



MJ – comparing SM and HVT

Andreas Hönle

Max Planck Institute for Physics
(Werner-Heisenberg-Institut)

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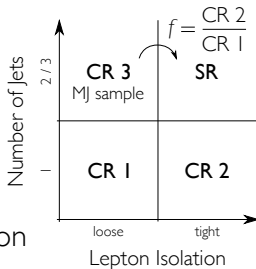


What is this?

- ▶ Brief summary of MJ in **1 lepton, resolved** events
- ▶ Was already done by **SM** analysis (see the [Note](#), 37ff.)
- ▶ Based on **fake factor** method

We will

- ▶ Take a look at SM plots from the note
- ▶ Compare to our **SimpleMerge500** selection
- ▶ Go from **SimpleMerge500** to **PriorityResolvedSR**



SM selection

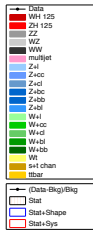
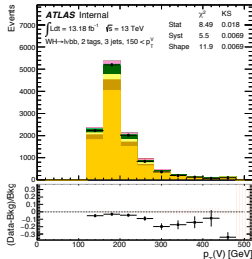
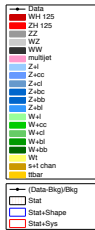
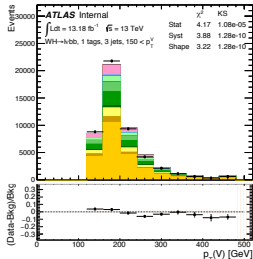
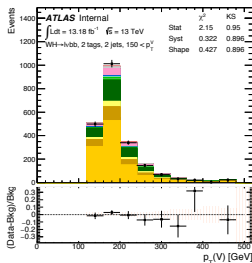
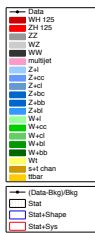
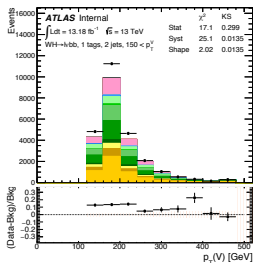
- ▷ 2, 3, ...jet events (we look only at **2 and 3 jet** events for now)
- ▷ consider **1 and 2** tag categories
- ▷ inclusive in m_{bb}
- ▷ almost identical selection (who knows the differences?)
- ▷ **resolved** only

Technical details

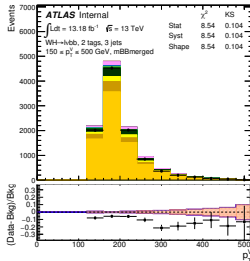
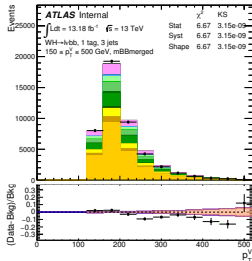
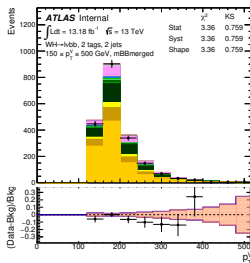
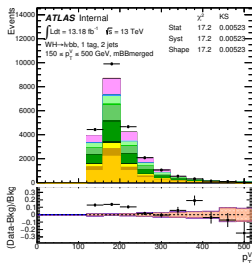
- ▷ `modelType = HVT`
- ▷ Split into 2, 3, 4p jet regions by hacking `HistNameSvc`
- ▷ MJ: “elQCD” and “muQCD” combined

Compare SM to SimpleMerge500

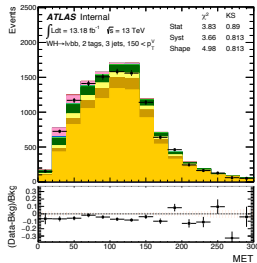
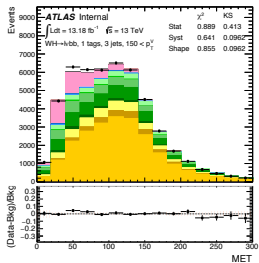
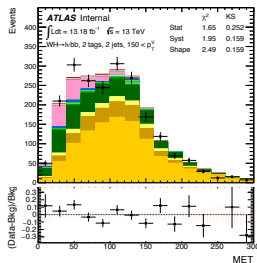
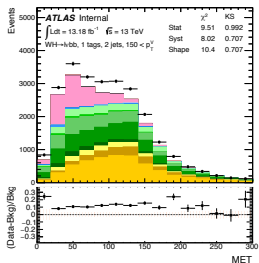
Standard Model p_T^V



