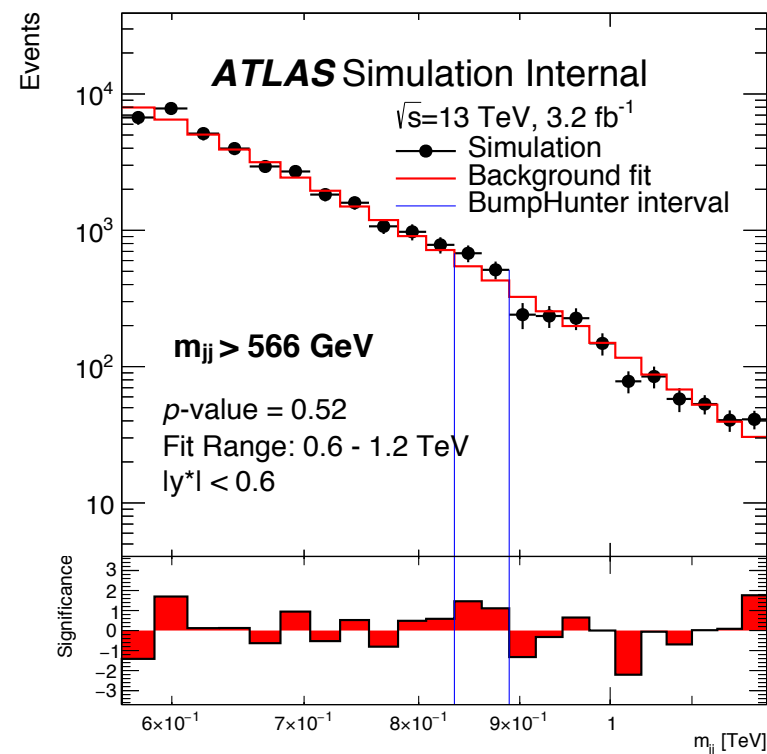
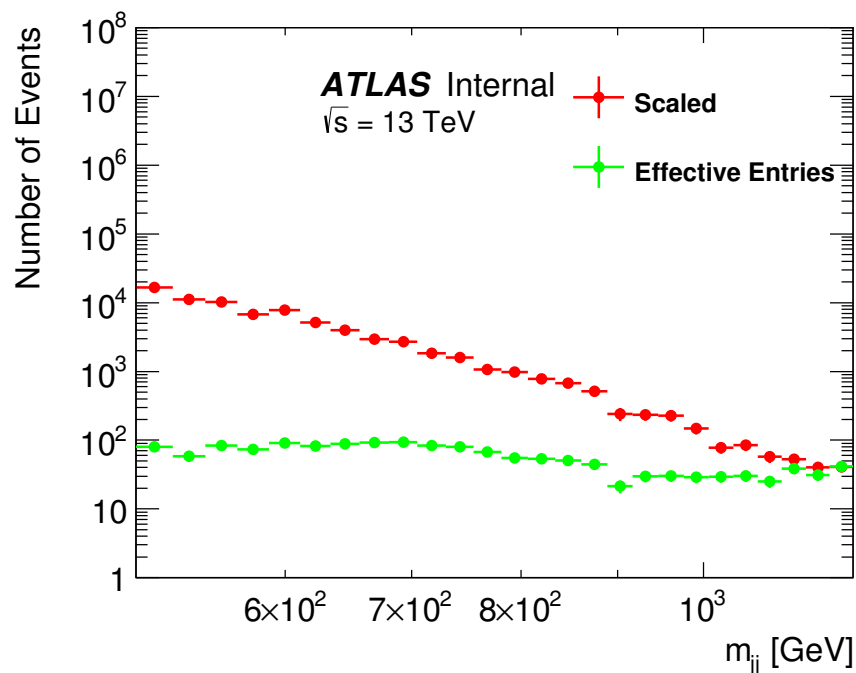




