Higgs Searches: Weekly report

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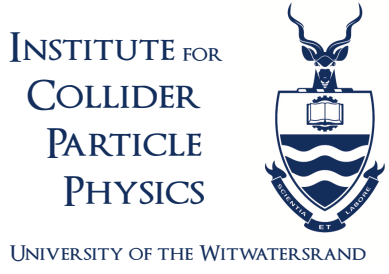
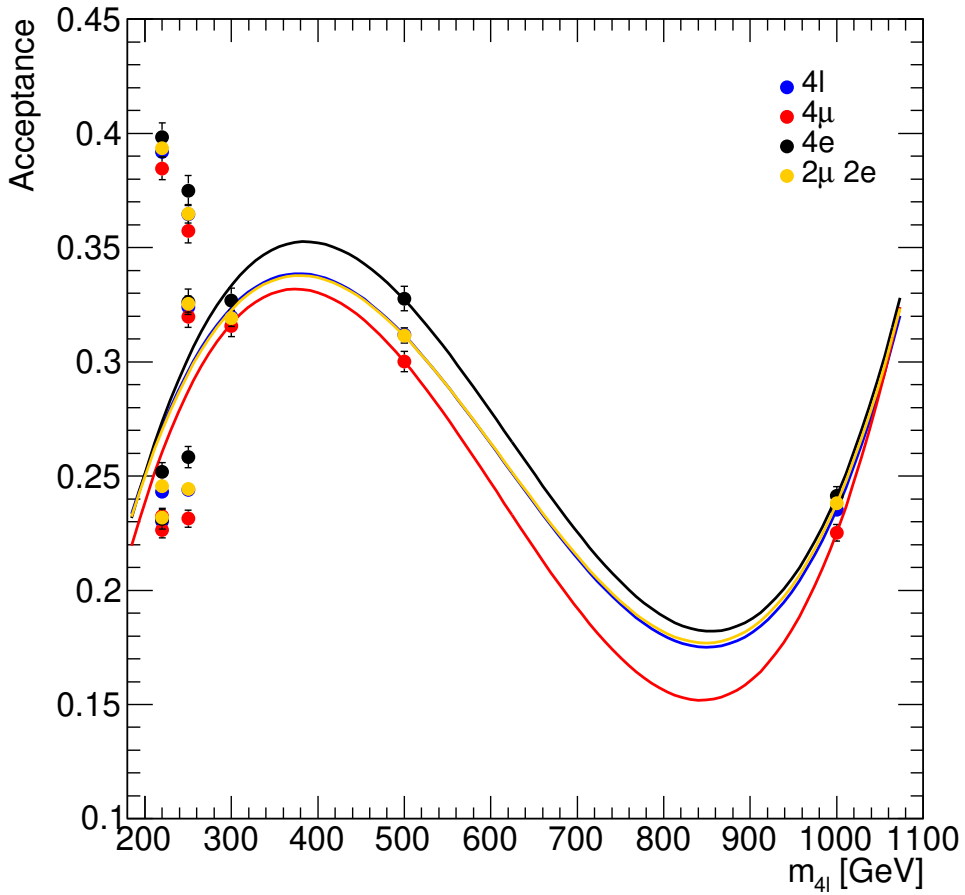
November 25, 2019



