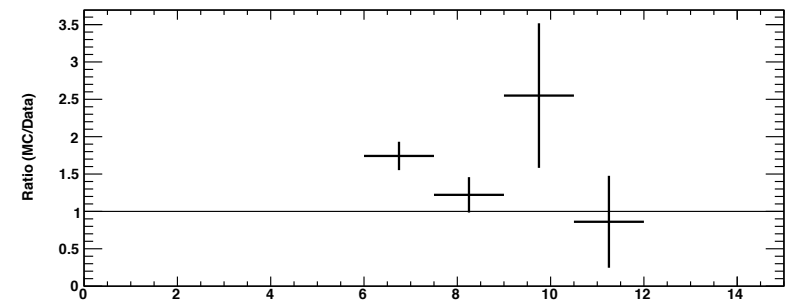
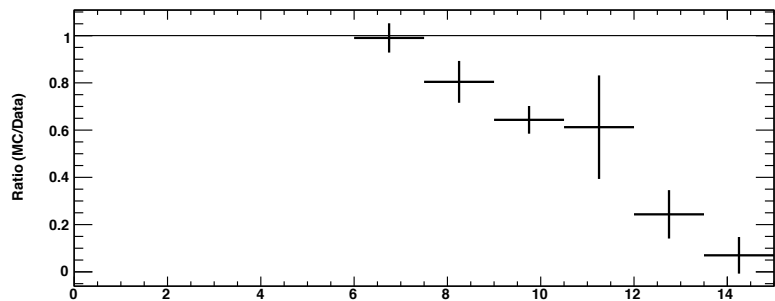
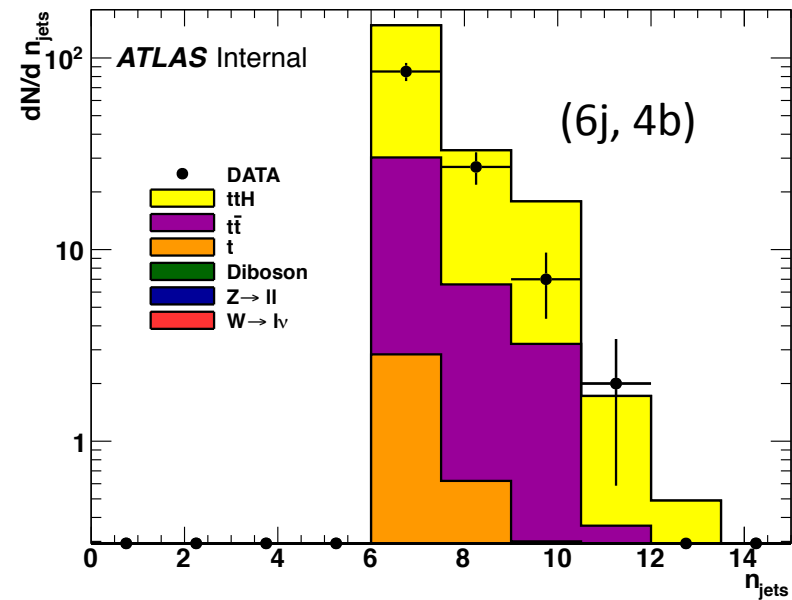
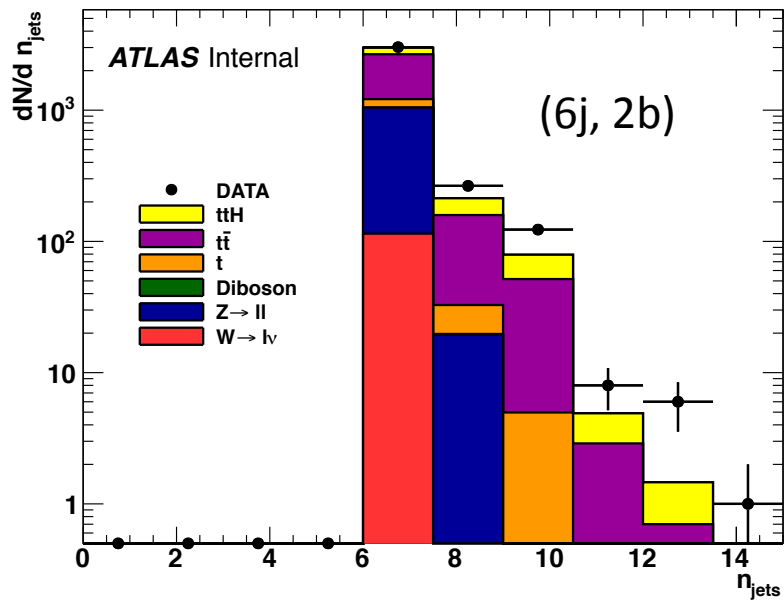