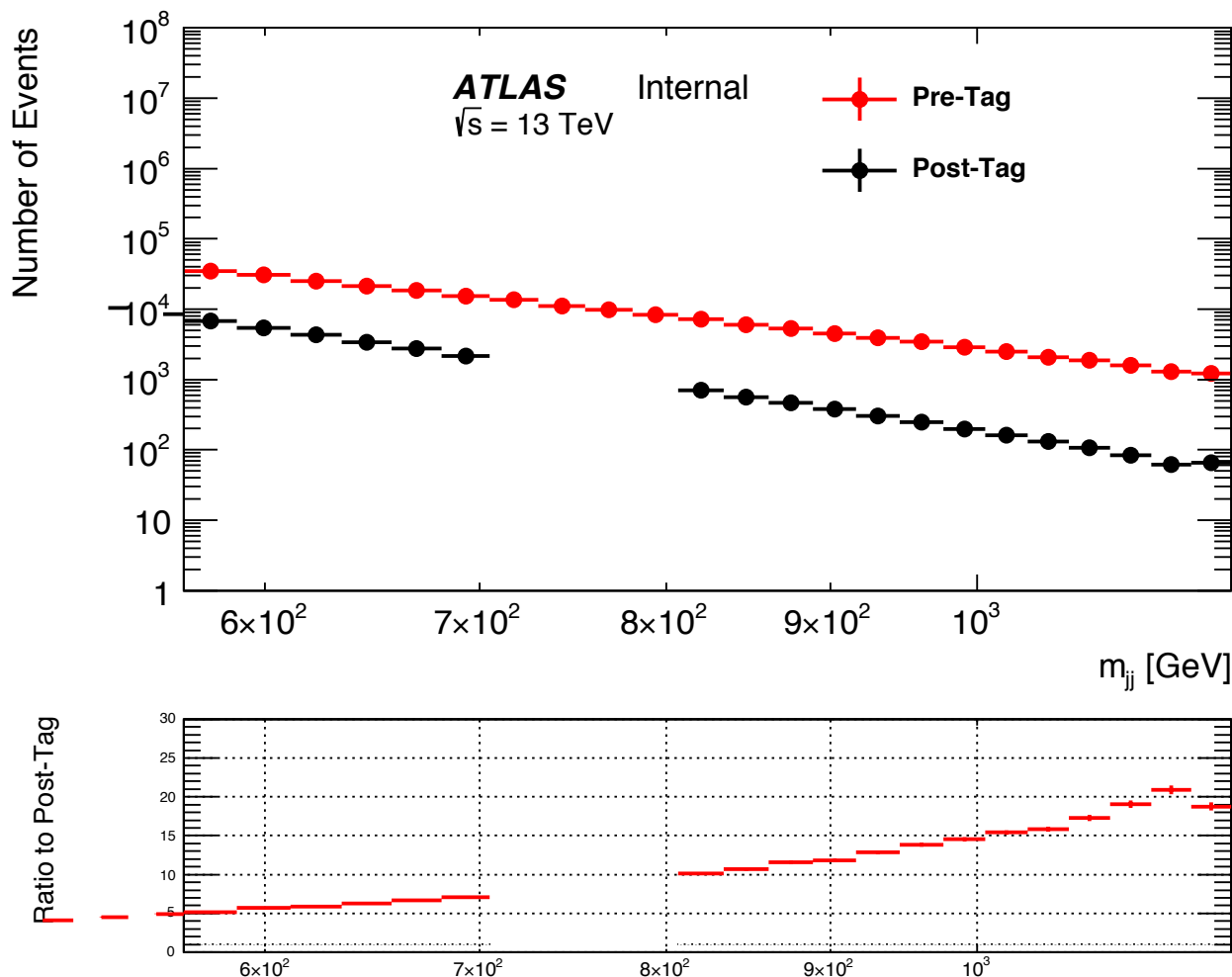
- **Confirm that fits discrepancies are not significantly occurring**
 - A fit discrepancy may fake or disguise signal
 - Fits performed to a representative background only data set can test fit function
- **Monte Carlo**
 - Pythia8 Dijet Sample, same cuts as in data
 - Except trigger, emulated using p_T dependant b-jet and non b-jet efficiencies
 - Problems with statistics, Effective Entries < Scaled Entries
 - => Not poisson-like errors