Update on $R \rightarrow SH \rightarrow 4\ell + E_T^{miss}$ analysis

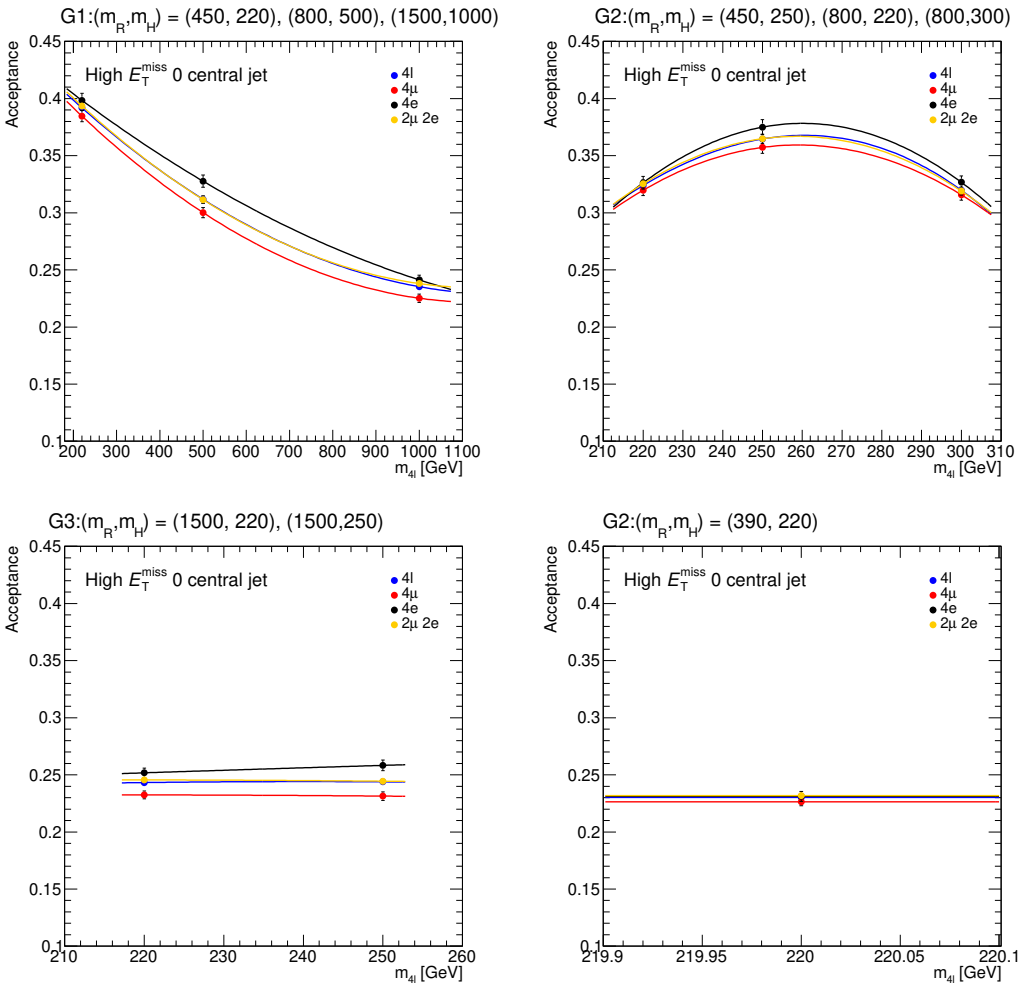
Problem with the irritability of the signal acceptance



- Impossible to find a simple polynomial function that can fit these signal acceptances.

Update on $R \to SH \to 4\ell + E_T^{miss}$ analysis

Problem with the irritability of the signal acceptance



- We might have a problem with stats, so we may need to generate more events.

Update on $R \to SH \to 4\ell + E_{\mathrm{T}}^{miss}$ analysis

A solution might work

- We can rearrange the signal samples by transforming them as follows:

$$\text{Mass-To-Fit} = -(m_R + m_H) \times m_H \times \text{A number}$$

- So I'm still fitting to get this done; and
- We can solve the signal acceptance fitting issue similarly.

