

Weekly Report

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Introduction

❖ HHML 2L ntuple production

- ◇ Include SFs now: Trigger match, lepton WP.
- ◇ Drell-Yan samples are missing
- ◇ Almost all other processes of jobs finished

❖ Study the Tight Lepton Definition

- ◇ Check the variation for each single selection.
- ◇ Fixed lepton ID, eta
- ◇ Multi-dimensions scan with
 - ◇ B-tag efficiency
 - ◇ Leading, subleading pt
 - ◇ ISO wp : PLVTight, PLVLoose, , old PLV, PflowLoose, PflowTight
 - ◇ Electron ambiguityType, QmisIDBDT
 - ◇ 900 combination totally..

Notation

❖ Baseline

- ◇ TightLH electron, Medium mu with FCLoose Iso
- ◇ SLT or DLT trigger match

❖ Previous analysis

electron			
	Loose	Tight	Anti-Tight
D0sig	5	5	5
Z0sintheta	0.5mm	0.5mm	0.5mm
Electron ID	LooseLH	Tight LH	
Isolation		FixedCutLoose WP	Fail one of tight requirements
Non-prompt rejection		PromptLeptonVeto<-0.7	
Qmis rejection		QMisIDBDT>0.7	

muon			
	Loose	Tight	Anti-tight
D0sig	3	3	3
Z0sintheta	0.5mm	0.5mm	0.5mm
Electron ID	Medium	Tight	
Isolation		FixedPFlowLoose WP	Fail one of tight requirements
Non-prompt rejection		PromptLeptonVeto<-0.5	

❖ MCweight

- ◇ $((36074.6 * (\text{RunYear} == 2015 || \text{RunYear} == 2016)) + 43813.7 * (\text{RunYear} == 2017) + 58450.1 * (\text{RunYear} == 2018)) * \text{weight_bTagSF_DL1r_70} * \text{weight_pileup} * \text{weight_jvt} * \text{weight_mc} * \text{mc_rawXSection} * \text{lepSFObjTight} * \text{custTrigSF_TightElMediumMuID_FCLooseIso_SLTorDLT} * \text{mc_kFactor} / \text{totalEventsWeighted}$
- ◇ No Old PLV, Pflow SF, the weight is not fully correct.

❖ Significance

$$Z = S / \sqrt{(B + (\alpha B)^2)} \quad \text{assume } \alpha = 0, 0.1, 0.2$$

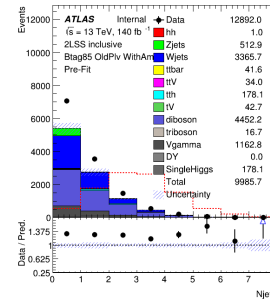
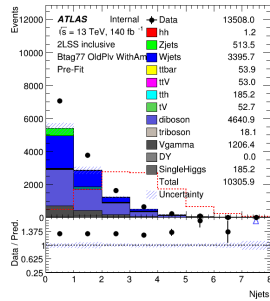
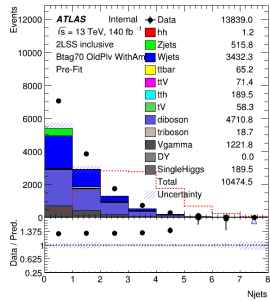
B-tag

eff70

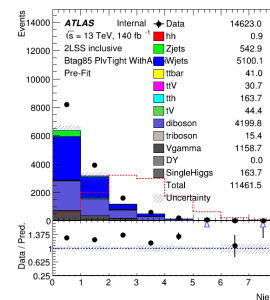
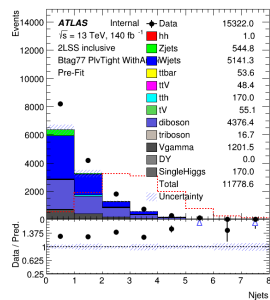
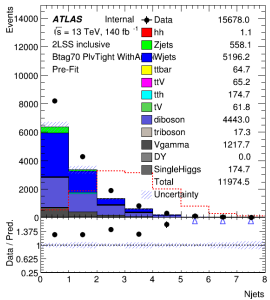
eff77

eff85

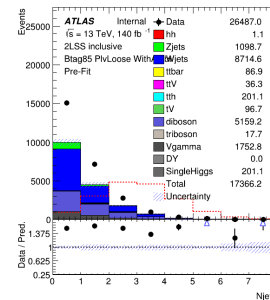
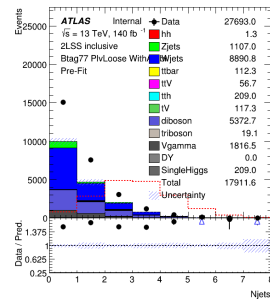
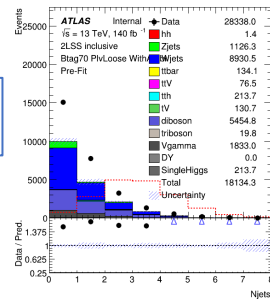
OldPlv



