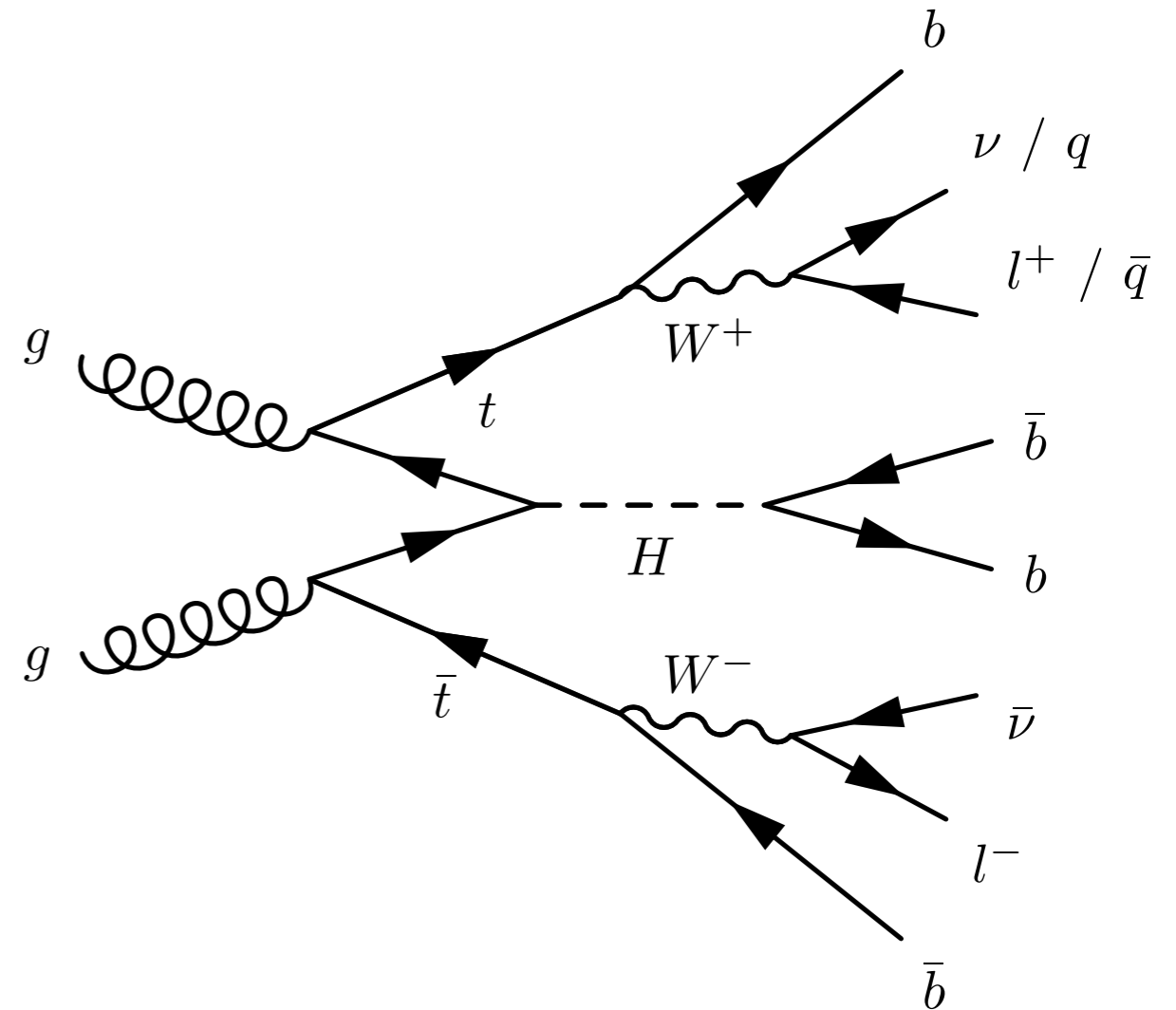


Search for $ttH(bb)$ in the single and OS dilepton channels

Stefan Guindon

*University at Albany,
State University of New York*

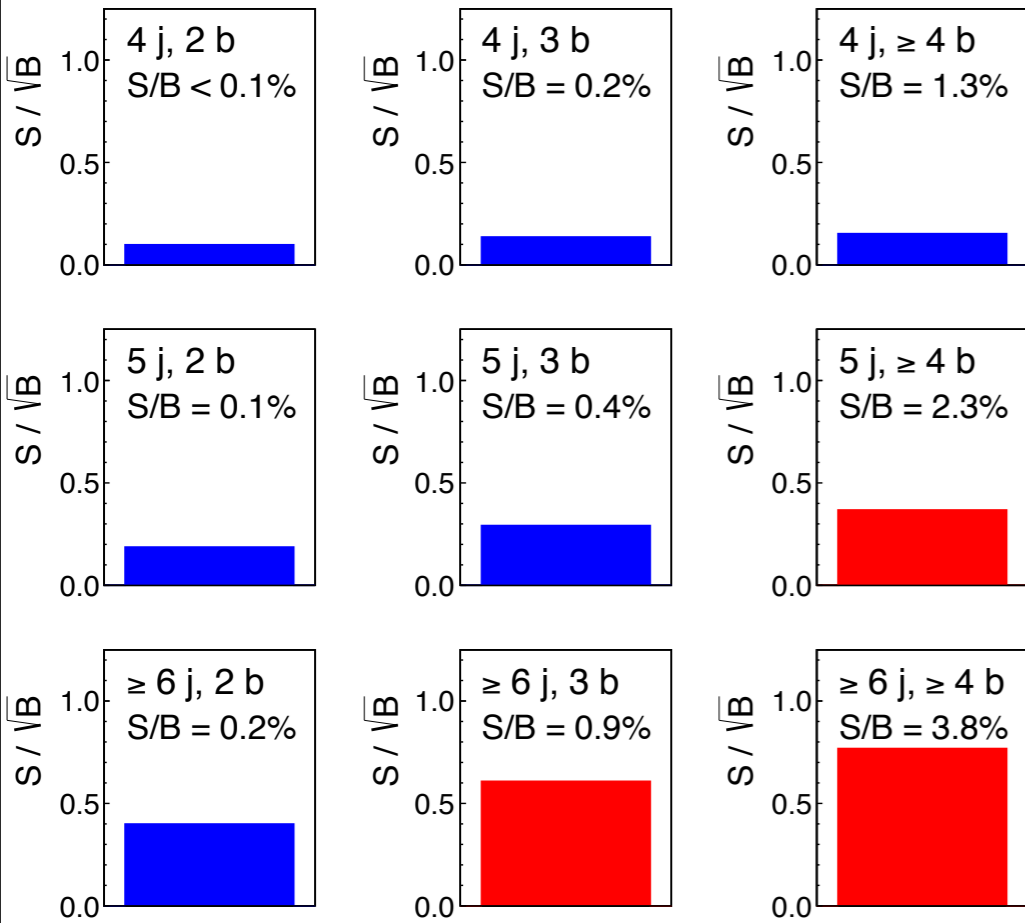
April 3rd, 2014



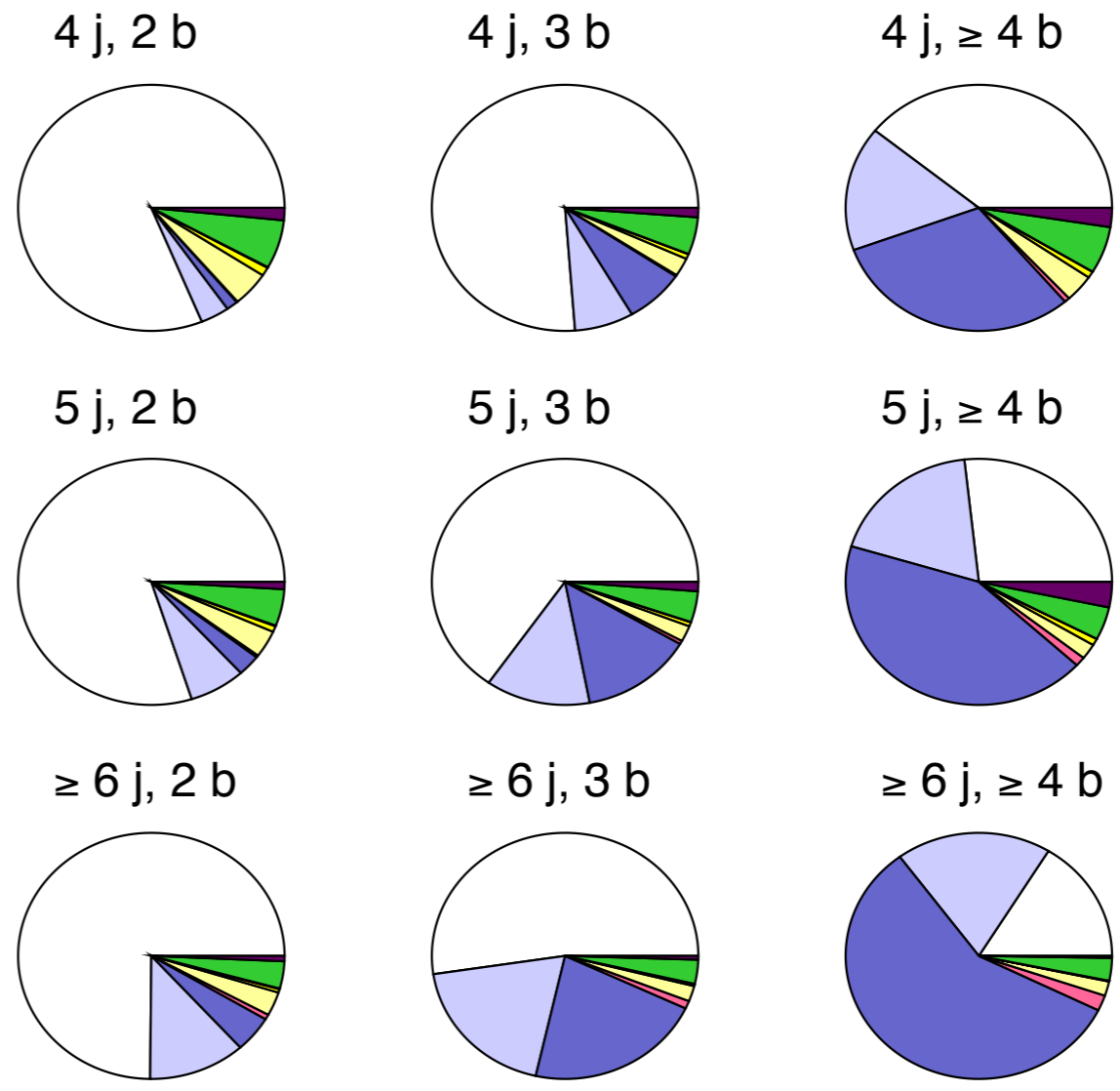