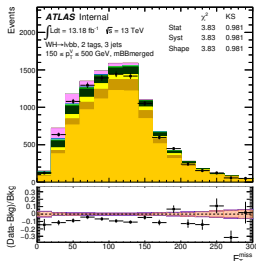
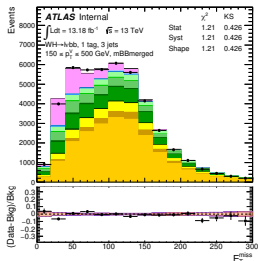
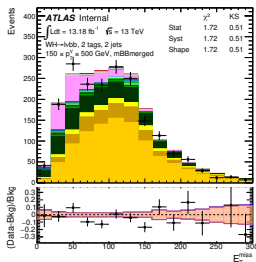
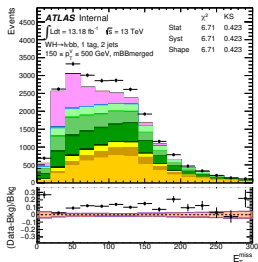
HVT SimpleMerge500 p_T^V



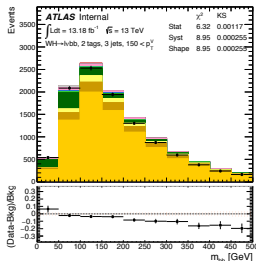
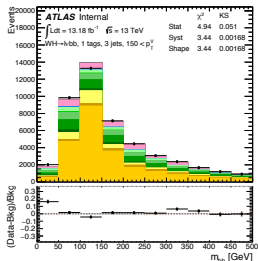
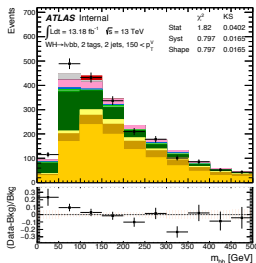
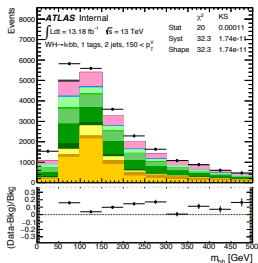
Standard Model E_T^{miss}



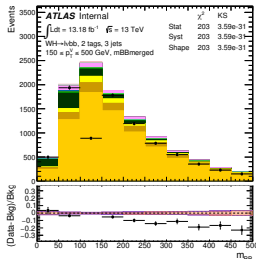
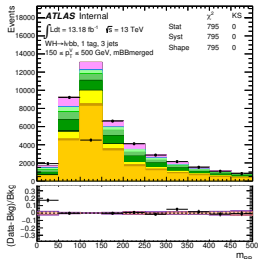
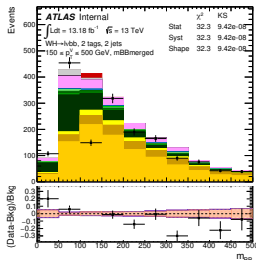
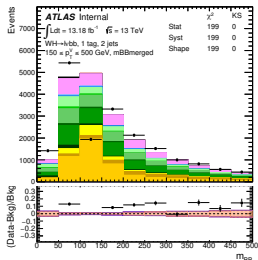
HVT SimpleMerge500 E_T^{miss}



Standard Model $m_{b\bar{b}}$



HVT SimpleMerge500 m_{bb}



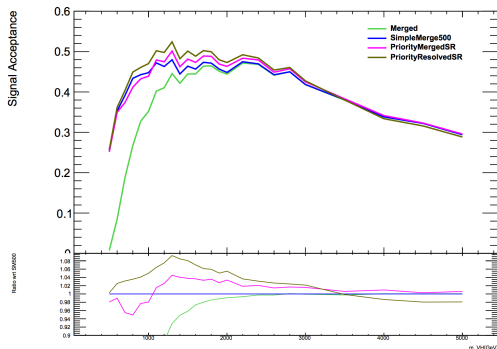
Compare SimpleMerge500 to PriorityResolvedSR

