

Weekly Report

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May.11.2020

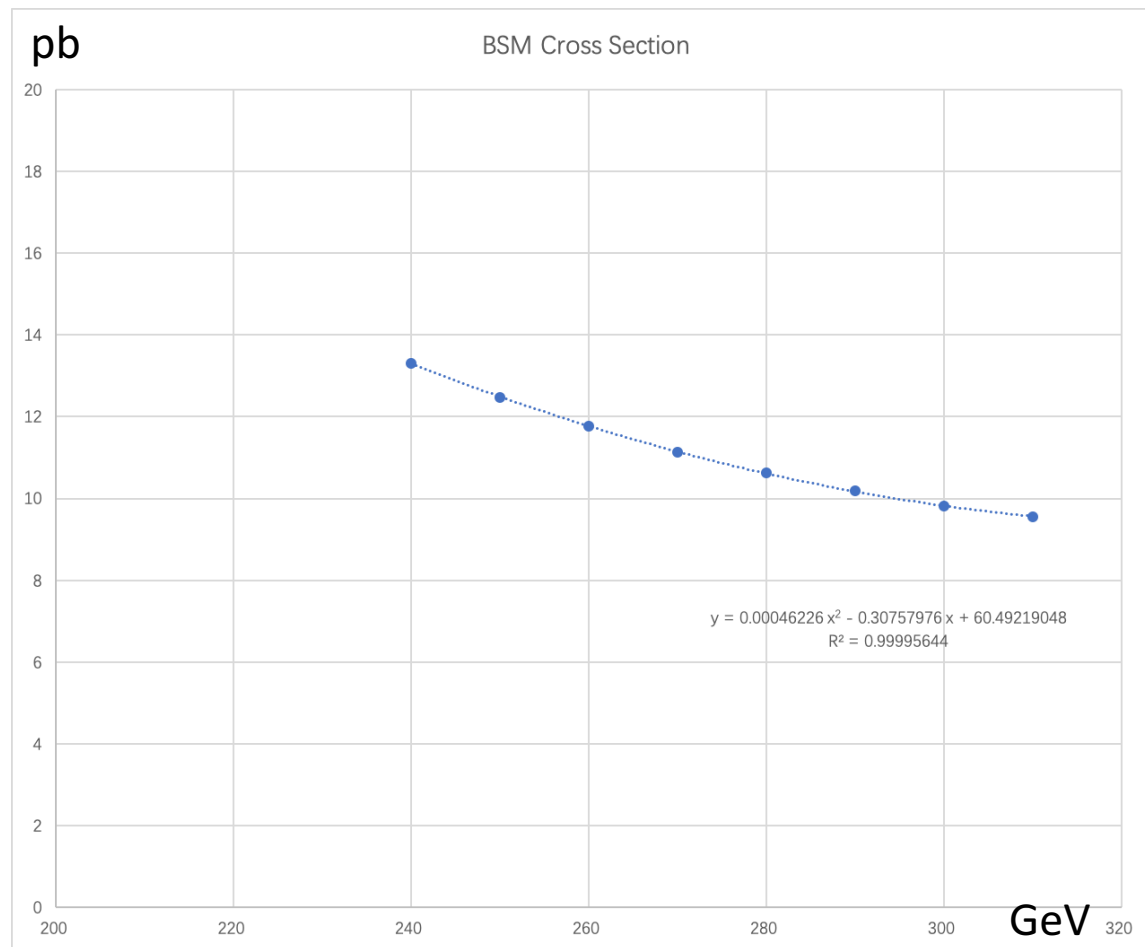
SH model study

Signal generation

- Tool: Delphes, Pythia
- Mass components
 - m_H : 266, 268, 270, 272, 274 GeV
 - m_S : 136, 138, 140, 142, 144 GeV
- Fit to
 - ATLAS H $\gamma\gamma$ RUN2
 - CMS H4l RUN2