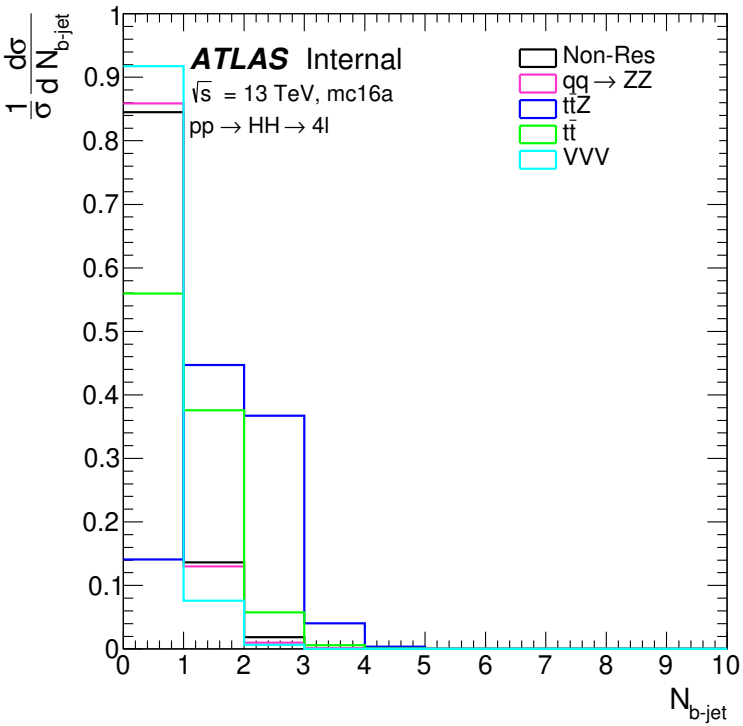
The signal

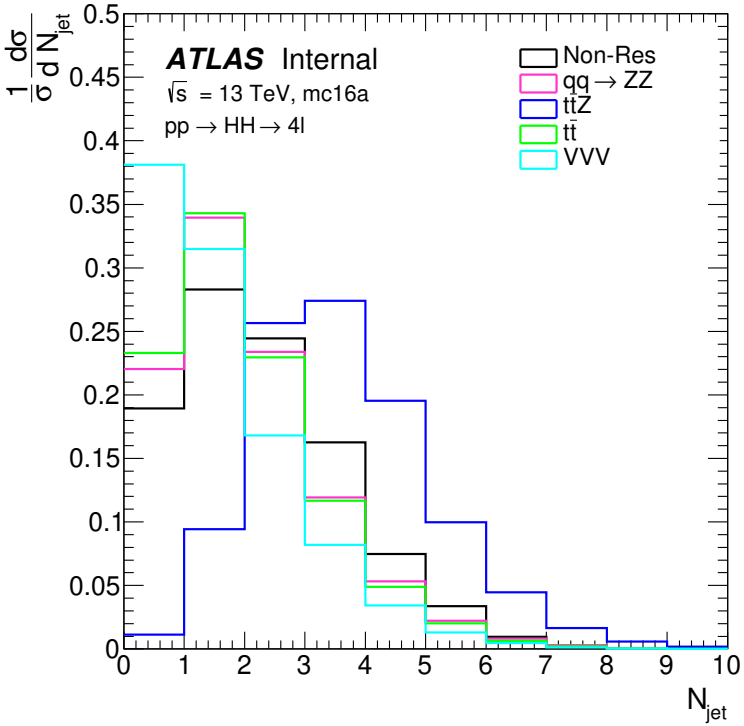
Non-Resonance Higgs signal $pp \to HH \to 4\ell$

- Background:
  - $qq \to ZZ$
  - $gg \to ZZ$
  - $t\bar{t}Z$
  - $Z + Jet$
  - $t\bar{t}$
  - VVV