PriorityResolvedSR

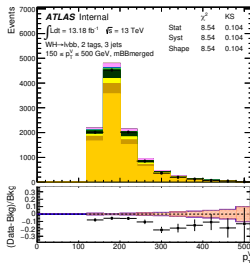
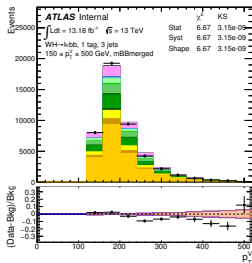
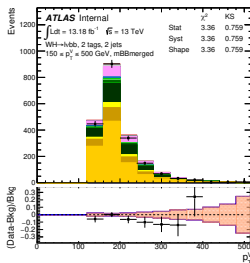
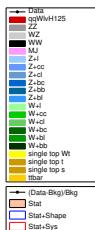
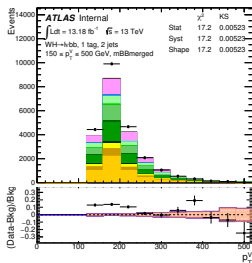
Prioritize regions in the order:

1. Merged SR
2. Resolved SR
3. Merged CR
4. Resolved CR

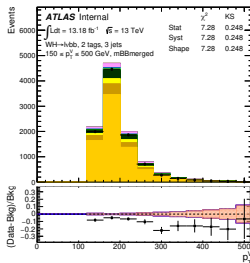
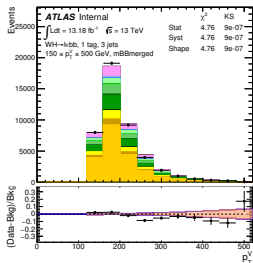
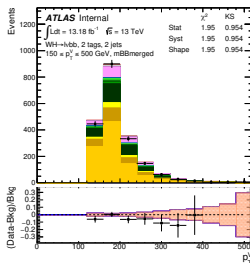
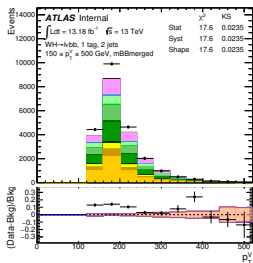
opposed to simple cut on p_T^V



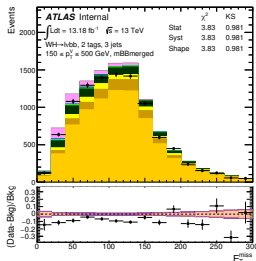
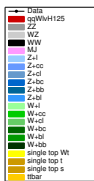
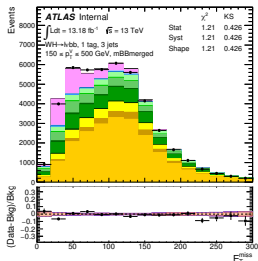
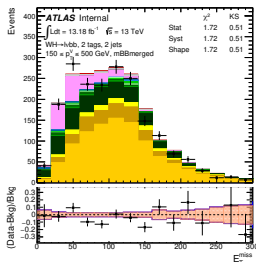
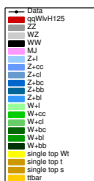
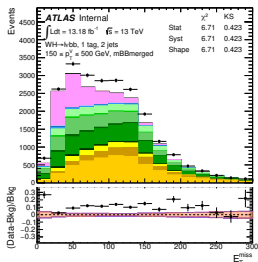
HVT SimpleMerge500 p_T^V



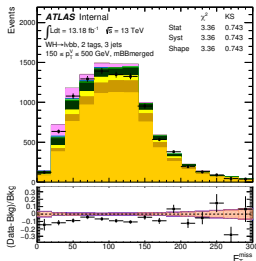
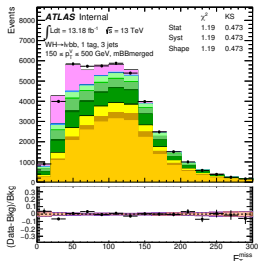
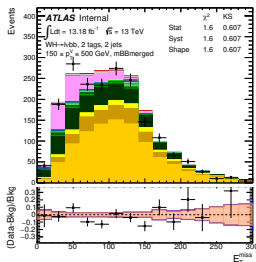
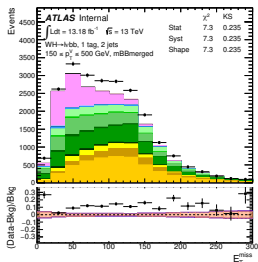
HVT PriorityResolvedSR p_T^V