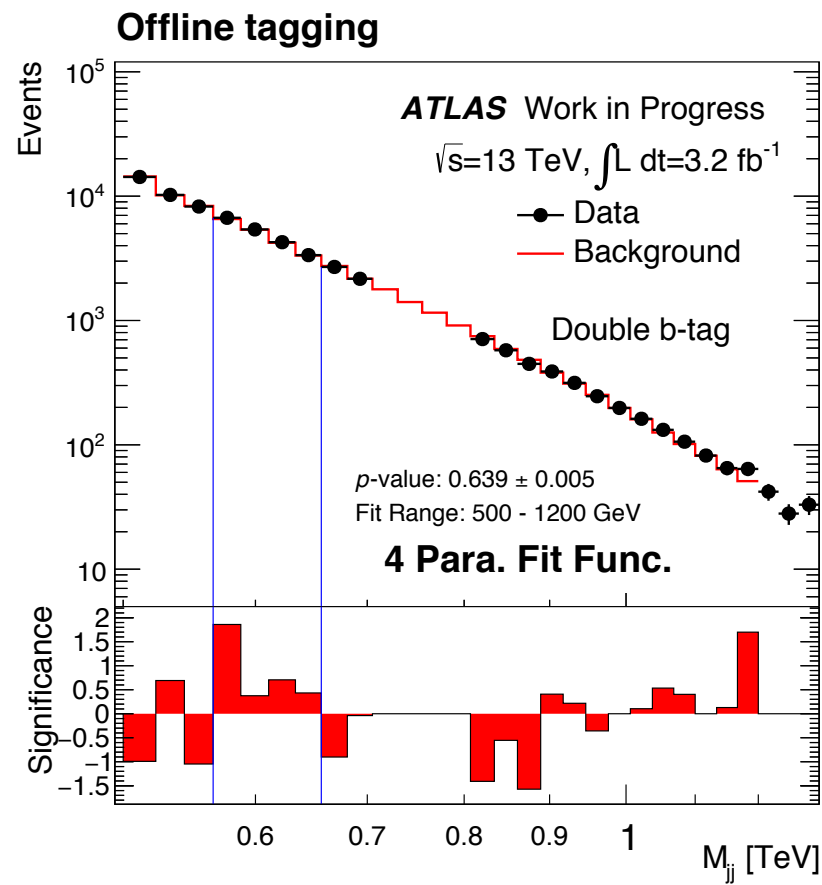
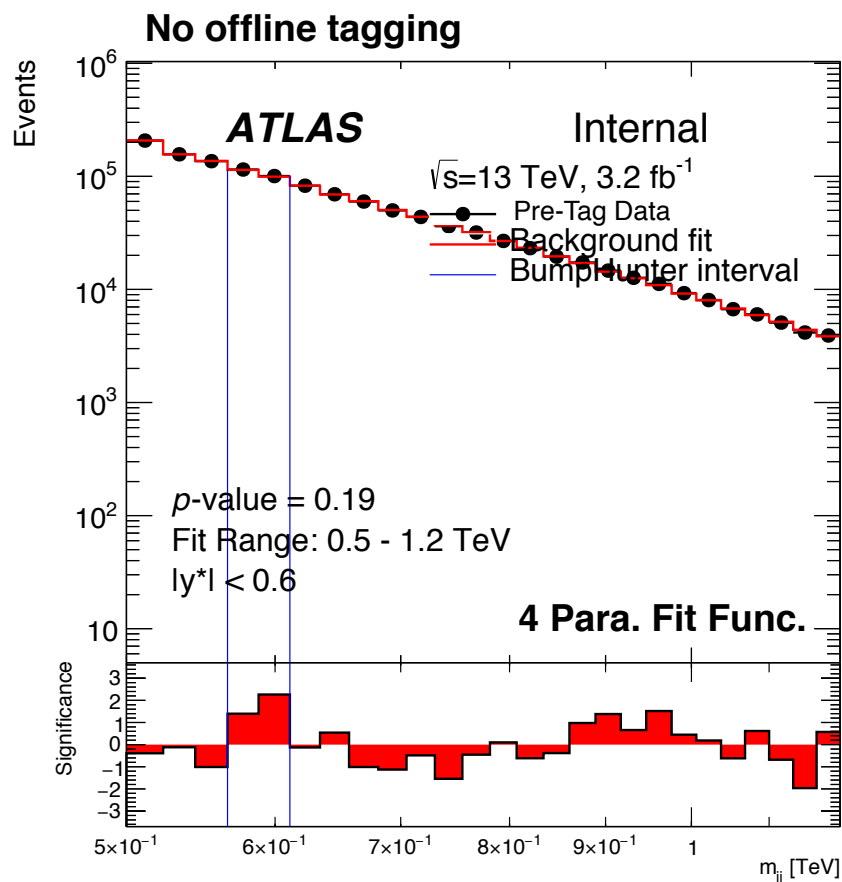
- Fit to Data with Trigger Applied