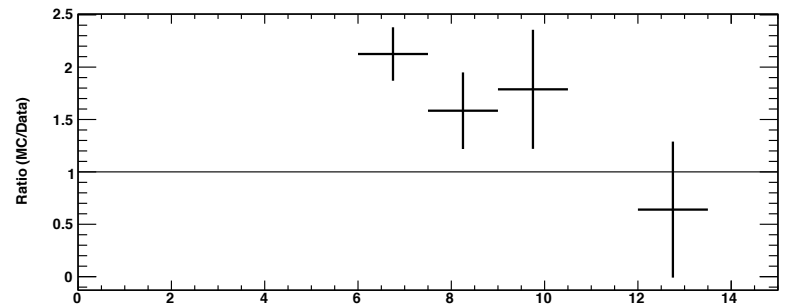
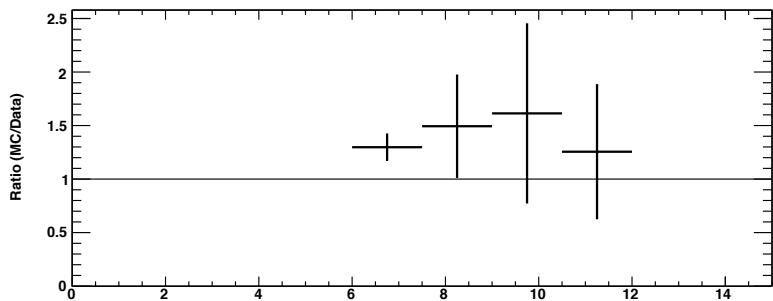
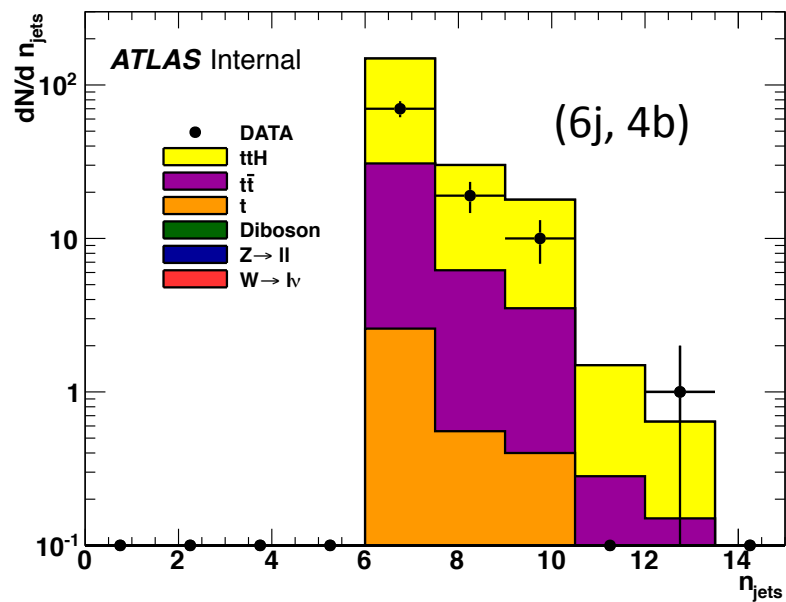
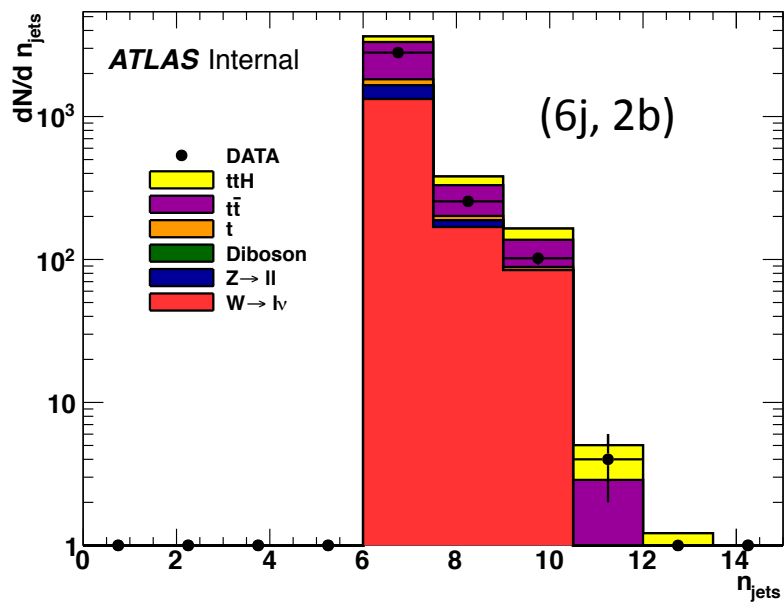