Update on $pp \to HH \to 4\ell$ analysis

Number of jet and b-tagged as jet

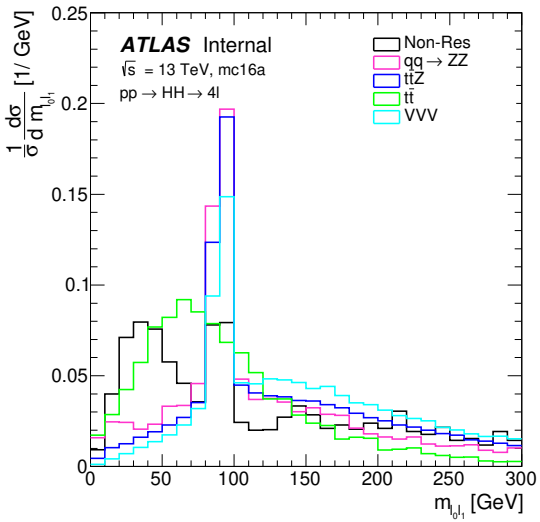


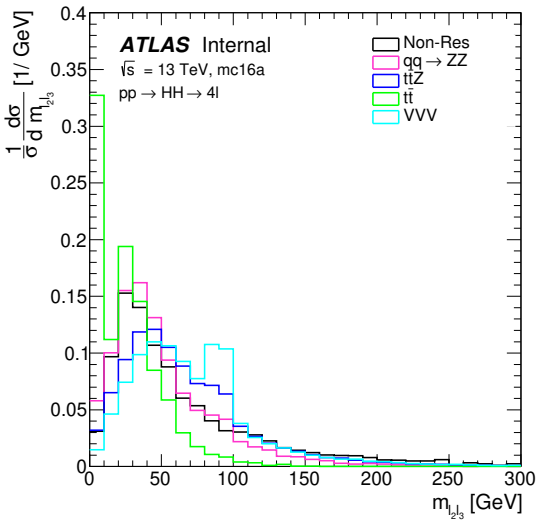


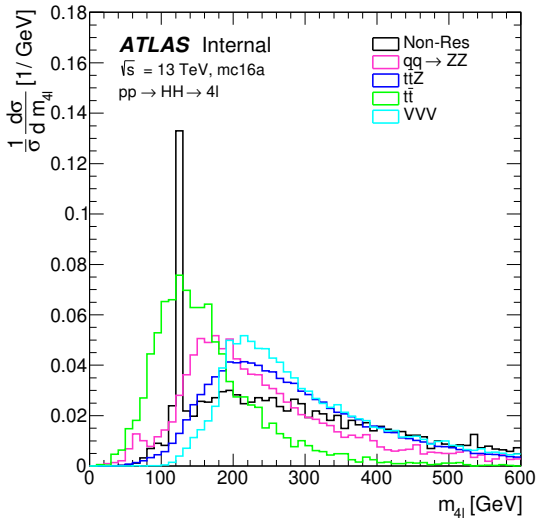
- $N_{\text{b-jet}} = 0$
- $N_{\text{jet}} = 0$ and $N_{\text{jet}} \geq 1$

Update on $pp \to HH \to 4\ell$ analysis

Invariant mass of the first and second lepton pairs and the $m_{4\ell}$

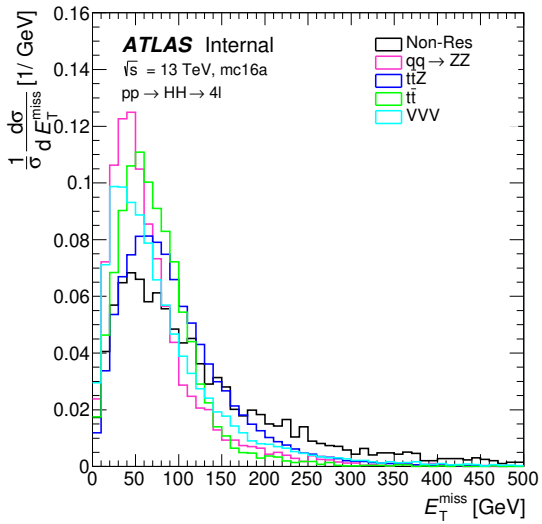


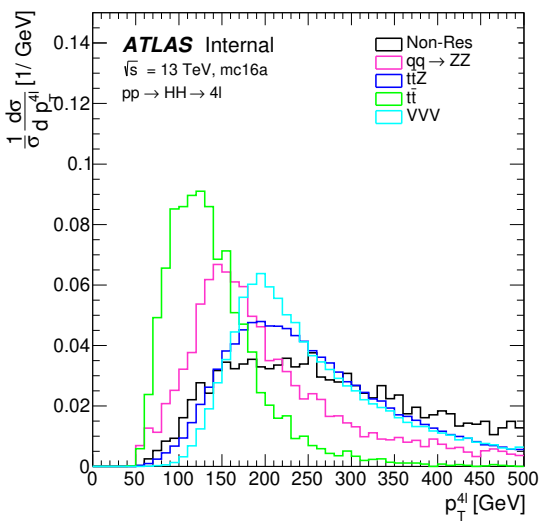


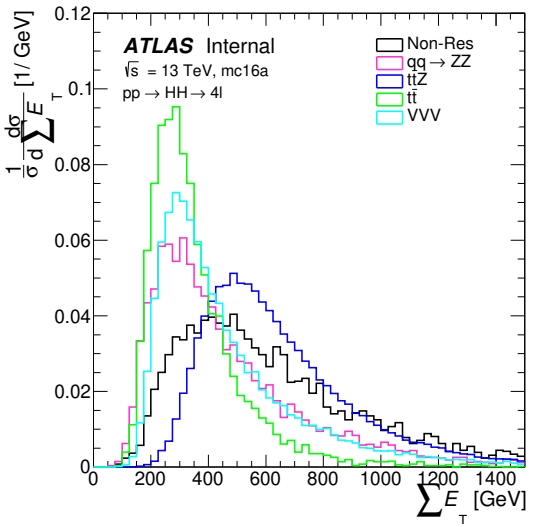


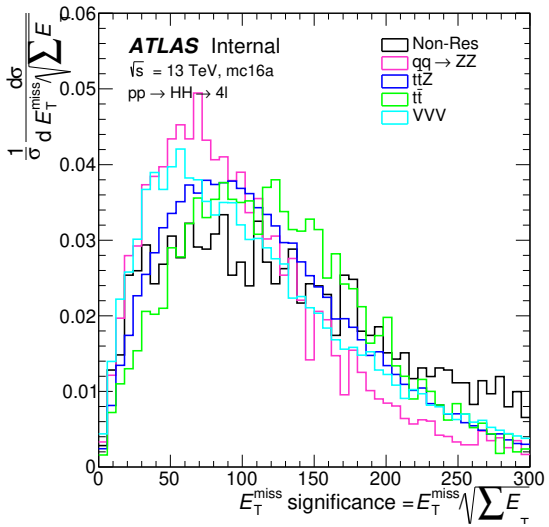
Update on $pp \rightarrow HH \rightarrow 4\ell$ analysis