TightPlv

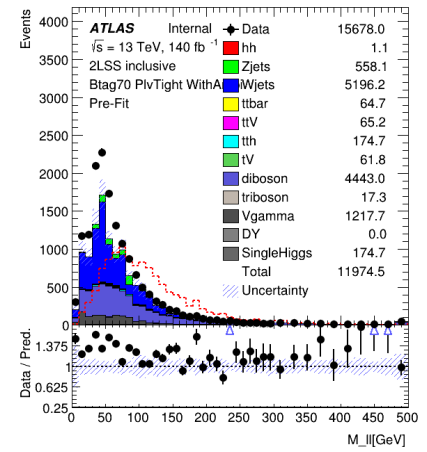
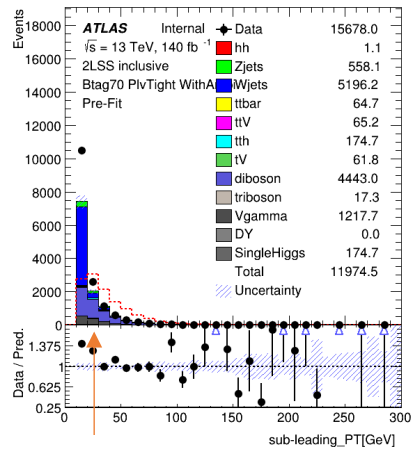
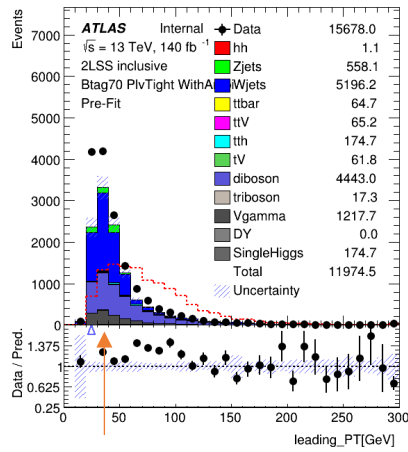


LoosePlv



- ◇ Amount of W+jets events due to no met cut yet
- ◇ Require N-jets ≥ 3 to calculate Z

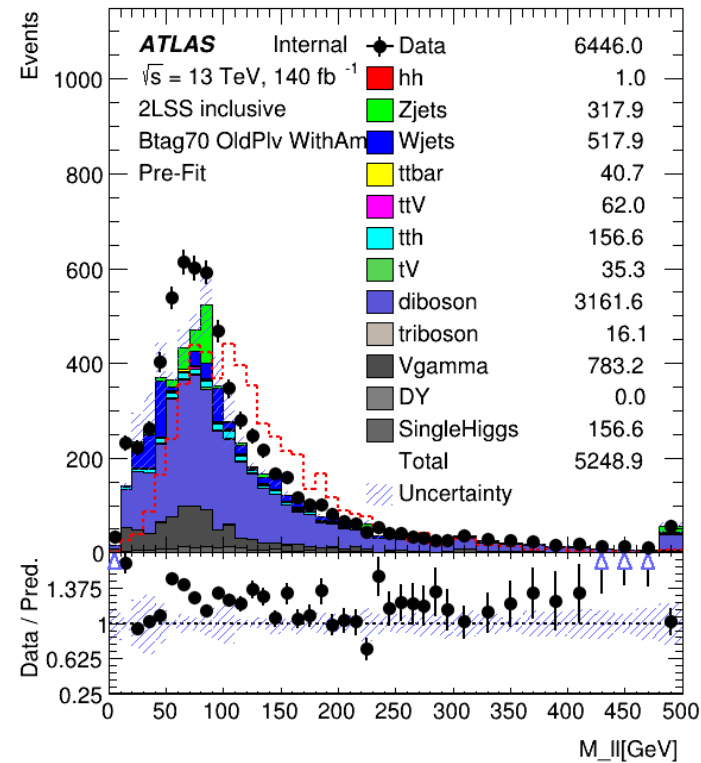
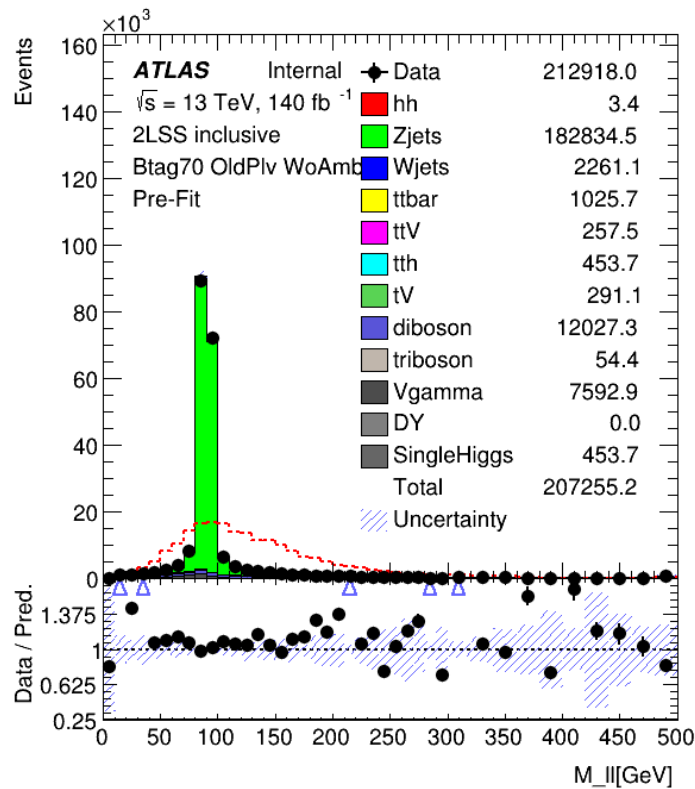
To reduce W+jets bkg