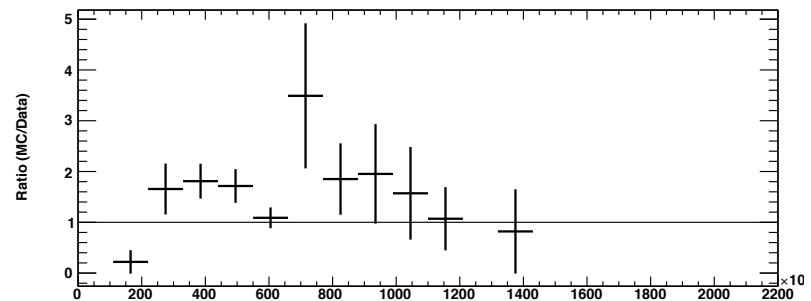
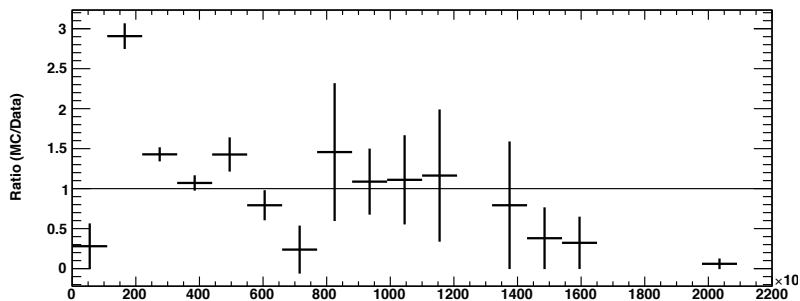
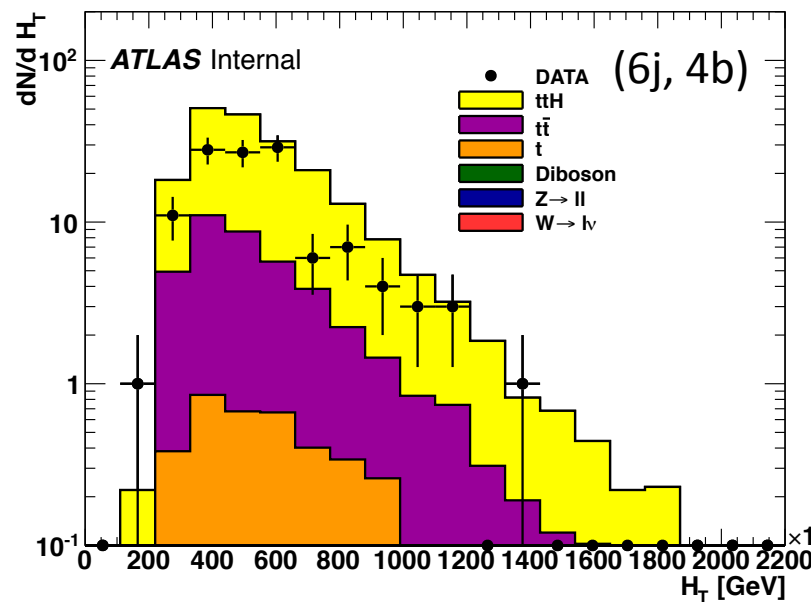
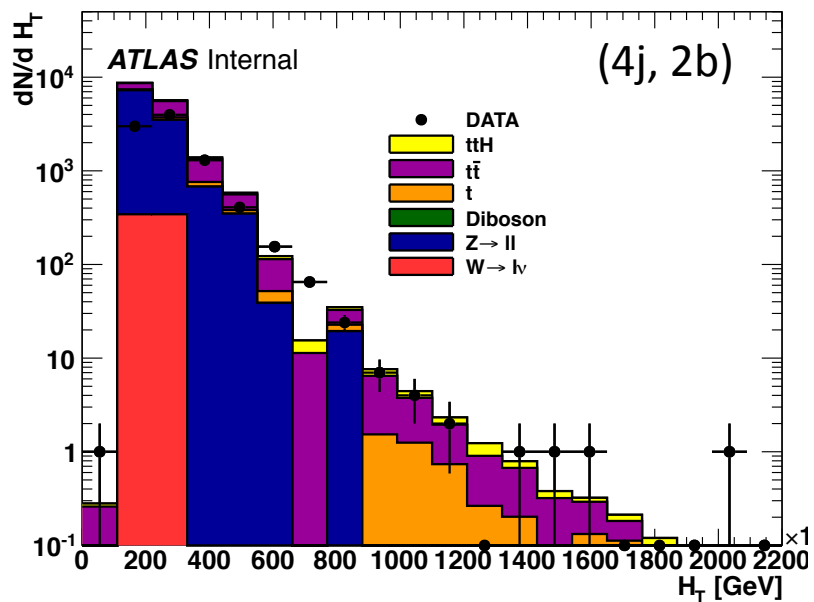
$n_{\text{jets}}, e\text{-jets}$