$p_T^{4\ell}$, E_T^{miss}, $\sum E_T$ and E_T^{miss} significance $= E_T^{miss}/\sqrt{E_T}$



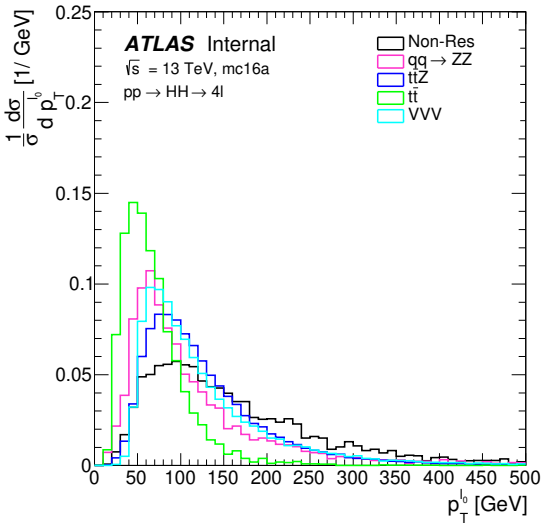


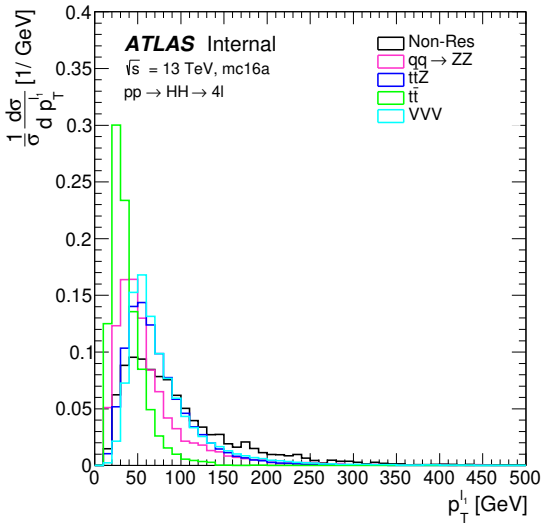


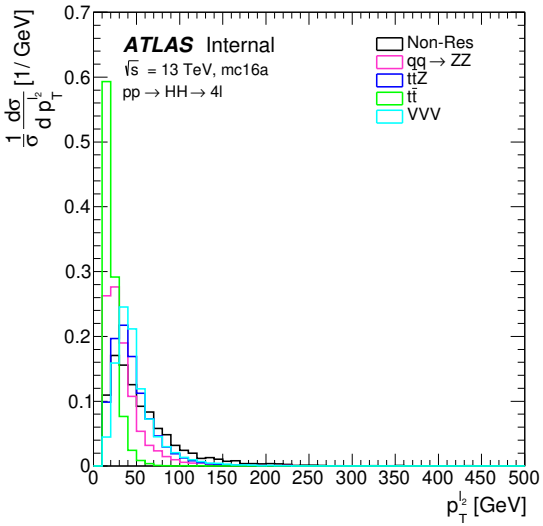


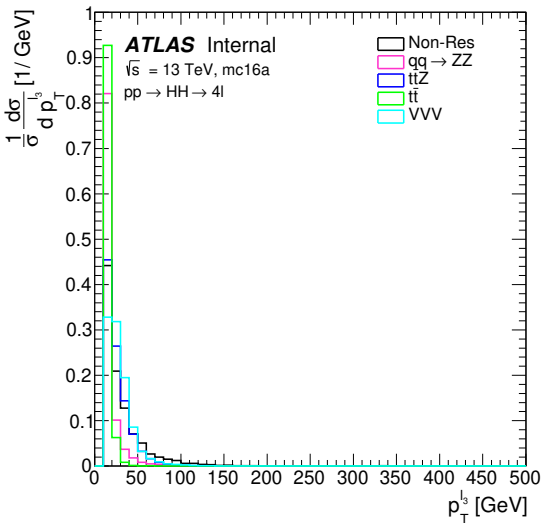
Update on $pp \rightarrow HH \rightarrow 4\ell$ analysis

Momentum transverse energy of leptons









Thank you!