◇ Cut at $pt_0 > 30 \text{ GeV}, pt_1 > 20 \text{ GeV}$

Inclusive

- ❖ Electron ambiguityType, QmisIDBDT are also needed
- ❖ To reduce the fake electrons from photon conversions that pass the tight election selection



Inclusive

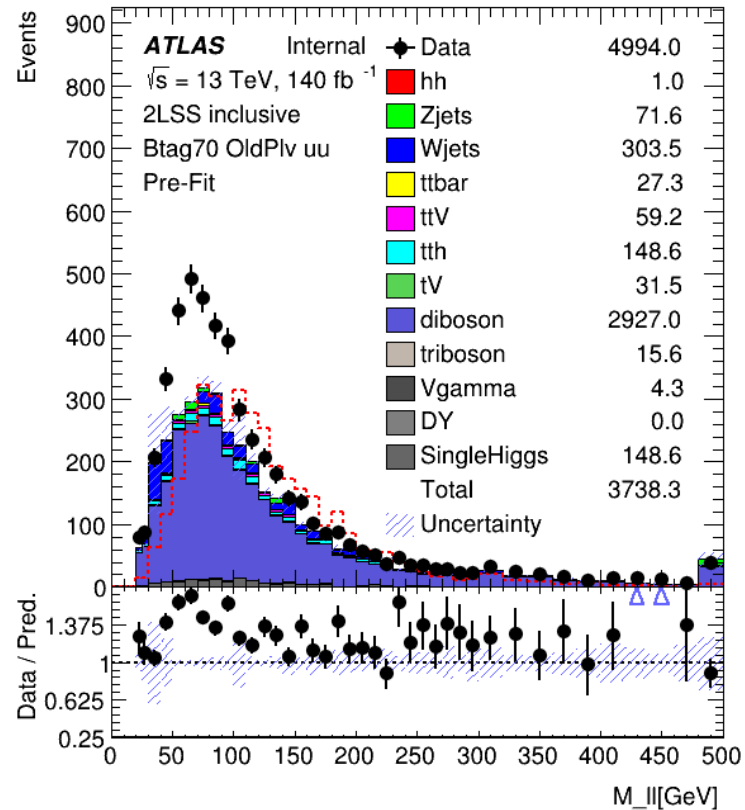
Z	$\alpha = 0$	$\alpha = 0.1$	$\alpha = 0.2$
Btag70	0.0224	0.0073	0.0038
Btag77	0.02157	0.00727	0.0038
Btag85	0.01899	0.00685	0.0036

◇ Fixed Btag 70%

Z	$\alpha = 0$	$\alpha = 0.1$	$\alpha = 0.2$
Old PIV	0.0224	0.0073	0.0038
PLV tight	0.02087	0.00782	0.00413
PLV loose	0.02205	0.00731	0.0038
Plow tight	0.0200	0.00142	0.0007
Plow loose	0.02112	0.0061	0.00315

Add mll, MET selection

❖ Didn't finish individual channel yet



Summary

- ❖ Those variable don't influences Data/MC comparison greatly
- ❖ $pt_0 > 30\text{GeV}$, $pt_1 > 20\text{GeV}$ with B-tag@70%, e
- ❖ Why 2l is not so sensitive?