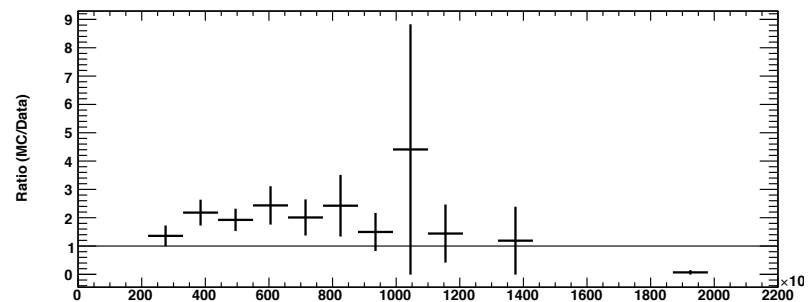
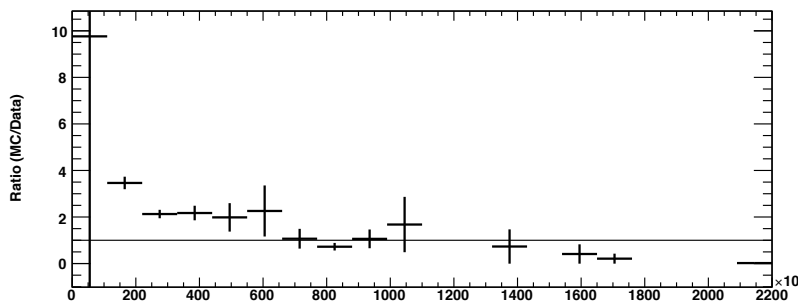
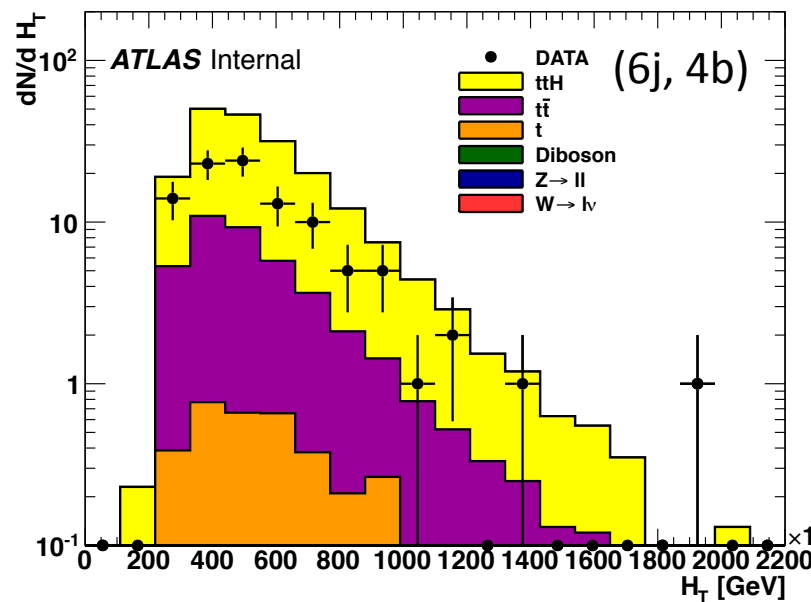
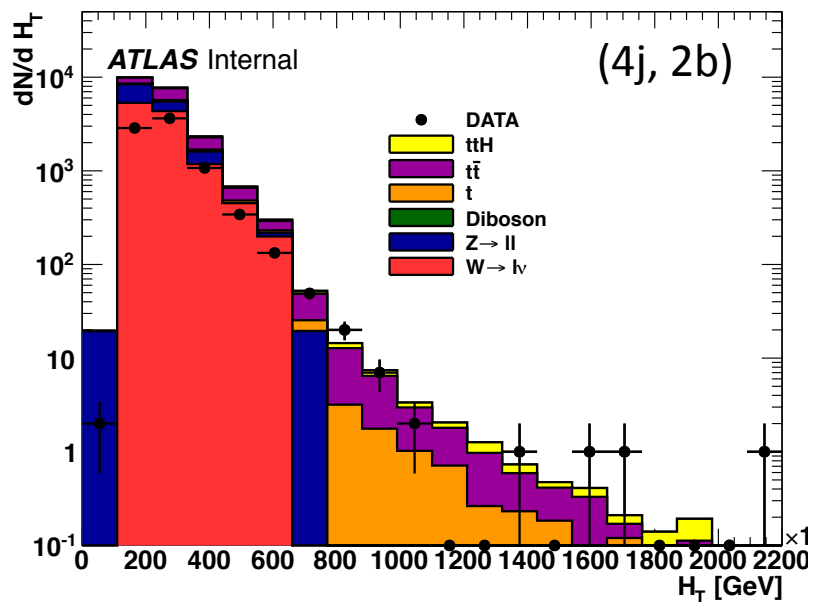
$n_{\text{jets}}, \mu\text{-jets}$