Backgrounds

ATLAS Preliminary Simulation

$\sqrt{s} = 8 \text{ TeV}, \int L dt = 20.3 \text{ fb}^{-1}$



Single lepton
 $m_H = 125 \text{ GeV}$

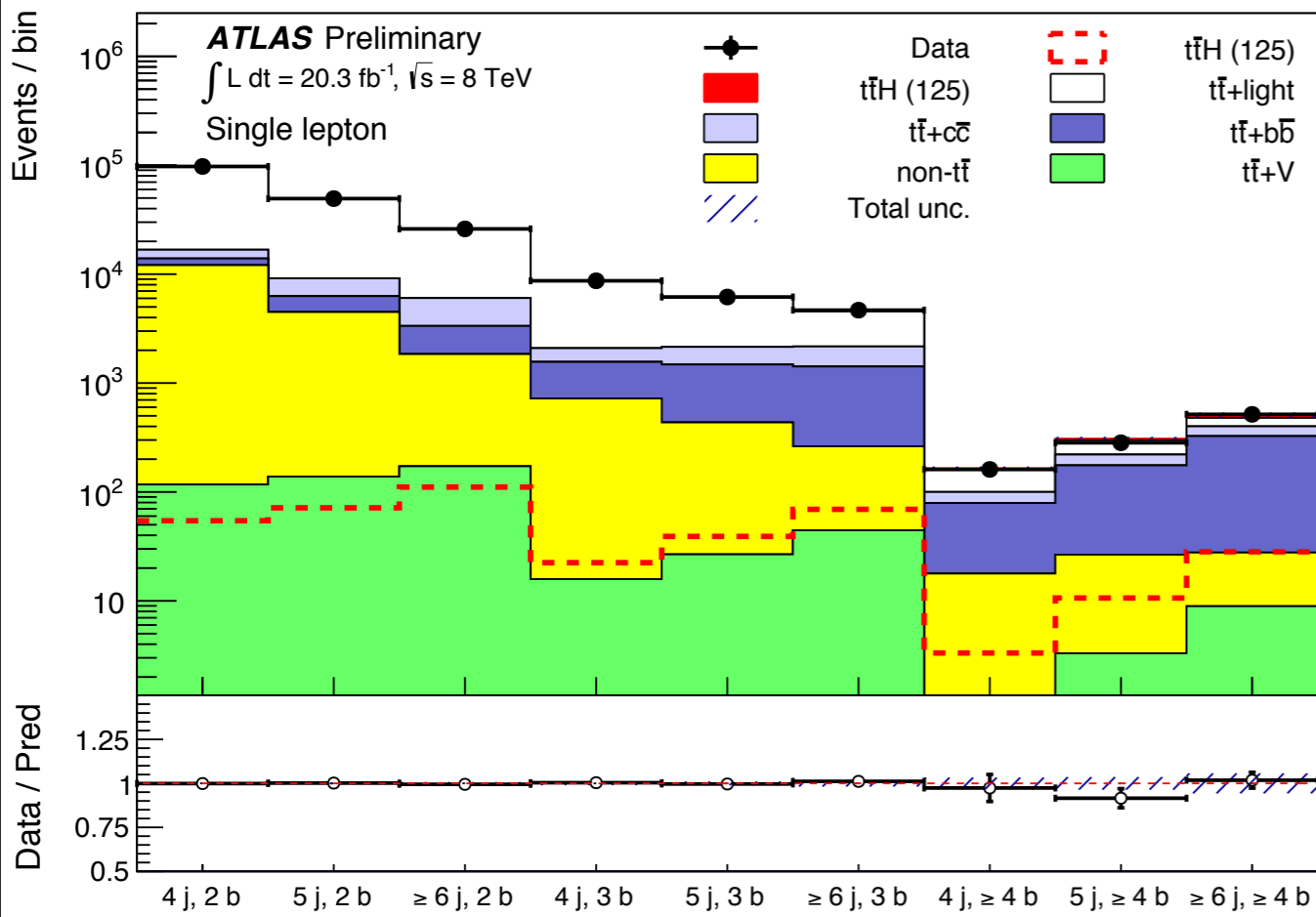


ATLAS Preliminary Simulation
 $m_H = 125 \text{ GeV}$
 $\sqrt{s} = 8 \text{ TeV}$