BSM cross section

- Parameterization
- A function of m_H



Combination Fit results

mH(GeV)	mS(GeV)	sm factor	beta_g^2	chi2
266	136	0.7973	1.1058	28.7211
266	138	0.7621	1.2892	28.1219
266	140	0.8401	0.9214	29.8455
266	142	0.821	1.1311	30.2964
266	144	0.9737	0.3349	31.3756
268	136	0.8407	0.9023	29.4314
268	138	0.7954	1.1329	28.6041
268	140	0.7545	1.3433	27.8521
268	142	0.8408	0.9311	29.851
268	144	0.81	1.207	30.129
270	136	0.9032	0.6035	30.4335
270	138	0.8435	0.8973	29.4672
270	140	0.7975	1.1287	28.6574
270	142	0.7586	1.3354	27.8088
270	144	0.8406	0.9408	29.7772

- Constraint on sm factor [0,1]

Fit results

mH(GeV)	mS(GeV)	sm factor	beta_g^2	chi2
272	136	0.9535	0.3636	31.0427
272	138	0.9092	0.5816	30.5106
272	140	0.8461	0.8966	29.4757
272	142	0.7966	1.1473	28.564
272	144	0.7674	1.3084	27.9997
274	136	0.9967	0.1612	31.3868
274	138	0.9557	0.36	31.0628
274	140	0.8973	0.6459	30.2723
274	142	0.8441	0.9125	29.4073
274	144	0.7986	1.1509	28.6225

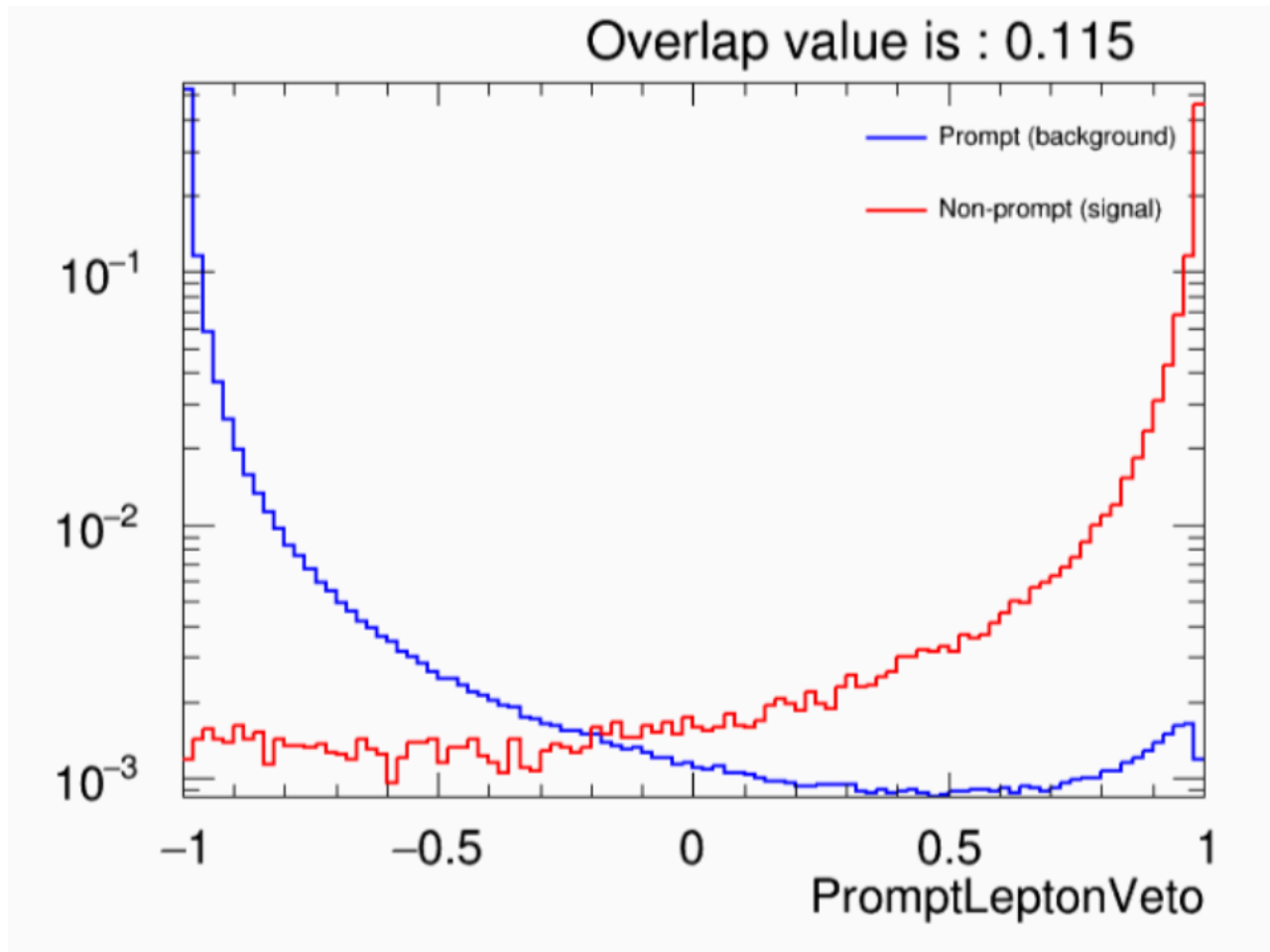
- 268,140 has the largest beta_g^2
- To do
 - Fit to CMS RUN2 15/16 Hyy
 - Fit to ATLAS RUN 15/16 H4l

