Weekly Report

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Introduction

- 2LSS Acceptance Challenge
  - Status
- ggF HH->muli-lepton Pythia8 samples
  - The goal is to study the Parton shower with Pythia8/Powhig7
  - Learn how to generate EVNT,LHE files
  - Modifying the JO and trying to run them.

2LSS AC challenge

- Status
  - Background samples

	Disagree	
Backgrounds:	**Samples used by Oceane**	**Samples used by Shuiting**
ttbar	410470	410470
ttZ	413023	410156 + 410157 + 410218 + 410219 +410220
ttZ_low_mass	From 410276 to 410278	
ttW	410155	413008
ttH	From 346343 to 346345	346343 - 346345
VVV	From 364242 to 364249	364242-364249
VH	342284, 342285	342284, 342285
VV	364250, 364253-364255, 364283-364287, 363355-363360, 363489	364250, 364253-364255 ,364283-364287 ,363355-363360 ,363489
Wjets	From 364156 to 364197	364156-364197
Zjets	From 364100 to 364141	364100-364141
Zjets_low_mass	364198-364215	364198-364215
Vgamma	From 364500 to 364535	364500-364535
QmisID	Data Driven	Data Driven
tV	From 410644 to 410649, 410658, 410659	410560,410646,410647
Signal		
HH	From 450661 to 450663	410661,410662,410663

410220.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_tttautau.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r931
413008.Sherpa_221_NN30NNLO_ttW_multilegNLO.deriv.DAOD_HIGG8D1.e7286_e5984_s3126_r9364_r9315_p413
410156.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttZnunu.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r931
410157.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttZqq.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r9315_
410218.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttee.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r9315_p
410219.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttmumu.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r931
410560.MadGraphPythia8EvtGen_A14_tZ_4fl_tchan_noAllHad.deriv.DAOD_HIGG8D1.e5803_s3126_r9364_r9315_p4
410646.PowhegPythia8EvtGen_A14_Wt_DR_inclusive_top.deriv.DAOD_HIGG8D1.e6552_e5984_s3126_r9364_r9315
410647.PowhegPythia8EvtGen_A14_Wt_DR_inclusive_antitop.deriv.DAOD_HIGG8D1.e6552_e5984_s3126_r9364_r9

413023.Sherpa_221_ttll_multileg_NLO.deriv.DAOD_HIGG8D1.e7504_e5984_s3126_r9364_r9315_p4133
410276.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttee_mll_1_5.deriv.DAOD_HIGG8D1.e6087_e5984_s3126
410277.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttmumu_mll_1_5.deriv.DAOD_HIGG8D1.e6087_e5984_s3
410278.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_tttautau_mll_1_5.deriv.DAOD_HIGG8D1.e6087_e5984_s3
410155.aMcAtNloPythia8EvtGen_MEN30NLO_A14N23LO_ttW.deriv.DAOD_HIGG8D1.e5070_s3126_r9364_r9315_p4
410644.PowhegPythia8EvtGen_A14_singletop_schan_lept_top.deriv.DAOD_HIGG8D1.e6527_e5984_s3126_r9364_r
410645.PowhegPythia8EvtGen_A14_singletop_schan_lept_antitop.deriv.DAOD_HIGG8D1.e6527_e5984_s3126_r936
410646.PowhegPythia8EvtGen_A14_Wt_DR_inclusive_top.deriv.DAOD_HIGG8D1.e6552_e5984_s3126_r9364_r9315
410647.PowhegPythia8EvtGen_A14_Wt_DR_inclusive_antitop.deriv.DAOD_HIGG8D1.e6552_e5984_s3126_r9364_r9
410648.PowhegPythia8EvtGen_A14_Wt_DR_dilepton_top.deriv.DAOD_HIGG8D1.e6615_e5984_s3126_r9364_r9315_
410649.PowhegPythia8EvtGen_A14_Wt_DR_dilepton_antitop.deriv.DAOD_HIGG8D1.e6615_e5984_s3126_r9364_r9
410658.PhPy8EG_A14_tchan_BW50_lept_top.deriv.DAOD_HIGG8D1.e6671_e5984_s3126_r9364_r9315_p4133",
410659.PhPy8EG_A14_tchan_BW50_lept_antitop.deriv.DAOD_HIGG8D1.e6671_e5984_s3126_r9364_r9315_p4133