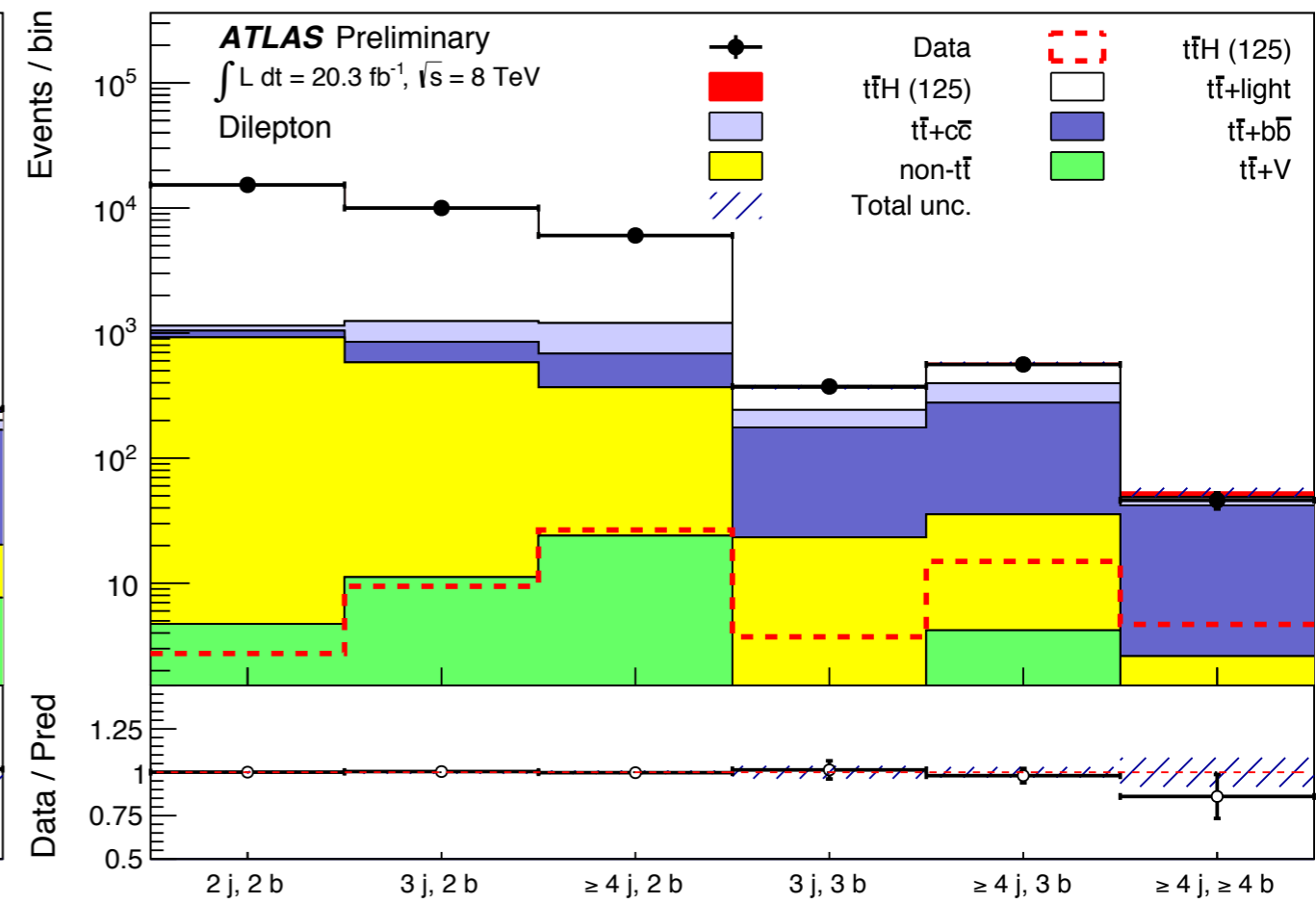
- $t\bar{t}$ +light
- $t\bar{t}$ + $c\bar{c}$
- $t\bar{t}$ + $b\bar{b}$
- $t\bar{t}$ +V
- W+jets
- Z+jets
- Diboson
- Single top
- Multijet