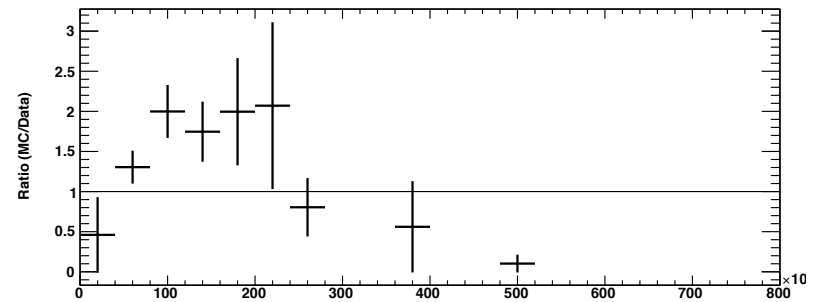
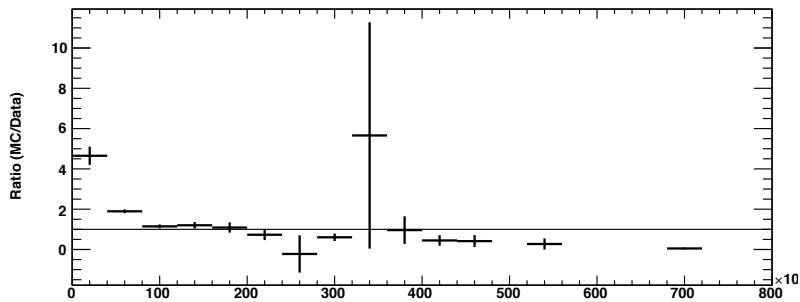
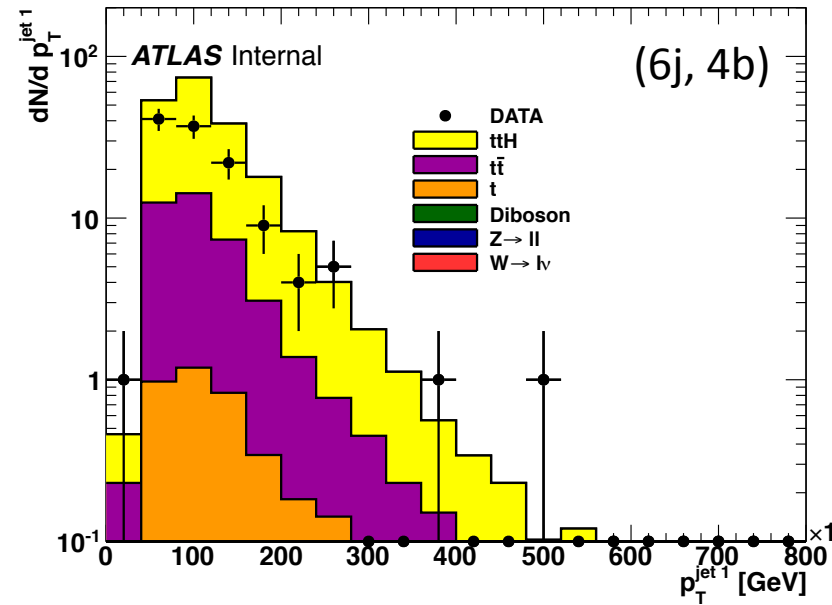
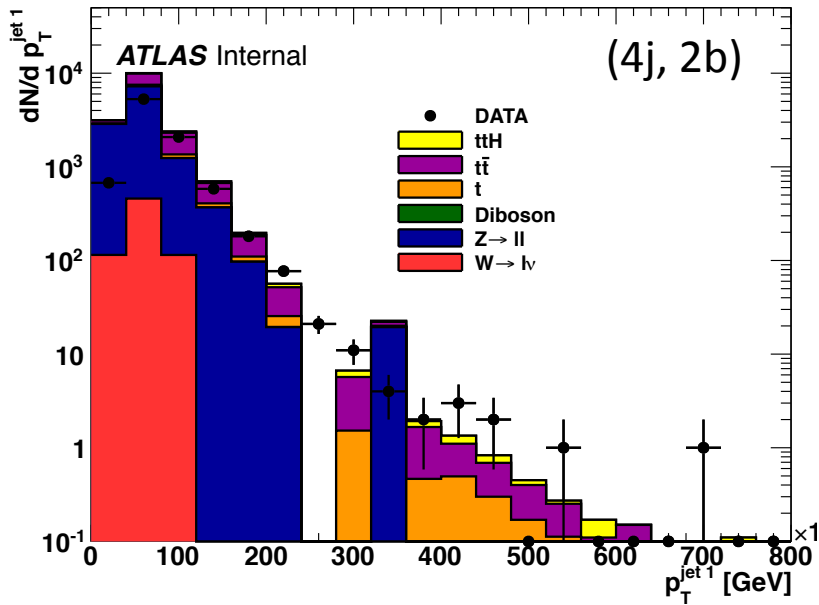
H_T , e-jets