- b-Tagging not applied, so we are not blinded.
- Dominated by bl, but this give us a similar, but different control region to test fitting





- **Fit to Data with Trigger Applied**
 - Old cuts: L Jet $p_T > 200$ GeV, SL Jet $p_T > 80$ GeV, $m_{jj} > 500$ GeV
- **Fit quality: On old cuts**
 - Periodic structure, seen in ratio plot.
 - Also hints of this in blinded double b-tag spectrum

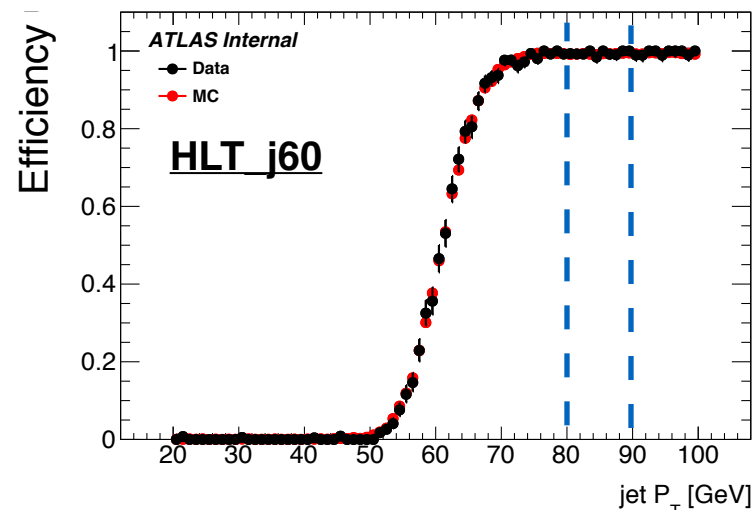
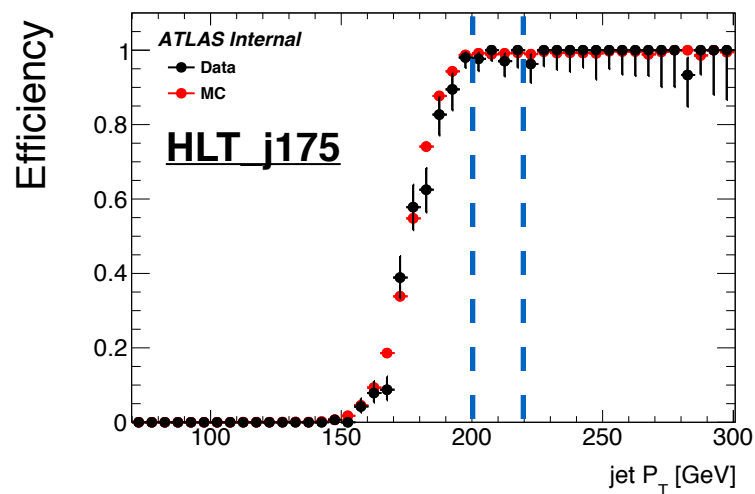