Single lepton

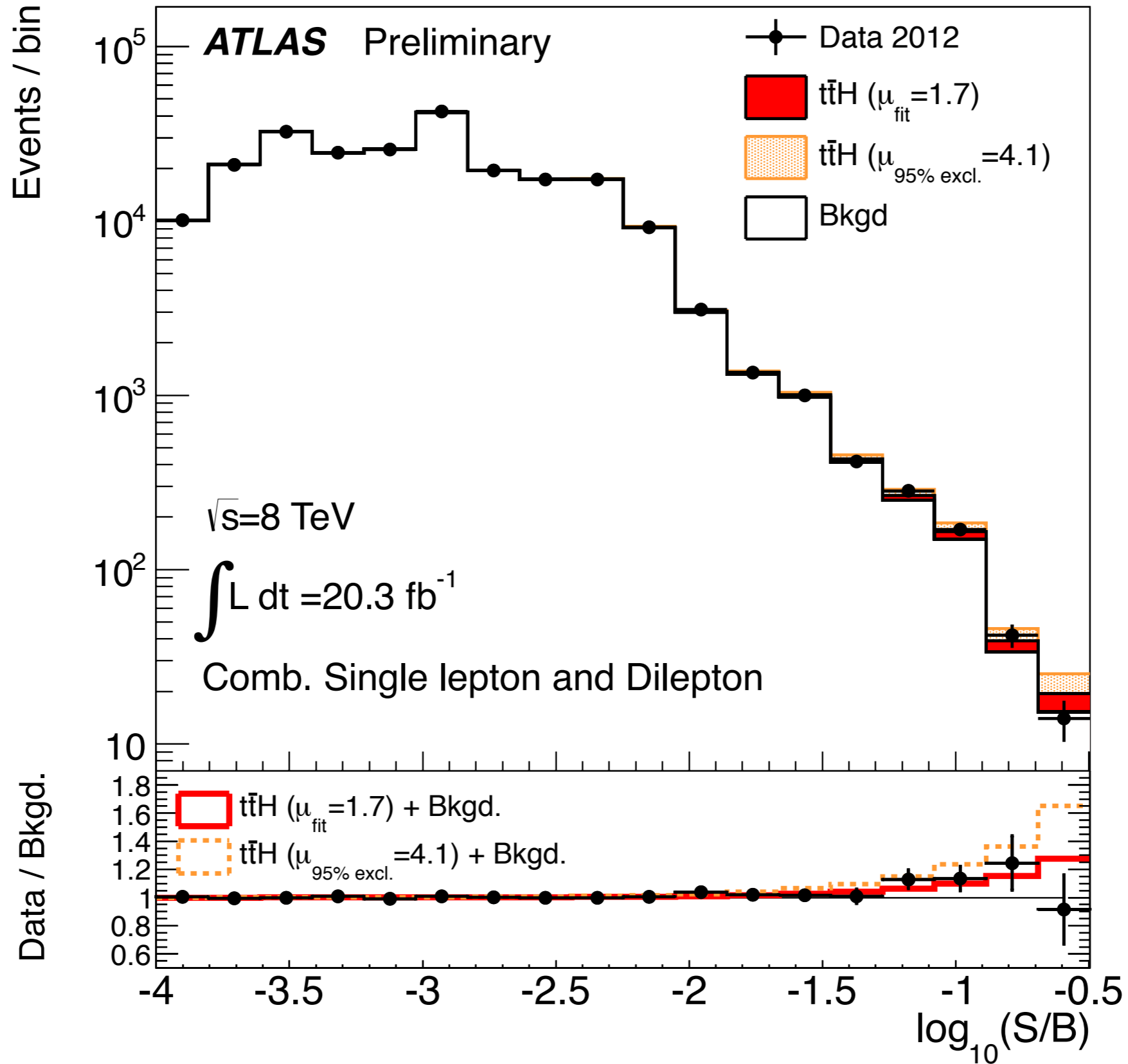
Single Lepton



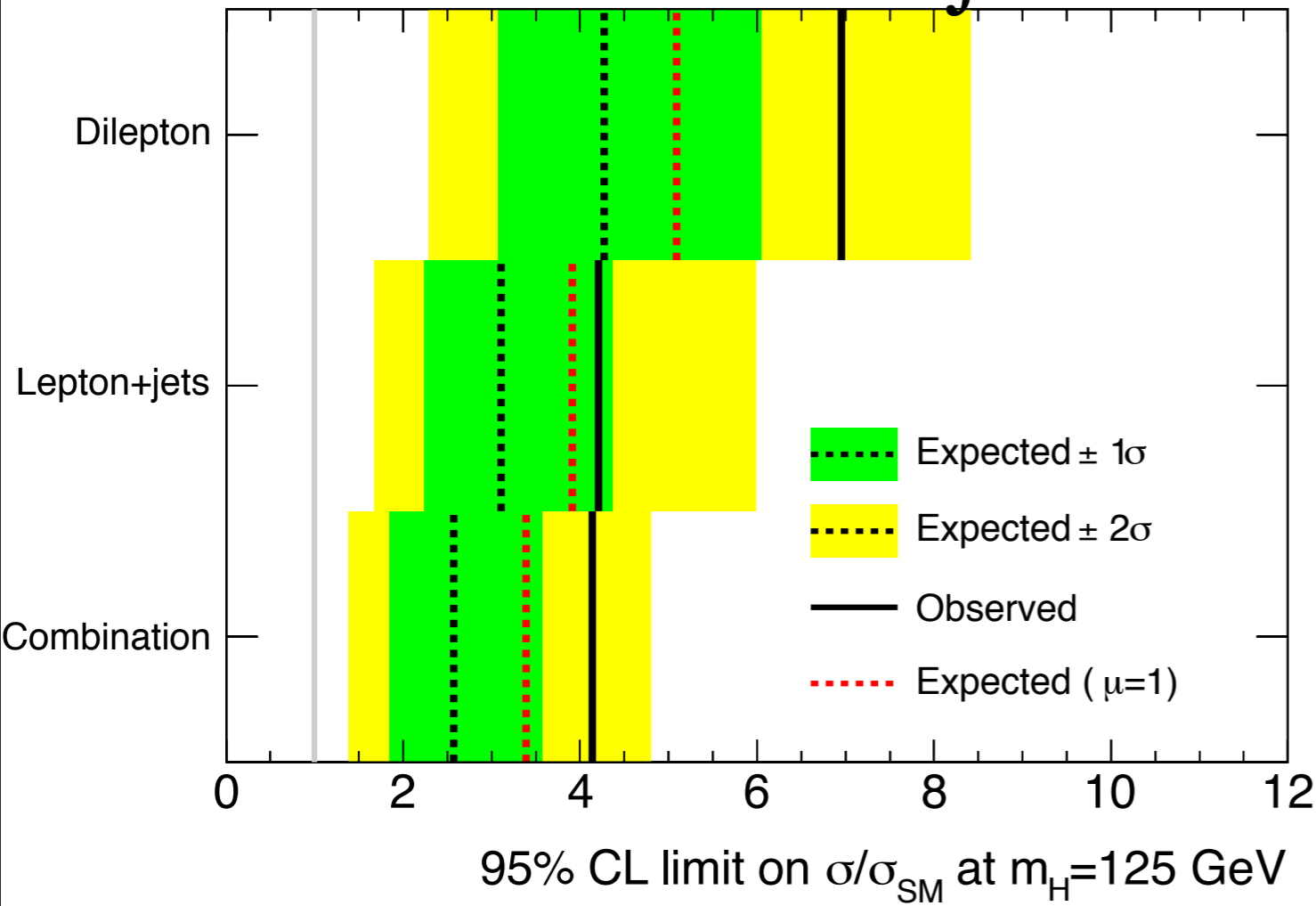
Dilepton



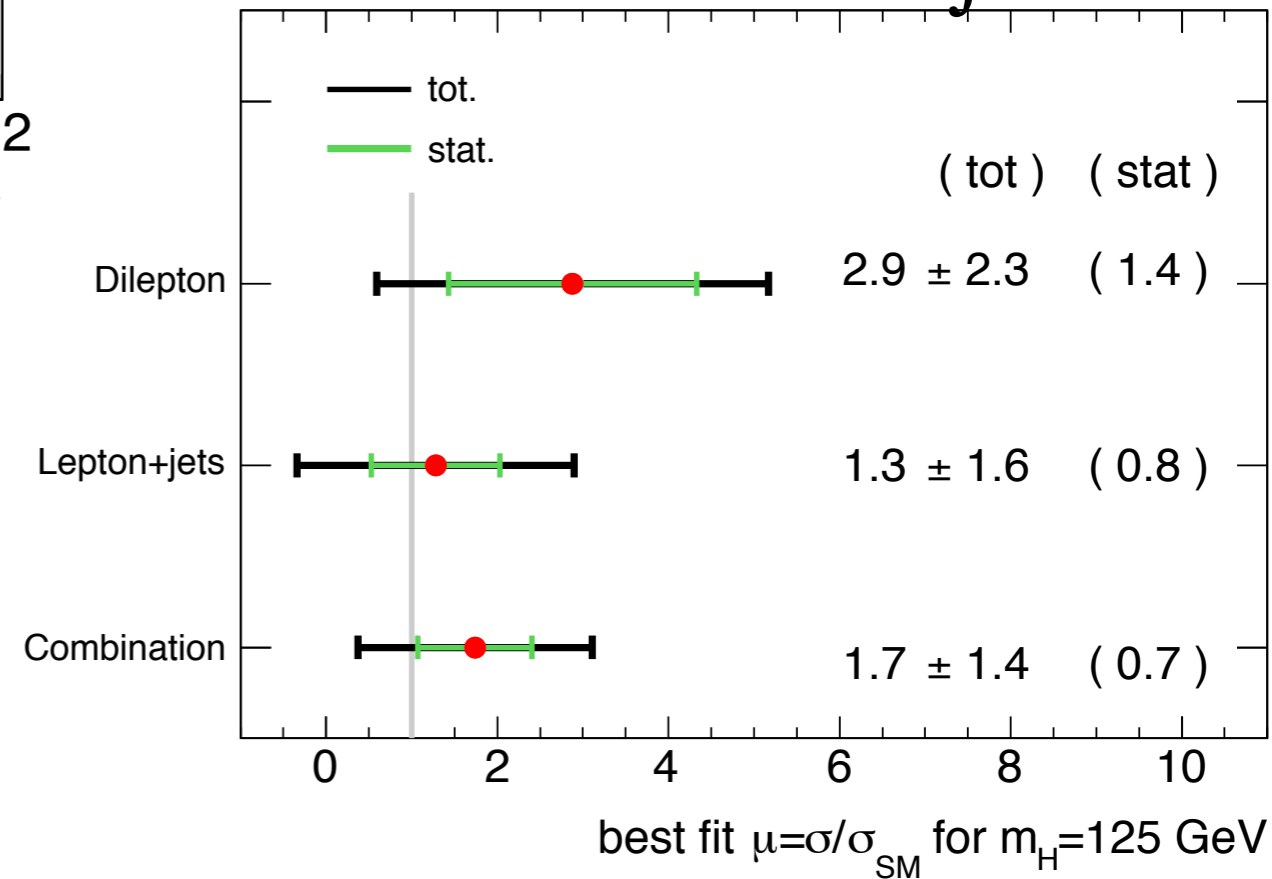
Fit Results



ATLAS Preliminary $\sqrt{s}=8$ TeV, $\int L dt=20.3$ fb $^{-1}$



ATLAS Preliminary $\sqrt{s}=8$ TeV, $\int L dt=20.3$ fb $^{-1}$





Back-up Slides

ATLAS and CMS Object Cuts

	CMS	ATLAS
Lepton pT	30 GeV	25 GeV
Lepton Eta	< 2.1	< 2.5
Jet pT	(40 GeV jet 1-3) 30 GeV	25 GeV
Jet Eta	< 2.4	< 2.5
Jet Algorithm	Anti kT 0.5	Anti kT 0.4
b-tagging	70% b / 20% c / 2% l	70% b / 20% c / 1% l