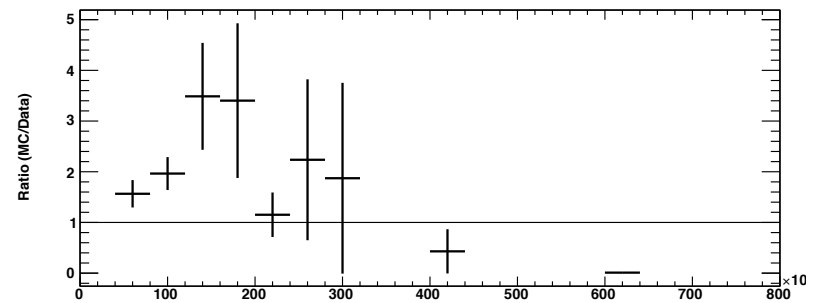
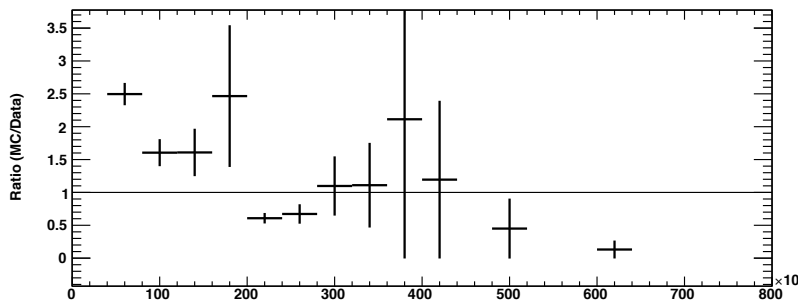
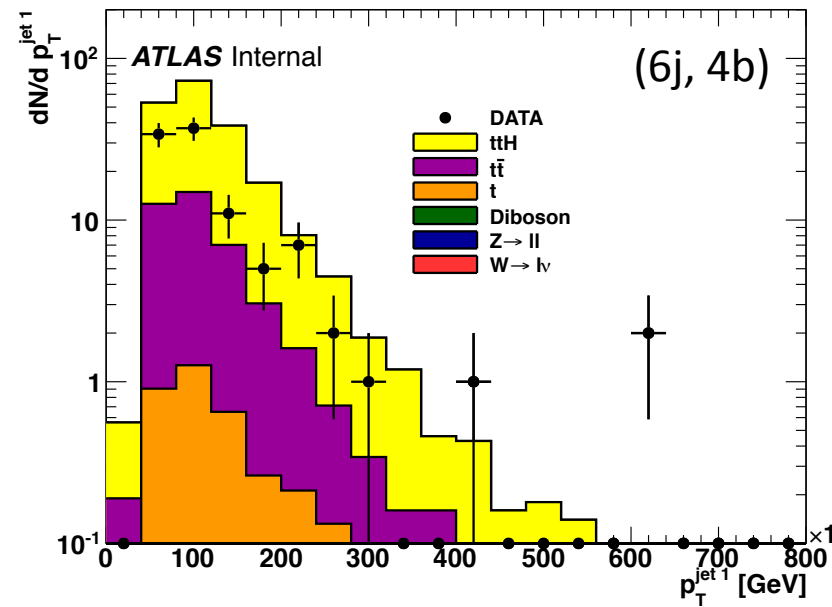
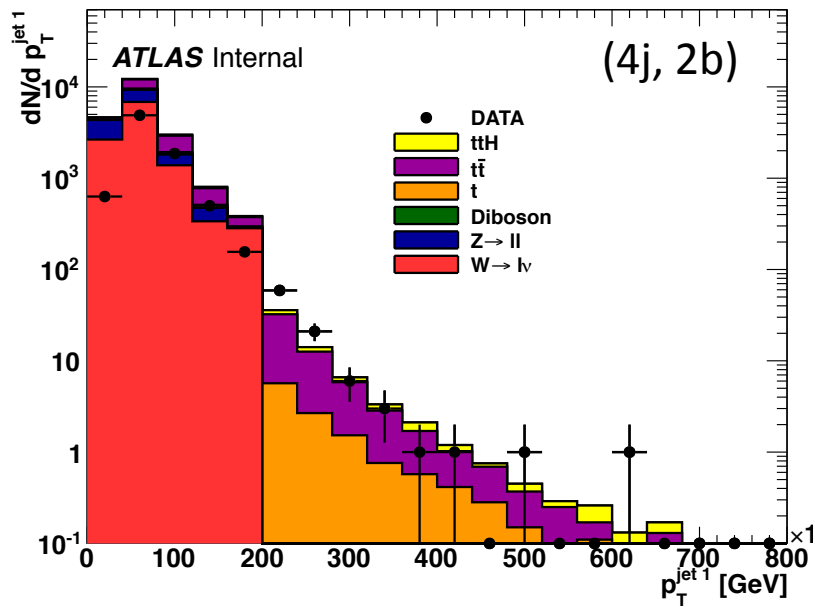
H_T , μ -jets