HHML 2LSS Analysis

- Slimmed ntuples from v10 GN1 samples
- Included mc16a/d/e
- Validation
 - Trigger efficiency study
 - Lepton W.P
 - electron PflowLoose ,FCTight && TightLH
 - Muon PflowLoose PflowTight && Tight
 - TightTrackOnly no longer available for Muon in this derivation

PLV impact on Trigger efficiency

- PromptLeptonVeto



- Working Point : PLV < -0.4

PLV impact on Trigger efficiency

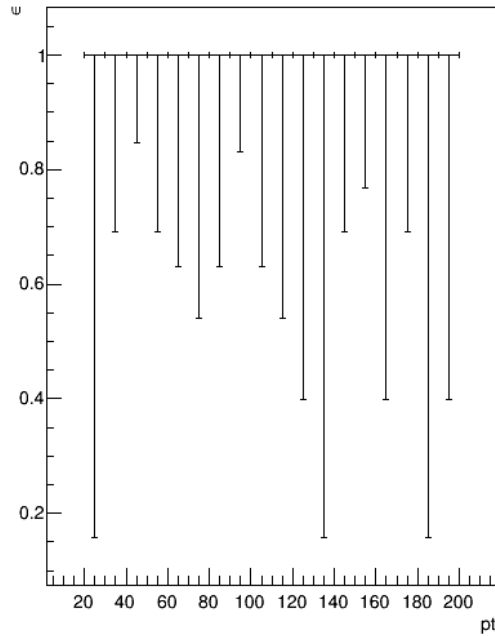
- With OR operator

```
Char_t trigger2018=(HLT_e26_lhtight_nod0_ivarlose || HLT_e60_lhmedium_nod0 || HLT_e140_lhlose_nod0);  
Char_t trigger2015=HLT_mu20_iloose_L1MU15 || HLT_mu50 || HLT_e24_lhmedium_L1EM20VH || HLT_e60_lhmedium ||  
HLT_e120_lhlose;  
Char_t trigger201617= HLT_mu26_ivarmedium||HLT_mu50 || HLT_e26_lhtight_nod0_ivarlose || HLT_e60_lhmedium_  
nod0 || HLT_e140_lhlose_nod0;
```

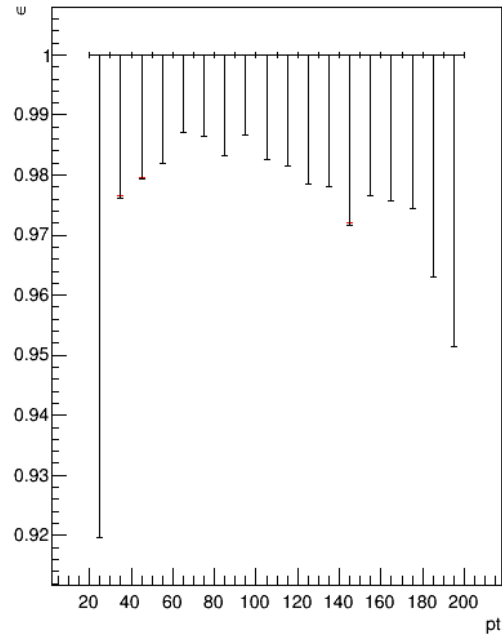
- Applied triggers only for corresponding dataset
- RunYear==2015 &&trigger2015