Yields in CMS and ATLAS

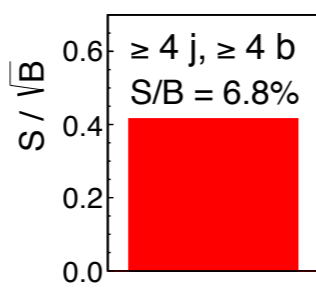
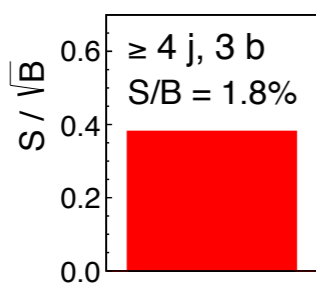
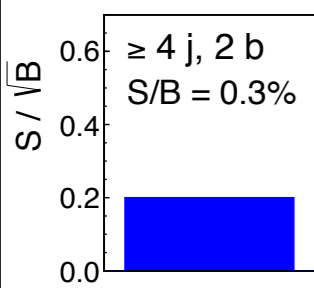
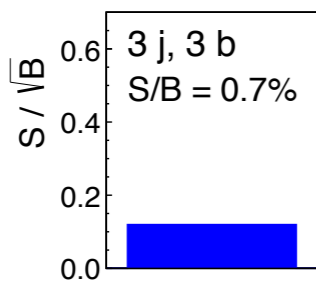
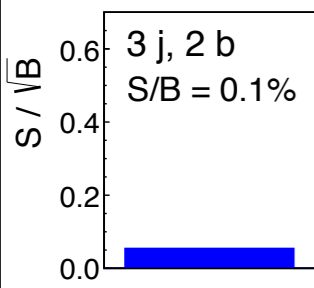
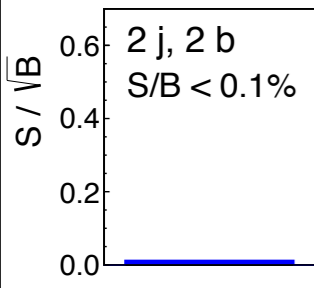
	4 jets / 4 b-tags			5 jets / 4 b-tags			6 jets / 4 b-tags		
	CMS	ATLAS	Diff. (%)	CMS	ATLAS	Diff. (%)	CMS	ATLAS	Diff. (%)
ttH	1.8	1.8	0	5.2	5.8	-10	8.3	16	-48
tt+light	74	55	35	79	67	18	71	67	6
tt+cc	19	23	-17	32	47	-32	52	80	-35
tt+bb	34.1	43	-21	67	110	-39	111	240	-54

	≥ 3 jets / ≥ 3 b-tags			3 jets / 3 b-tags	4 jets / 3 b-tags	4 jets / 4 b-tags
	CMS	ATLAS	Diff. (%)	ATLAS	ATLAS	ATLAS
ttH	11.2	12.8	-13	2	8.3	2.5
tt+light	289	244.6	18.2	105	138	1.6
tt+cc	147	195	-25	70	120	5
tt+bb	229	309	-26	100	180	29

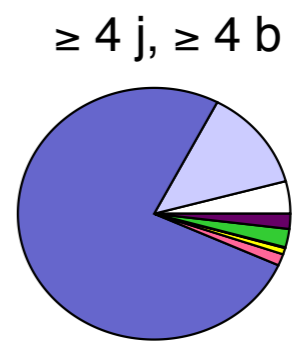
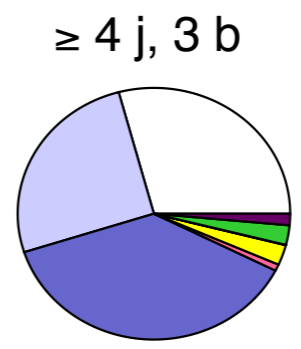
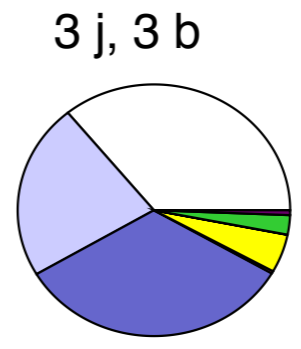
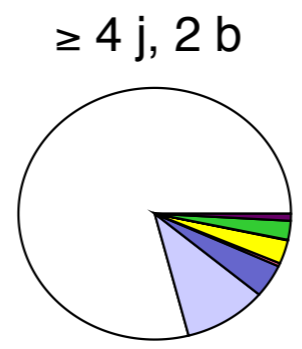
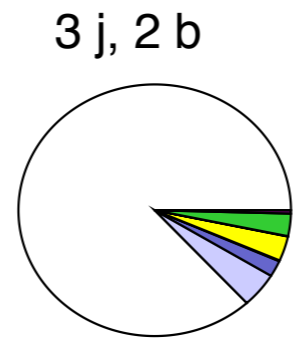
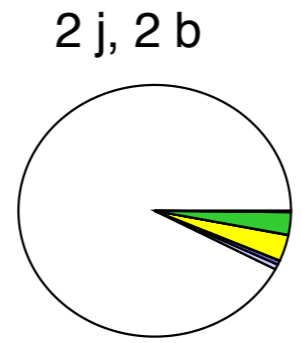
Dilepton Backgrounds

ATLAS Preliminary Simulation

$\sqrt{s} = 8 \text{ TeV}, \int L dt = 20.3 \text{ fb}^{-1}$



Dilepton
 $m_H = 125 \text{ GeV}$



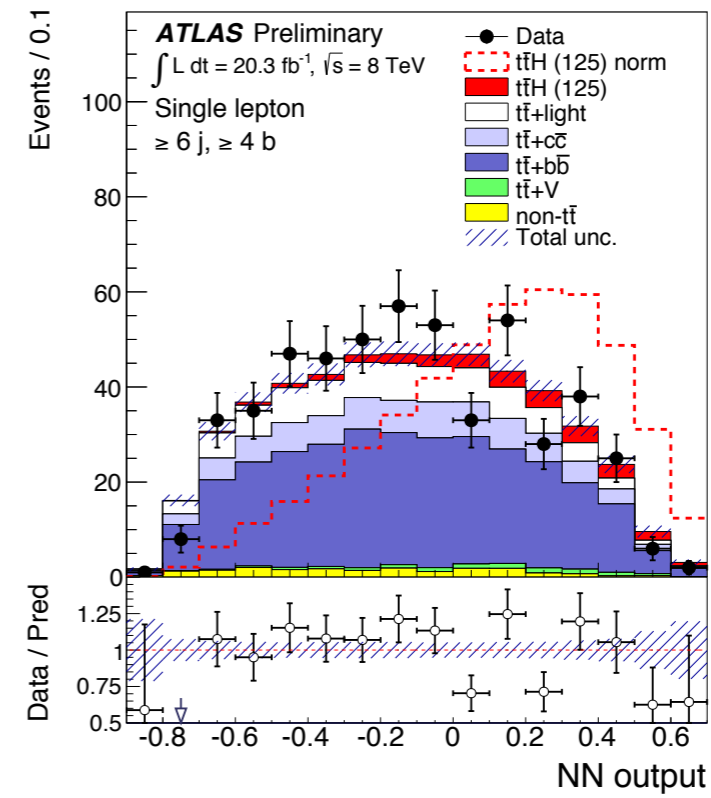
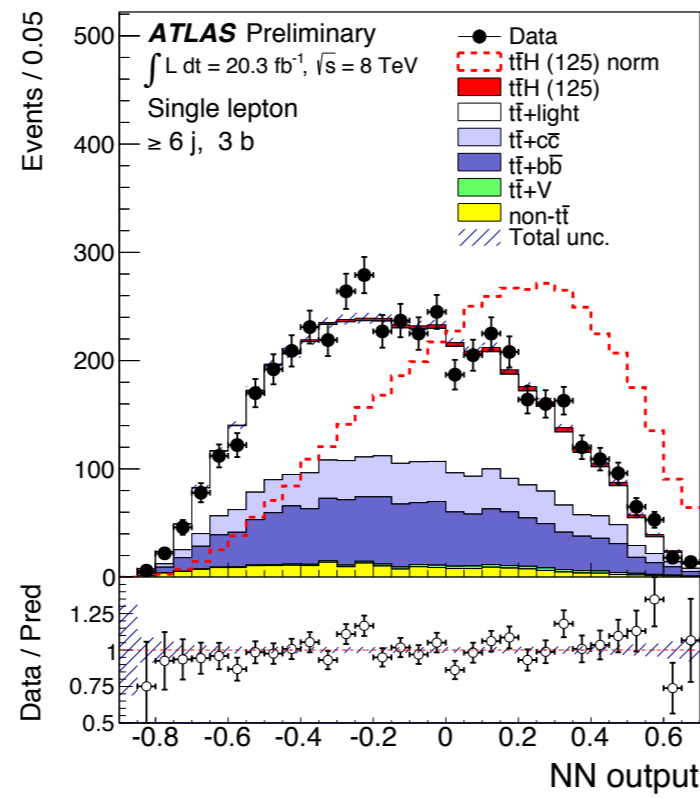
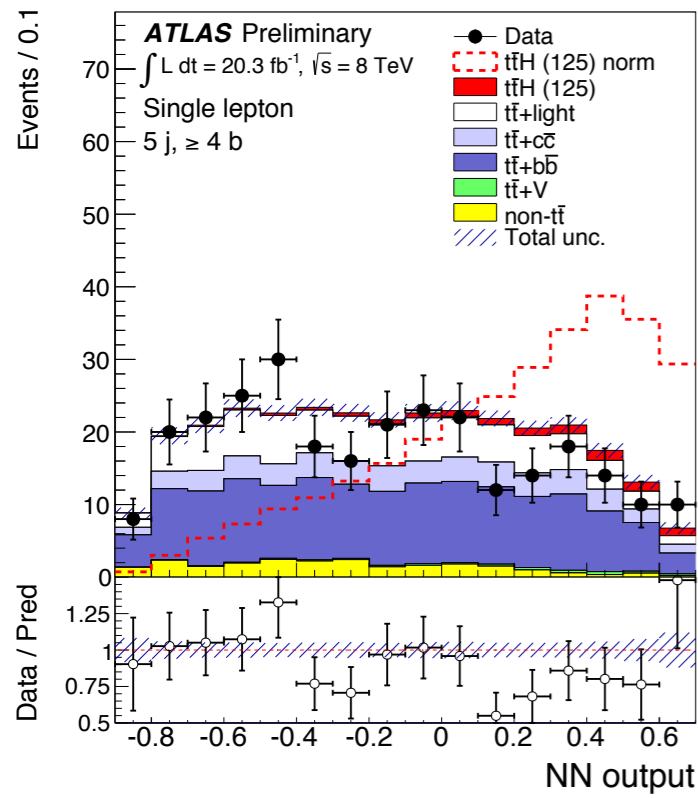
ATLAS Preliminary Simulation