Jet 1 p_T , e-jets



Jet 1 p_T , μ -jets



Other distributions

- Lepton p_T
- Lepton φ
- Lepton η
- Jet 2 p_T
- M_{bb}
- M_{jj}



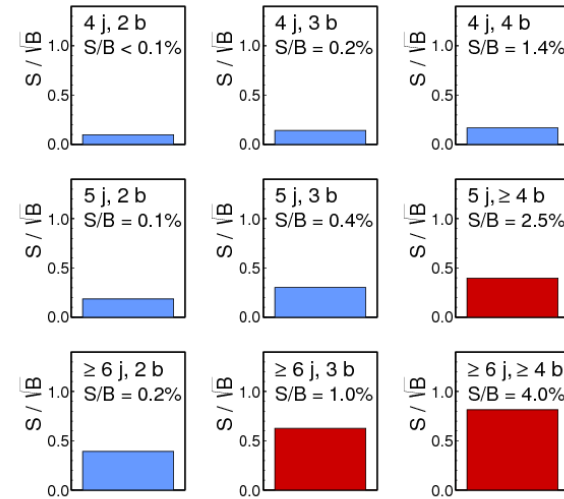
(Slides from last time)

BACKUP SLIDES

Signal Regions

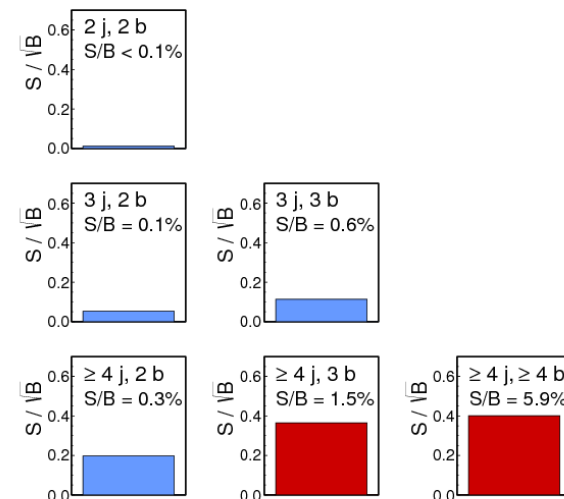
- “Signal-depleted” (blue) and “signal-rich” (red) regions
- S/\sqrt{B} and S/B for each region shown
 - “Signal-rich” requires $S/\sqrt{B} > 0.3$ and $S/B > 1\%$