Signal

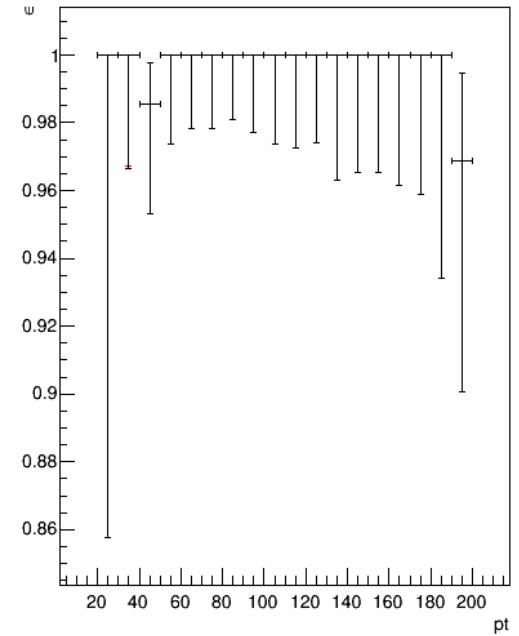
2015 trigger



201617 trigger



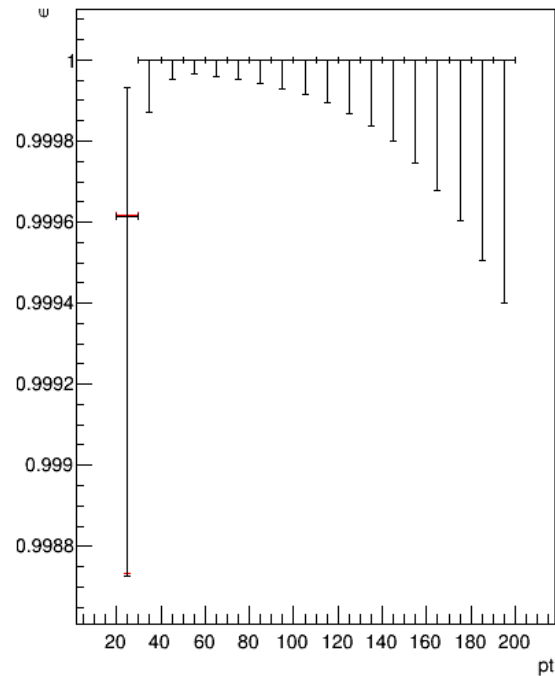
2018 trigger



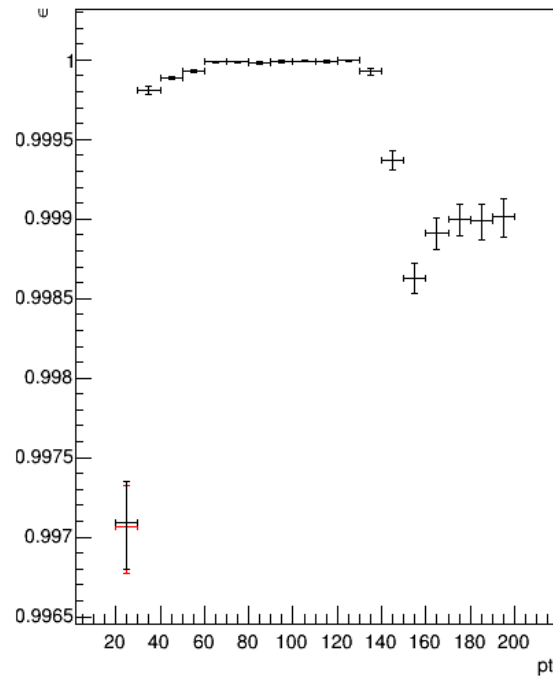
- Selection : lepton at preselection level
- Electron pt(leading) vs Trigger efficiency
- Black(with plv)
- Red (without plv)