$m_H = 125 \text{ GeV}$
 $\sqrt{s} = 8 \text{ TeV}$

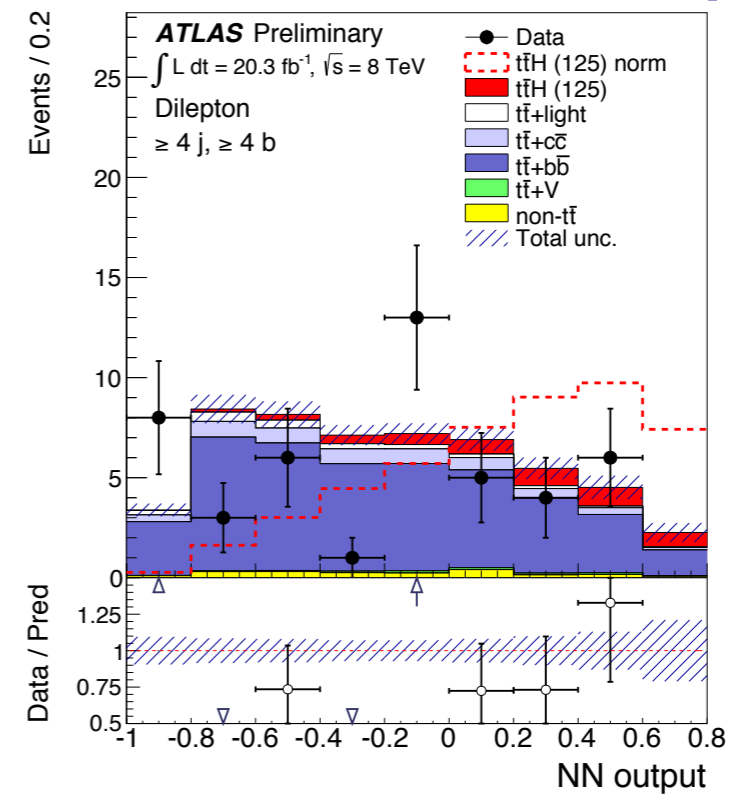
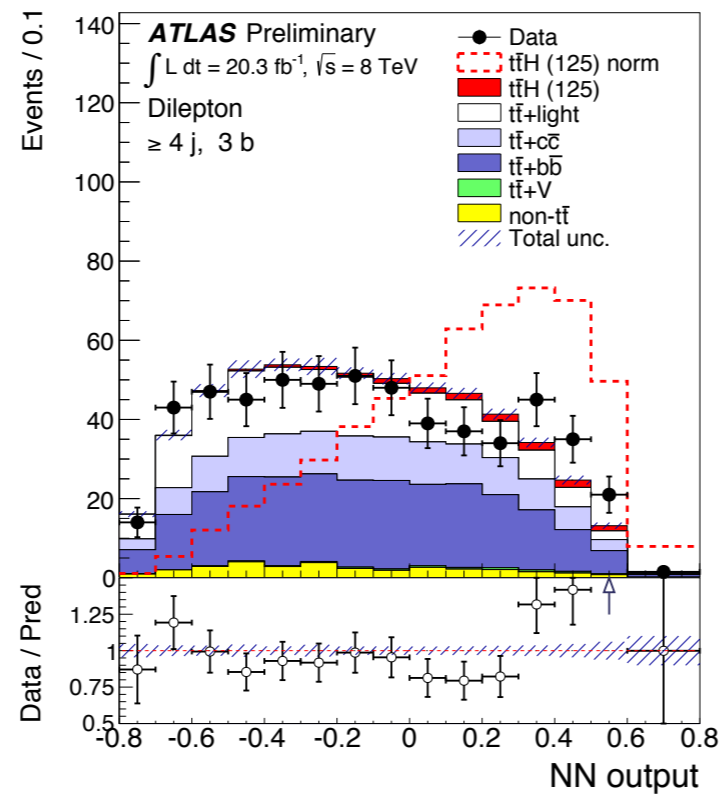
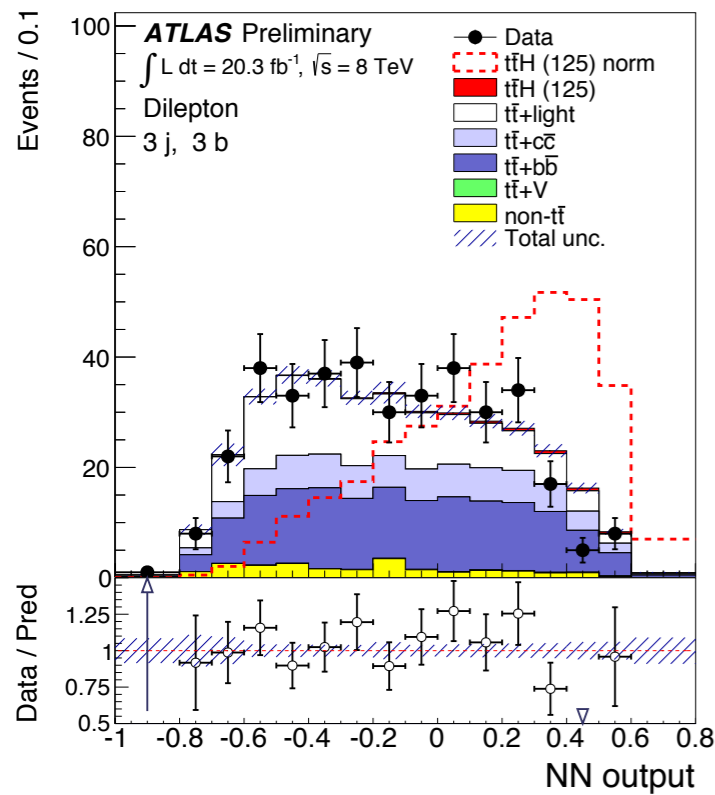
- $t\bar{t}$ +light
- $t\bar{t}$ + $c\bar{c}$
- $t\bar{t}$ + $b\bar{b}$
- $t\bar{t}$ +V
- Z+jets
- Diboson
- Single top
- Multijet