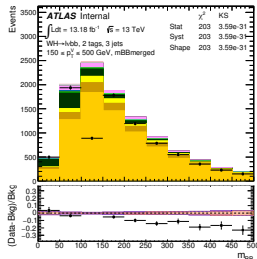
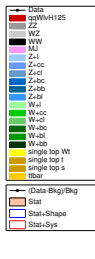
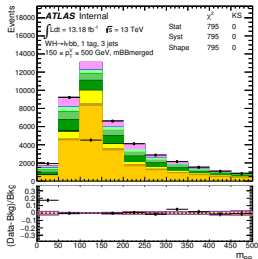
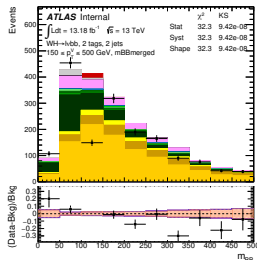
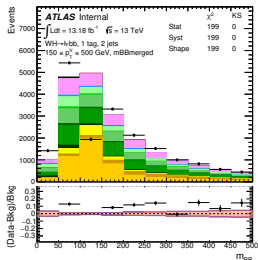
HVT SimpleMerge500 E_T^{miss}



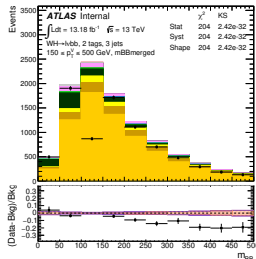
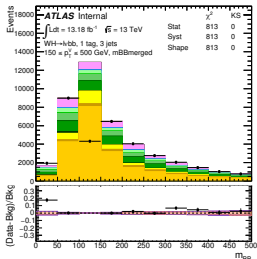
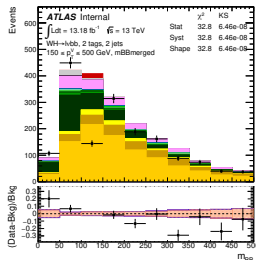
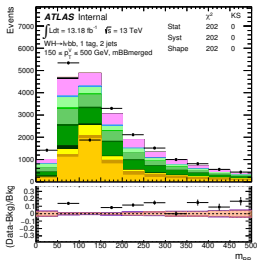
HVT plots PriorityResolvedSR E_T^{miss}



HVT SimpleMerge500 m_{bb}



HVT PriorityResolvedSR m_{bb}





Summary:

- ▷ Very good agreement between SM & HVT SimpleMerge500
- ▷ Going to PriorityResolvedSR is not a game-changer

Suggestion:

- ▷ Check in the (few small) changes required to generate multijet sample by setting a switch in the config
- ▷ Include in next inputs with full systematics (Explain procedure on TWiki?)
- ▷ Fitters should use the current procedure for resolved events
→ compare to SM post-fit

Outlook:

- ▷ Most importantly: What to do with merged? Is MJ negligible?
How to show this? MJ MC samples?
- ▷ Eventually: Calculate f from own selection

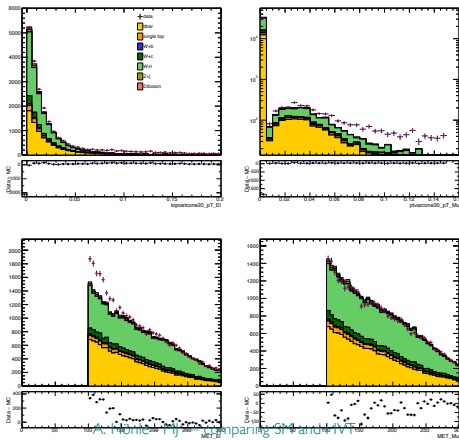


What's new? Work in progress ...

Merged QCD background

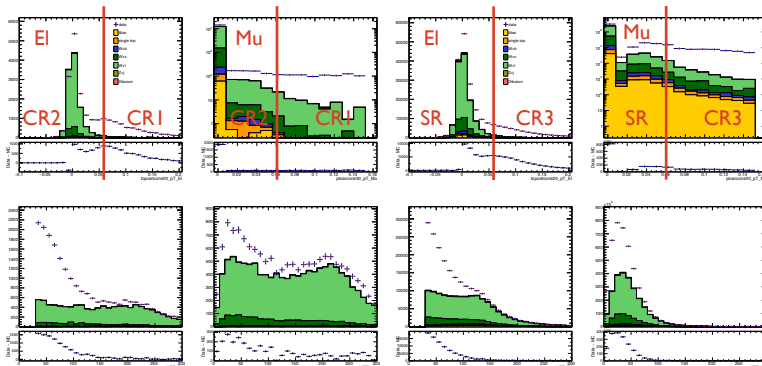
Quick (and dirty?): Isolation inversion

Events passing fat jet **selection** (CR or SR) with **isolation inversion** and (for electrons) **tightLH**



Fake Factor calculation

El: $m_{TW} > 150 \text{ GeV}$



1jet

2jet

BACKUP

Detailed requirements – Fake Factor CRs