Frozen object definition and selection

	Oceane	Shuiting	
	Event selections		
	lep_ID_0*lep_ID_1>0	lep_ID_0*lep_ID_1>1	
	nJets_OR_DL1r_70==0	nJets_OR_DL1r_77=0	*
	nJets_OR>=2 && nJets_OR<=7	nJets_OR>=3(For SR)	*
	lep_Pt_0>20e3 && lep_Pt_1>20e3	pt >20GeV	
	/	MET >10GeV	*
	Mll01>12GeV	Mll > 15GeV and Mll> 100GeV or Mll < 80GeV for ee	*
	nTaus_OR_Pt25_RNN==0	nTaus_OR_Pt25_RNN = 0	
	Trigger selection		
	GlobalTrigDecision	GlobalTrigDecision	
	custTrigMatch_TightElMediumMuID_FCLooseIso_SLTorDLT	custTrigMatch_TightElMediumMuID_FCLooseIso_SLTorDLT	
	Lepton definitions		
muons		lep_isolationFCLoose	
		fabs(lep_Eta)<2.5	
	/	fabs(lep_sigd0PV)<3	*
	/	fabs(lep_Z0SinTheta)<0.5	*
	lep_isMedium	lep_isMedium	
	lep_plvWP_Tight	lep_plvWP_Tight	
electrons	lep_isTightLH	lep_isTightLH	
	lep_chargeIDBDTResult > -0.3	lep_chargeIDBDTResult > -0.337671	
	lep_ambiguityType	lep_ambiguityType	
	lep_plvWP_Tight	lep_plvWP_Tight	
	/	fabs(|lep_sigd0PV)<5	*
	/	fabs(lep_Z0SinTheta)<0.5	*
		fabs(lep_Eta)<2.5 &&(fabs(lep_Eta)>1.52 || fabs(lep_Eta)<1.37)	
		lep_isolationFCLoose_0	