Dilepton

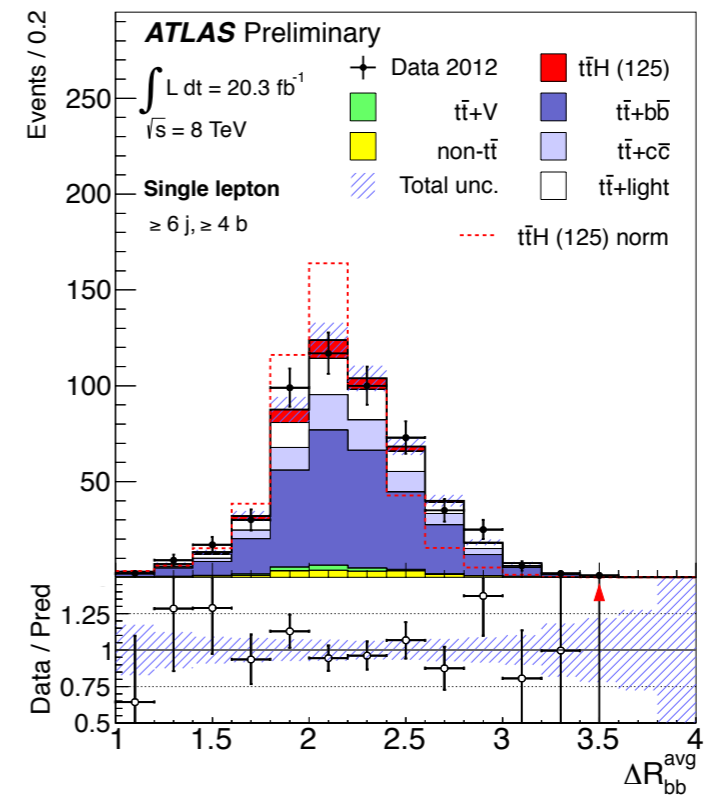
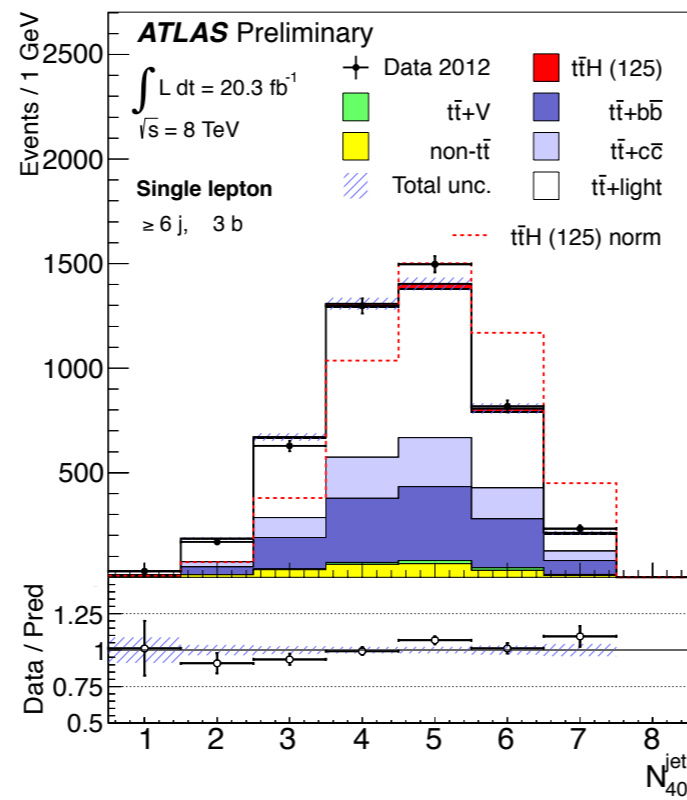
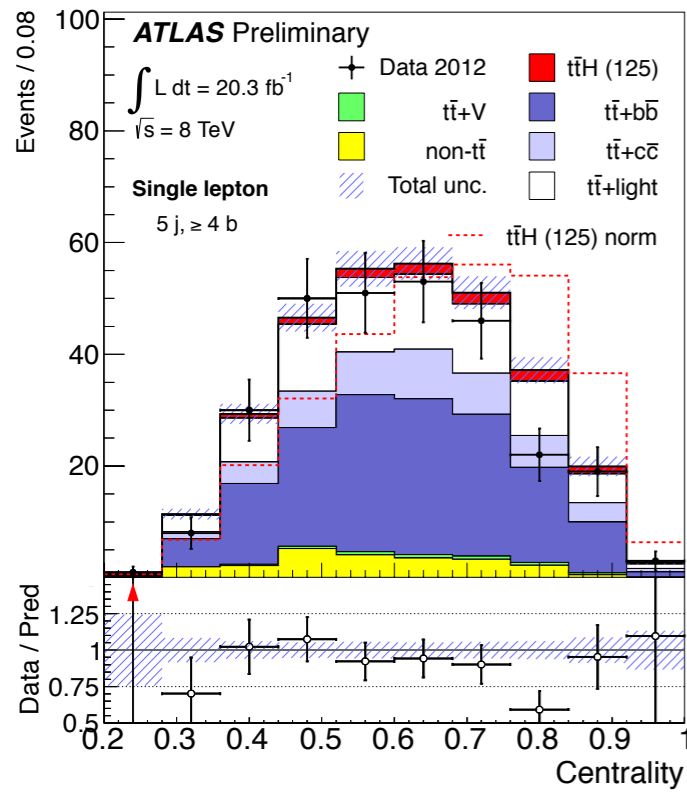
Single Lepton