4 Leading Jet P_T Cut

- Possible cause of misfit is from trigger turn on effect

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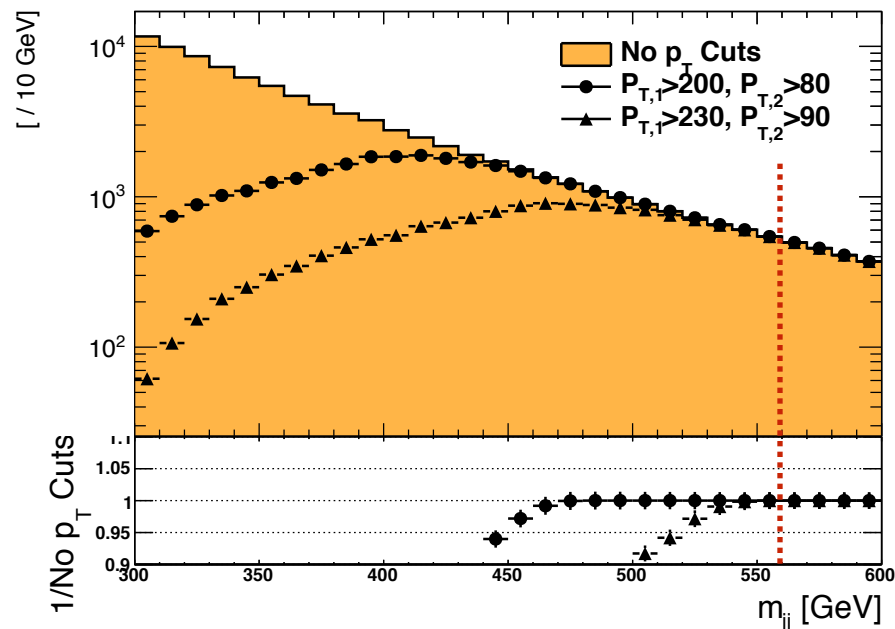


Change of Cuts