ATLAS Simulation
 $\sqrt{s} = 8 \text{ TeV}, 20.3 \text{ fb}^{-1}$



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

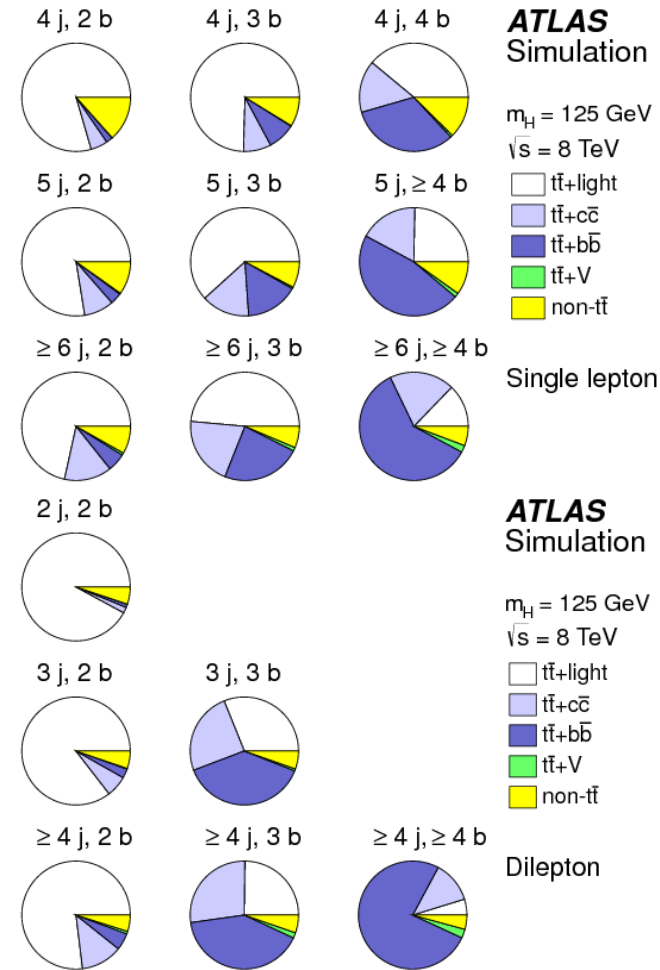
ATLAS Simulation
 $\sqrt{s} = 8 \text{ TeV}, 20.3 \text{ fb}^{-1}$



Dilepton
 $m_H = 125 \text{ GeV}$

Background Composition

- Breakdown of the background for each considered region
 - Signal-depleted regions predominantly $t\bar{t}$ +light
 - Signal-rich regions predominantly $t\bar{t}$ + $b\bar{b}$
- $t\bar{t}$ + $b\bar{b}$ ($c\bar{c}$) has one jet matched to a b(c)-hadron
 - $t\bar{t}$ +light is remainder of $t\bar{t}$ +jets events



Selection and Object Definitions

Lepton+Jets:

- 1 isolated lepton
- $p_T > 25$ GeV
- $|\eta| < 2.5$ (excluding calorimeter gap)
- $n_{\text{Jets}} \geq 4$
- $p_T^{\text{jet}} > 25$ GeV
- $|\eta^{\text{jet}}| < 2.5$
- No MET cut
- No second lepton

Dilepton:

- 2 isolated leptons
- $p_T^{1l} > 25$ GeV
- $p_T^{2l} > 15$ GeV
- $|\eta^l| < 2.5$ (excluding calorimeter gap)
- $n_{\text{Jets}} \geq 2$
- $p_T^{\text{jet}} > 25$ GeV
- $|\eta^{\text{jet}}| < 2.5$
- $|m_{ll} - 91| > 8$ GeV
- $m_{ll} > 15$ GeV
- 2 b-tags with $m_{ll} > 60$ GeV
- $H_T > 130$ GeV for $e\mu$ selection

Synchronisation Cutflow: l+jets

INITIAL
GRL
GOODCALO
TRIGDEC
EL_N 25000 >= 1
EL_N 25000 == 1
MU_N 25000 == 0
TRIGMATCH
JETCLEAN LooseBad
JET_N 25000 >= 1
JET_N 25000 >= 2
JET_N 25000 >= 3
JET_N 25000 >= 4
JET_N 25000 == 4
MV2C20_N -0.4434 == 2
MV2C20_N -0.4434 == 3
MV2C20_N -0.4434 >= 4
JET_N 25000 == 5
MV2C20_N -0.4434 == 2
MV2C20_N -0.4434 == 3
MV2C20_N -0.4434 >= 4
JET_N 25000 >= 6
MV2C20_N -0.4434 == 2
MV2C20_N -0.4434 == 3
MV2C20_N -0.4434 >= 4

- MC
 - One file (e.g., mc15_13TeV.410000.PowhegPythiaEvtGen_P2012_ttbar_hdamp172p5_nonallhad.merge.DAOD_TOPQ1.e3698_s2608_s2183_r6765_r6282_p2413/DAOD_TOPQ1.06405917._000001.pool.root.1)
 - Matches for both e+jets and μ +jets in ttbar!
 - Data underway
 - Last step ($n_{\text{jets}} \geq 6$, $b\text{-tags} \geq 4$) blinded as the strongest signal region in single lepton case for run 1 (see slide 6)