Zjets

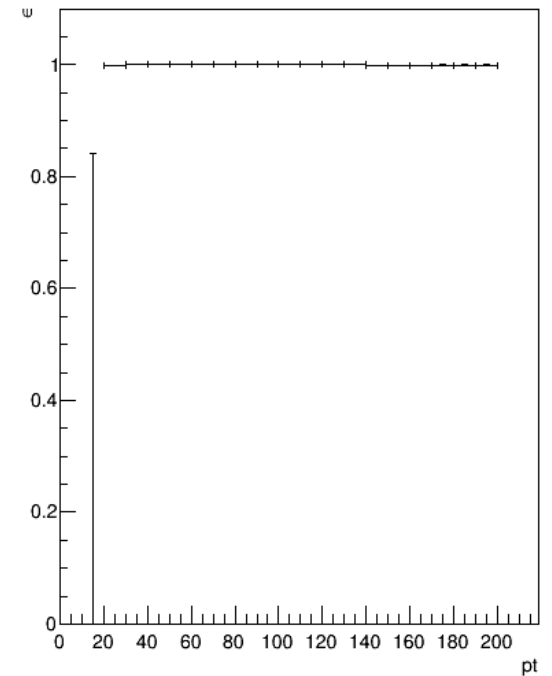
2015 trigger



201617 trigger



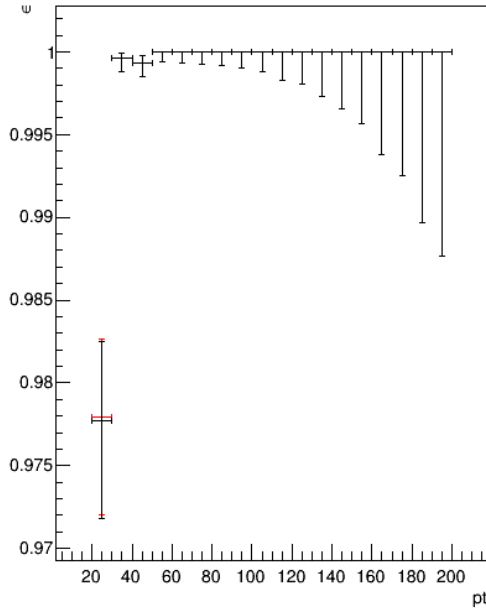
2018 trigger



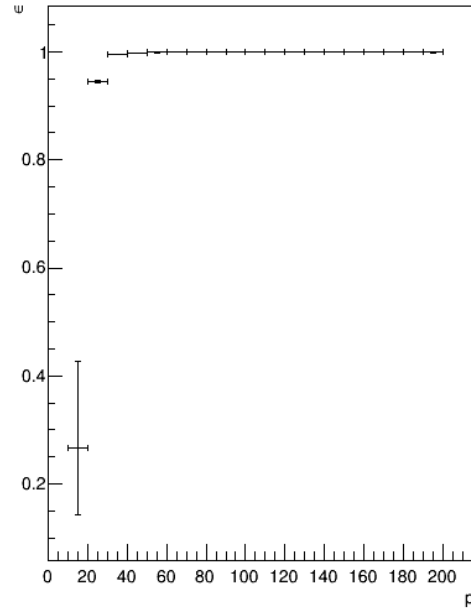
- Selection : lepton Zjets CR (remove njets and Zwindow requirements)
- Electron pt (leading) vs Trigger efficiency
- Black(with plv)
- Red (without plv)

TTbar

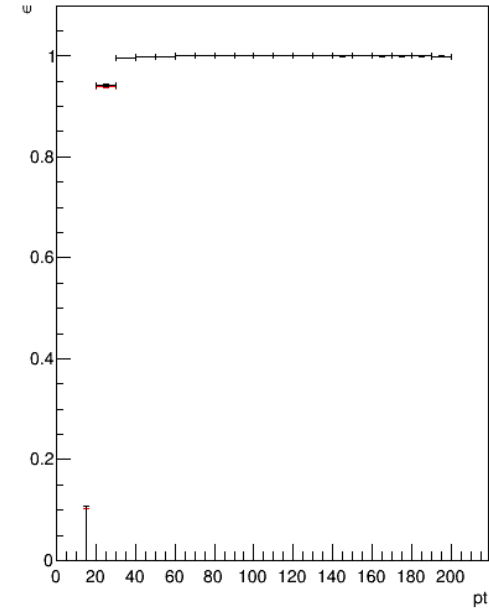
2015 trigger



201617 trigger



2018 trigger



- Selection : lepton ttbar CR (remove njets requirements)
- Electron pt(leading) vs Trigger efficiency
- Black(with plv)
- Red (without plv)

- Negligible effect from PLV