Leading Jet $P_T > 220$ GeV

Sublead. Jet $P_T > 90$ GeV

$m_{jj} > 566$ GeV

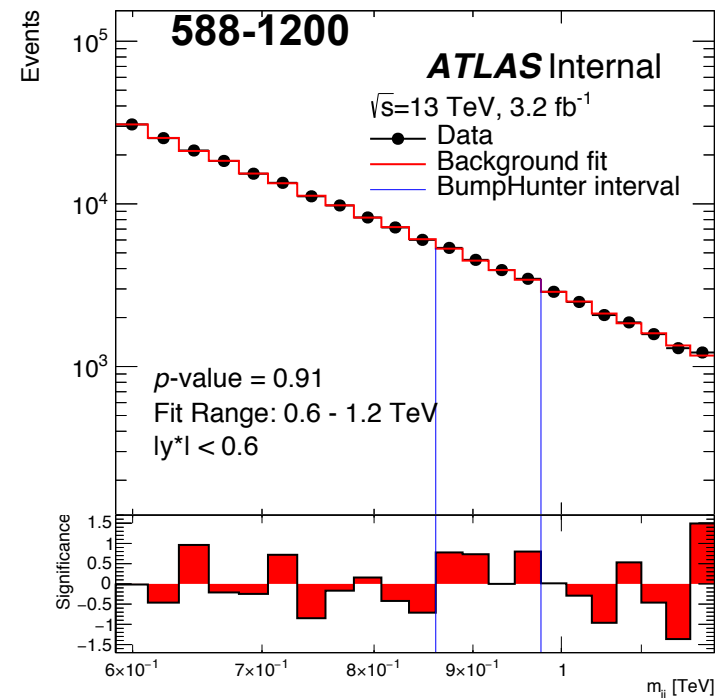
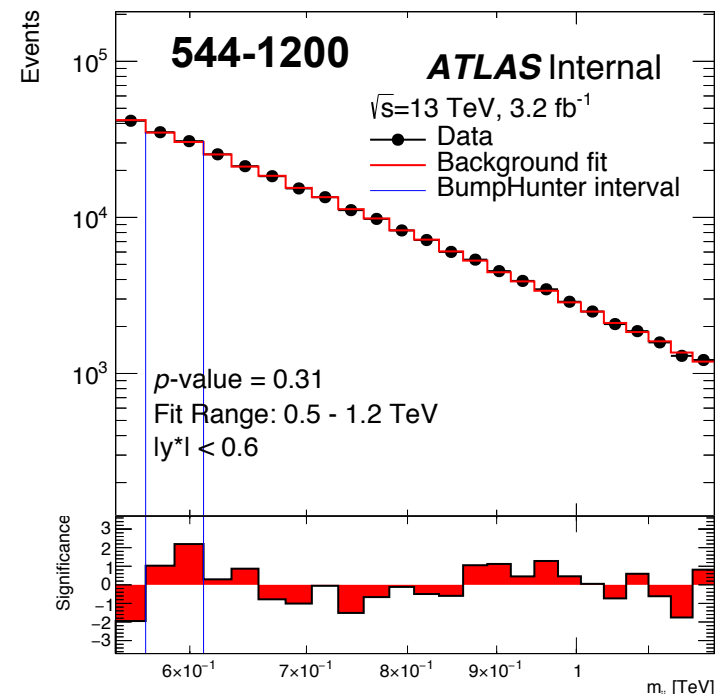
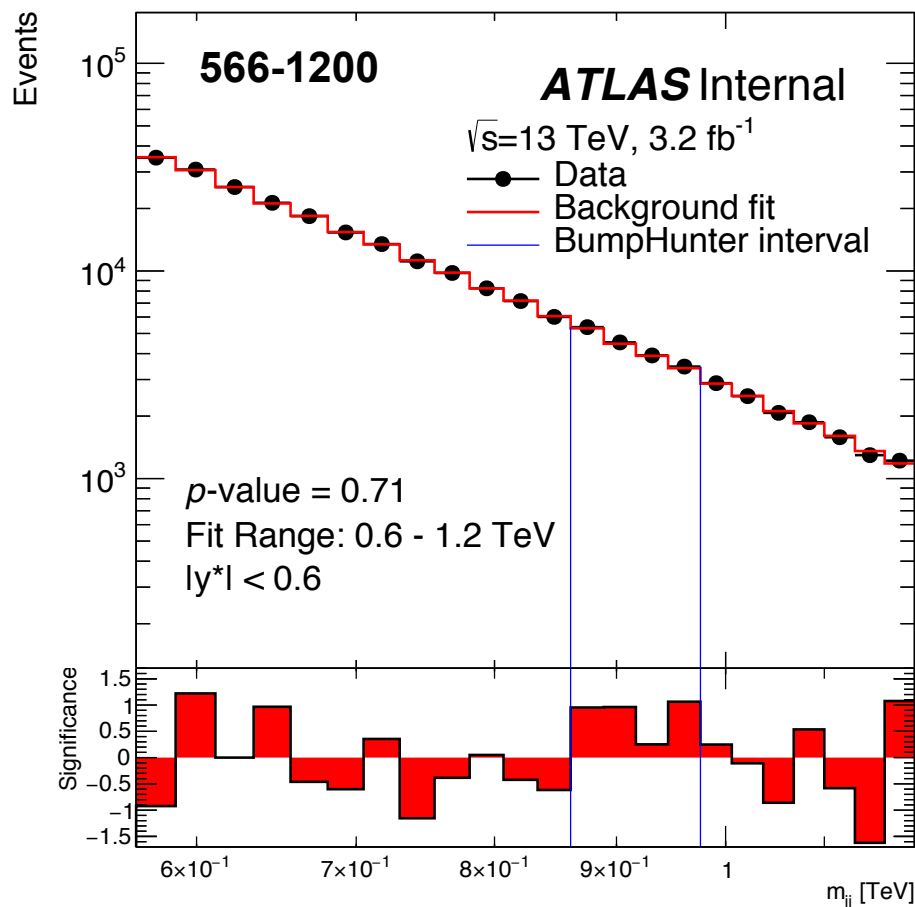




