0.40390	0.00206
$N_{loose - bjet} \geq 2$	618.0	618.000	0.62173	0.00128
N_{τ}	64.0	64.000	0.10356	0.00013
N_{lep}	62.0	62.000	0.96875	0.00013
N_{jet}	22.0	22.000	0.35484	0.00005
N_{bjet}	7.0	7.000	0.31818	0.00001

Table: cutflow of category 1Tau0L

	raw entries	weighted	step-by-step eff	overall eff
Initial	483375.0	483375.000	1.00000	1.00000
METFilter	476660.0	476660.000	0.98611	0.98611
Trigger	171694.0	171694.000	0.36020	0.35520
HT > 500 GeV	115715.0	115715.000	0.67396	0.23939
$N_{loose} - \tau$	4448.0	4448.000	0.03844	0.00920
$N_{jet} \geq 6$	2461.0	2461.000	0.55328	0.00509
$pT_{jet6} > 40$ GeV	994.0	994.000	0.40390	0.00206
$N_{loose} - bjet \geq 2$	618.0	618.000	0.62173	0.00128
N_{τ}	64.0	64.000	0.10356	0.00013
N_{lep}	2.0	2.000	0.03125	0.00000
N_{jet}	2.0	2.000	1.00000	0.00000
N_{bjet}	1.0	1.000	0.50000	0.00000

Table: cutflow of category 1Tau1L

	raw entries	weighted	step-by-step eff	overall eff
Initial	483375.0	483375.000	1.00000	1.00000
METFilter	476660.0	476660.000	0.98611	0.98611
Trigger	171694.0	171694.000	0.36020	0.35520
HT > 500 GeV	115715.0	115715.000	0.67396	0.23939
$N_{loose - \tau}$	4448.0	4448.000	0.03844	0.00920
$N_{jet} \geq 6$	2461.0	2461.000	0.55328	0.00509
$pT_{jet6} > 40$ GeV	994.0	994.000	0.40390	0.00206
$N_{loose - bjet} \geq 2$	618.0	618.000	0.62173	0.00128
N_{τ}	64.0	64.000	0.10356	0.00013
N_{lep}	0.0	0.000	0.00000	0.00000
N_{jet}	0.0	0.000	-nan	0.00000
N_{bjet}	0.0	0.000	-nan	0.00000

Table: cutflow of category 1Tau2L

	raw entries	weighted	step-by-step eff	overall eff
Initial	483375.0	483375.000	1.00000	1.00000
METFilter	476660.0	476660.000	0.98611	0.98611
Trigger	171694.0	171694.000	0.36020	0.35520
HT > 500 GeV	115715.0	115715.000	0.67396	0.23939
$N_{loose} - \tau$	4448.0	4448.000	0.03844	0.00920
$N_{jet} \geq 6$	2461.0	2461.000	0.55328	0.00509
$pT_{jet6} > 40$ GeV	994.0	994.000	0.40390	0.00206
$N_{loose} - bjet \geq 2$	618.0	618.000	0.62173	0.00128
N_{τ}	0.0	0.000	0.00000	0.00000
N_{lep}	0.0	0.000	-nan	0.00000
N_{jet}	0.0	0.000	-nan	0.00000
N_{bjet}	0.0	0.000	-nan	0.00000

Table: cutflow of category 2Tau0L

	raw entries	weighted	step-by-step eff	overall eff
Initial	483375.0	483375.000	1.00000	1.00000
METFilter	476660.0	476660.000	0.98611	0.98611
Trigger	171694.0	171694.000	0.36020	0.35520
HT > 500 GeV	115715.0	115715.000	0.67396	0.23939
$N_{loose - \tau}$	4448.0	4448.000	0.03844	0.00920
$N_{jet} \geq 6$	2461.0	2461.000	0.55328	0.00509
$pT_{jet6} > 40$ GeV	994.0	994.000	0.40390	0.00206
$N_{loose - bjet} \geq 2$	618.0	618.000	0.62173	0.00128
N_{τ}	0.0	0.000	0.00000	0.00000
N_{lep}	0.0	0.000	-nan	0.00000
N_{jet}	0.0	0.000	-nan	0.00000
N_{bjet}	0.0	0.000	-nan	0.00000

Table: cutflow of category 2Tau1L

	raw entries	step-by-step eff	overall eff
Init	419666.0	1.00000	1.00000
pT	274492.0	0.65407	0.65407
eta	273938.0	0.99798	0.65275
ID	1918.0	0.00700	0.00457
ISO(already in ID)	1918.0	1.00000	0.00457
Trig emu (not applied)	1918.0	1.00000	0.00457
IP	1255.0	0.65433	0.00299
convVeto and missingHits	1111.0	0.88526	0.00265

Table: cutflow of Electron

	raw entries	step-by-step eff	overall eff
Init	341036.0	1.00000	1.00000
pT	174848.0	0.51270	0.51270
eta	174487.0	0.99794	0.51164
ID	21580.0	0.12368	0.06328
IP	9320.0	0.43188	0.02733
ISO	906.0	0.09721	0.00266

Table: cutflow of Muon

	raw entries	step-by-step eff	overall eff
Init	141375.0	1.00000	1.00000
pT	85069.0	0.60173	0.60173
eta	78083.0	0.91788	0.55231
IP	64185.0	0.82201	0.45401
decayMode	17199.0	0.26796	0.12166
VSjet	2701.0	0.15704	0.01911
VSe	2372.0	0.87819	0.01678
VSmu	1766.0	0.74452	0.01249

Table: cutflow of Tau

	raw entries	step-by-step eff	overall eff
Init	3875269.0	1.00000	1.00000
pT	2370472.0	0.61169	0.61169
eta	2055205.0	0.86700	0.53034
ID	2050048.0	0.99749	0.52901
BTag	184653.0	0.09007	0.04765

Table: cutflow of Jet