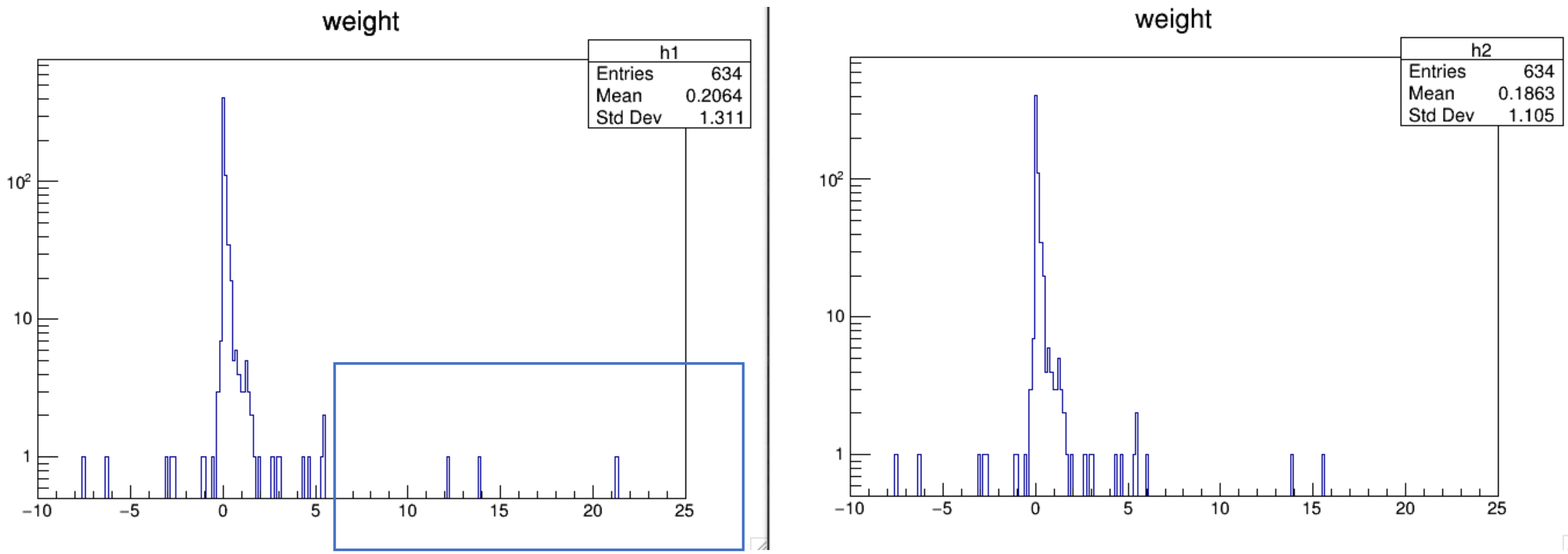
Cut flow with raw number

Cut Flow: No MC weight										
MC16a/d/e	N events									
	Shuting	Oceane	Shuting	Oceane	Shuting	Oceane	Shuting	Oceane	Shuting	Oceane
Cuts	**HH**		**VV**		**Wjets**		**Zjets**		**tt**	
((lep_ID_0*lep_ID_1>0) && nTaus_OR_Pt25_RNN == 0 && GlobalTrigDecision)&&(dilep_type&&(((abs(lep_ID_0)==13 && lep_isLoose_0)||(abs(lep_ID_0)==11&& lep_isLooseLH_0)) &&((abs(lep_ID_1)==13 && lep_isLoose_1)||(abs(lep_ID_1)==11 && lep_isLooseLH_1))))	/	/	/	/	/	/	/	/	/	/
Loose Leptons	110784	/	5748757	/	1421471	/	2023483	/	2865073	/
Tight Leptons && custTrigMatch_TightElMediumMuID_FCLooseIso_SLTorDLT	51323	51323	2822314	2845293	33925	33930	90244	90247	50720	50720
nJets_OR_DL1r_77==0	44544	44544	2677652	2699362	27884	27889	73598	73601	14980	14980
lep_Pt_0>20e3&&lep_Pt_1>20e3	35458	35458	1849770	1849770	2816	2817	59188	59190	4772	4772
met_met>10e3	35000	35000	1786628	1786628	2741	2742	53892	53893	4683	4683
Mll01>15e3	34974	34974	1771602	1771602	2694	2695	53878	53879	4634	4634
Z-veto	34312	34312	1717587	1717587	2620	2621	10639	10640	4510	4510
nJets_OR>=3	19229	19229	452277	452277	634	634	3060	3060	1952	1952

Cut flow with weighted number

- The discrepancy is due to different input files.
- Some events may fail when generating or miss because of grid issue.

A	B	C	D	E	F	G	H	I	J	K	L	M
Cut Flow: MC weight												
MC16a/d/e							**N events**					
		Shuting	Oceane	Shuting	Oceane	Shuting	Oceane	Shuting		Oceane	Shuting	Oceane
Cuts	**Weight**	**HH**		**VV**		**Wjets**		**Zjets**			**tt**	
((lep_ID_0*lep_ID_1>0) && nTaus_OR_Pt25_RNN == 0 && GlobalTrigDecision)&&(dilep_type&&(((abs(lep_ID_0)==13 && lep_isLoose_0)||(abs(lep_ID_0)==11&& lep_isLooseLH_0)) &&((abs(lep_ID_1)==13 && lep_isLoose_1)||(abs(lep_ID_1)==11 && lep_isLooseLH_1))))	((36074.6*(RunYear==2015||RunYear==2016)+ 43813.7*(RunYear==2017)+ 58450.1*(RunYear==2018))*weight_pileup*weight_jvt*weight_mc*mc_kFactor*mc_rawXSection/(totalEventsWeighted)		/	872360.8842	/		/		with Oceane's sample	/		/
Loose Leptons		35.5743	/	46838.9023	/	1017242.8003	/	1414063.3215		/	418938.1083	/
Tight Leptons && custTrigMatch_TightElMediumMuID_FCLooseIso_SLTorDLT	SF Tight leptons + SF custTrig	4.0233	4.0220	16195.2737	15612.796	19763.7676	19372.564	18572.7892	18427.3	18428.432	6668.9888	6665.6504
nJets_OR_DL1r_77==0	weight_bTagSF_DL1r_77	3.5611	3.5611	15572.7217	15028.043	18853.7556	18474.582	17868.5	17732.4	17732.352	2011.9172	2011.9136
lep_Pt_0>20e3&&lep_Pt_1>20e3		2.7397	2.7397	10235.1975	9823.6309	1126.6492	1181.8075	15051.2	14943.5	14943.475	649.5567	649.55621
met_met>10000		2.6928	2.6928	9909.9537	9508.6543	1018.2528	1082.0837	12735.5	12608.5	12608.453	637.4547	637.4541
Mll01>15e3		2.6905	2.6905	9817.8415	9420.0000	1037.1355	1100.8843	12724	12597	12596.875	630.9580	630.9574
Z-veto		2.6065	2.6065	9465.8579	9079.1416	1122.3434	1168.8351	3154.93	3154.67	3154.668	614.8072	614.8068
nJets_OR>=3		1.3187	1.3187	1433.9785	1300.7585	130.8890	118.10538	100.076	97.9365	97.936615	266.1950	266.1951



- ❖ Seems that two entries shifted.
- ❖ I possible have one additional loose cut but it shouldn't make any difference: Loose ID/ISO applied for leptons.
- ❖ The difference could be acceptable.

Summary

- object definition and selection are determined based on previous optimization
- The raw cutflow are almost identical. The discrepancy on weight cutflow is due to different input MC samples.
- Next step: to work on comparison about background estimation, MVA training etc..