5 Spurious Signal

• Changing Fit Range

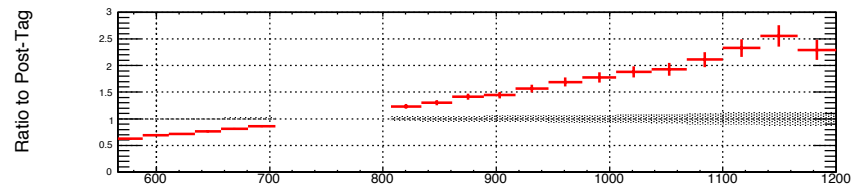
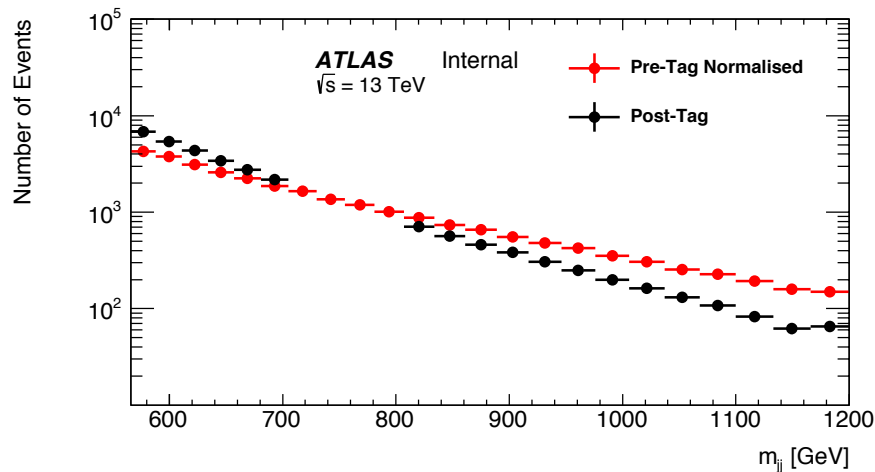
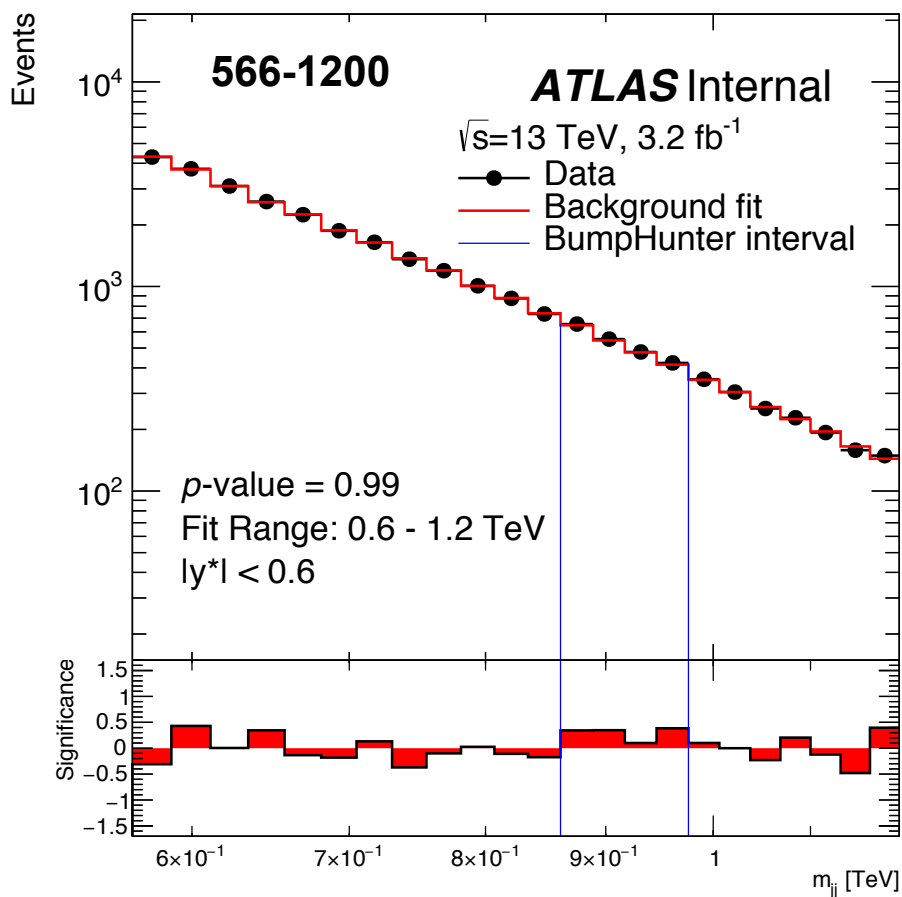
- 544-1200 => Poor Fit
- **566-1200 => Fit OK!**
- 588-1200 => Thrown in as well





6 Spurious Signal: Scaled Down

- **Scale Pre-Tag to Post-Tag**
 - Set errors to poisson-like
 - Fit and search for bumps



**We see that at post-tag scale:
Fit Discrepancies \ll Poisson Fluct.**



- **Check if statistical fluctuation at 566 GeV**
 - This may cause fit issues (even if not actually significant)
 - Removing up to stat edge allows fit to adjust
 - Still on old cuts (Leading jet $p_T > 200$ GeV, Subleading jet $p_T > 80$ GeV)

- **Remove Window**
- **Fit to Sidebands**
 - bH p-value = 0.4681
- **Then use fit with full range**
 - Rerun BumpHunter
 - bH p-value = 0.001
- **Evidence of fluctuation causing bad fit?**