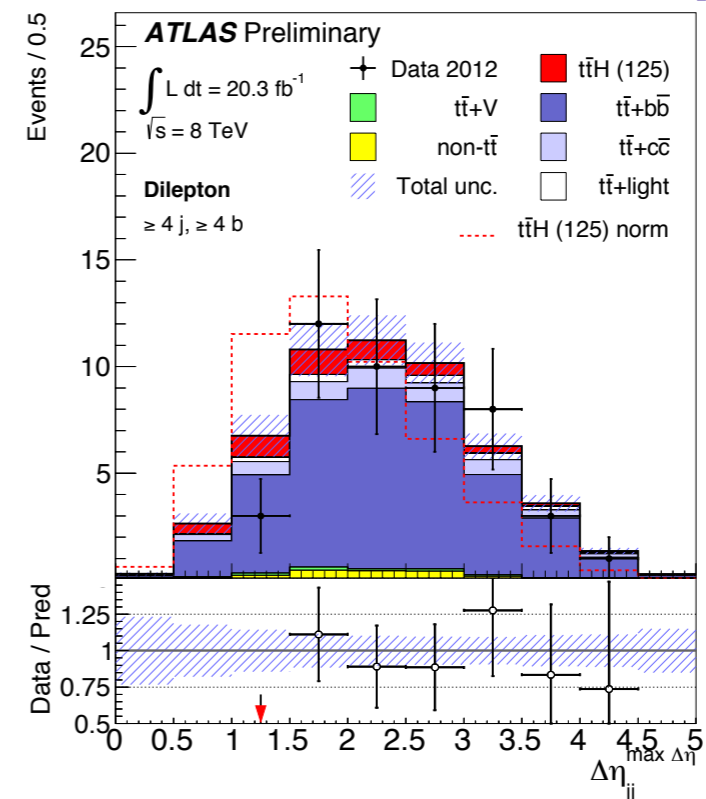
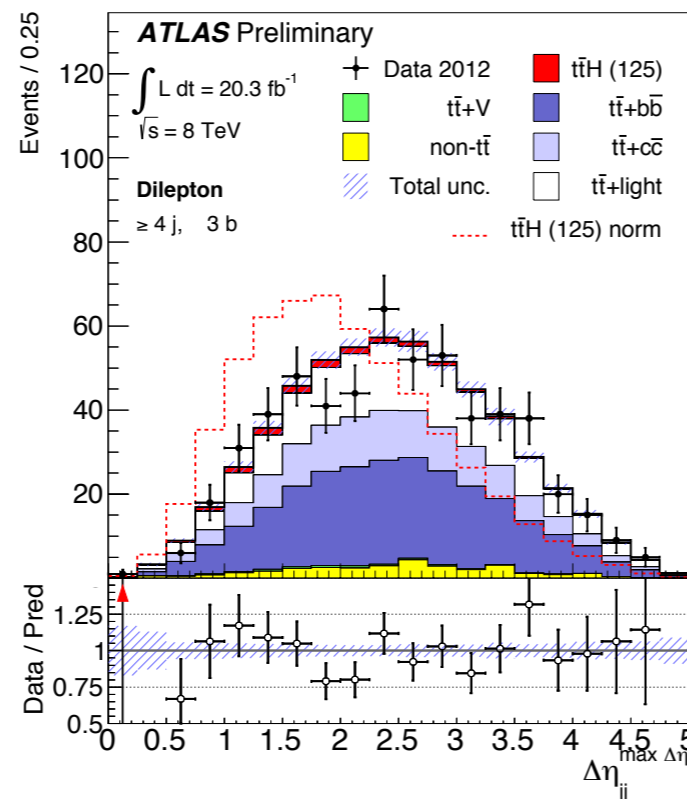
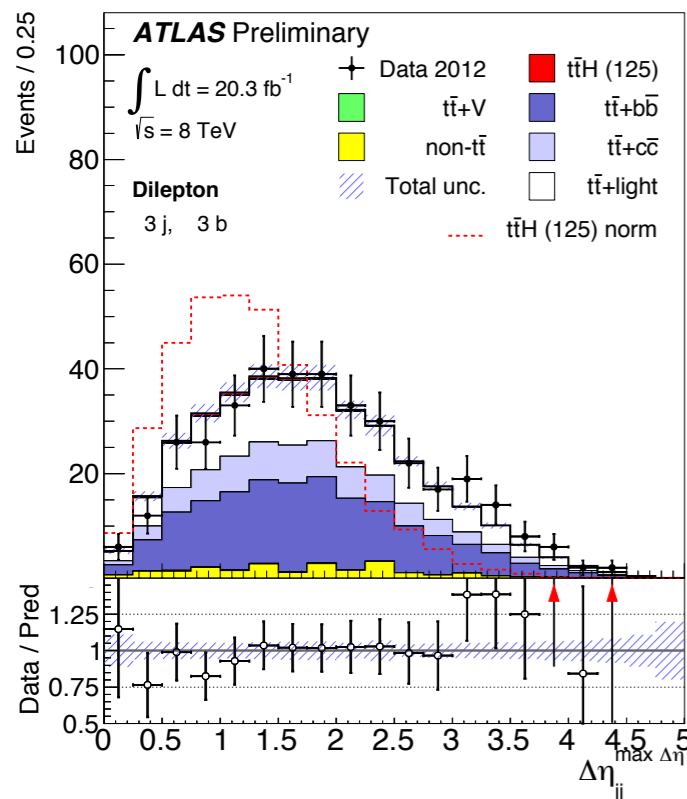
Dilepton



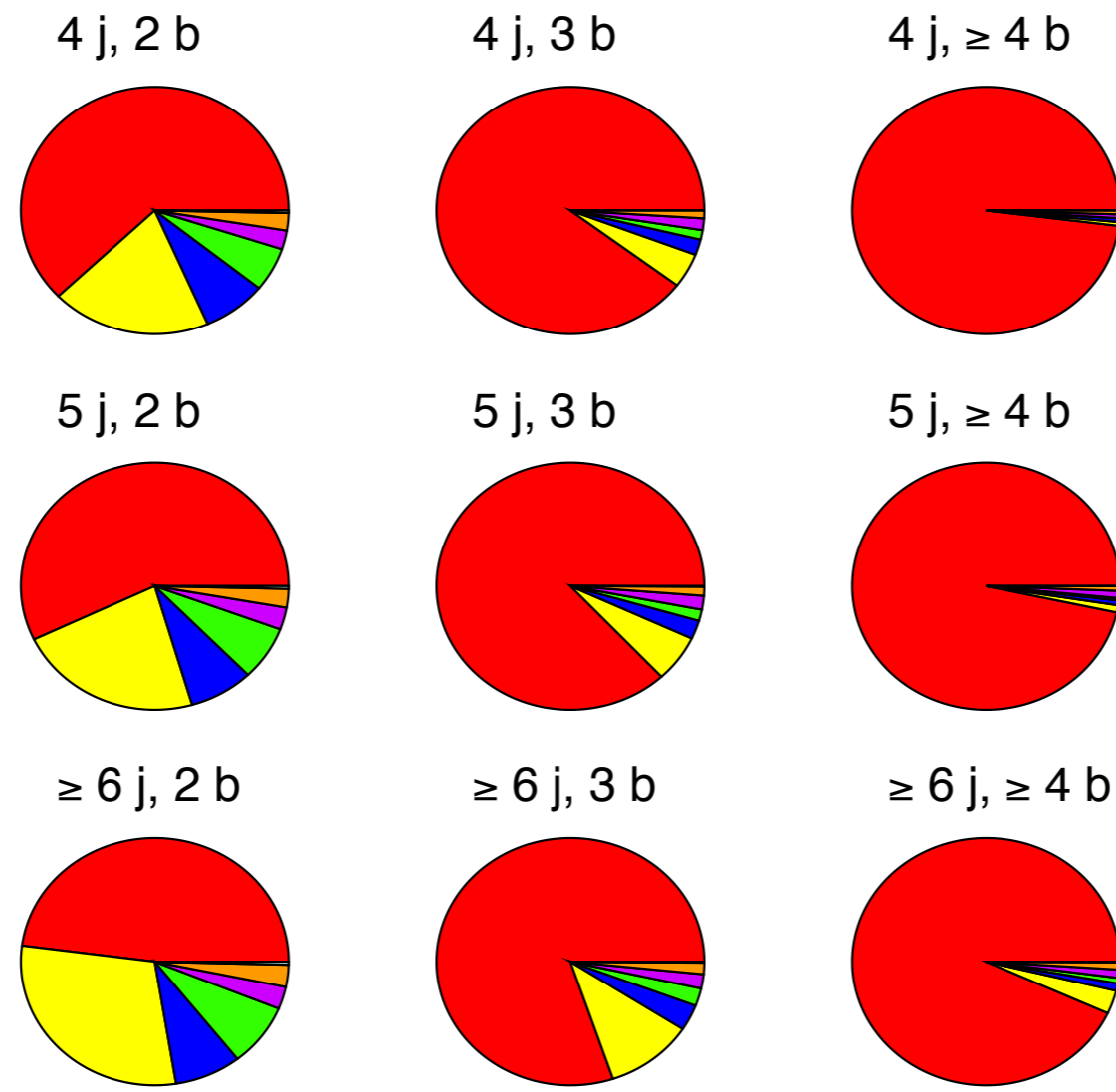
Single Lepton



Dilepton



Higgs Decays



ATLAS

Preliminary
Simulation

$m_H = 125$ GeV

$\sqrt{s} = 8$ TeV

- $t\bar{t}H, H \rightarrow b\bar{b}$
- $t\bar{t}H, H \rightarrow WW$
- $t\bar{t}H, H \rightarrow \tau\bar{\tau}$
- $t\bar{t}H, H \rightarrow gg$
- $t\bar{t}H, H \rightarrow c\bar{c}$
- $t\bar{t}H, H \rightarrow ZZ$
- $t\bar{t}H, H \rightarrow$ others

Single lepton

Ranking of Nuisance Parameters $\Delta\mu$

