

VV: Community Discussion on YR Recommendations

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Outline

4 Tribosons

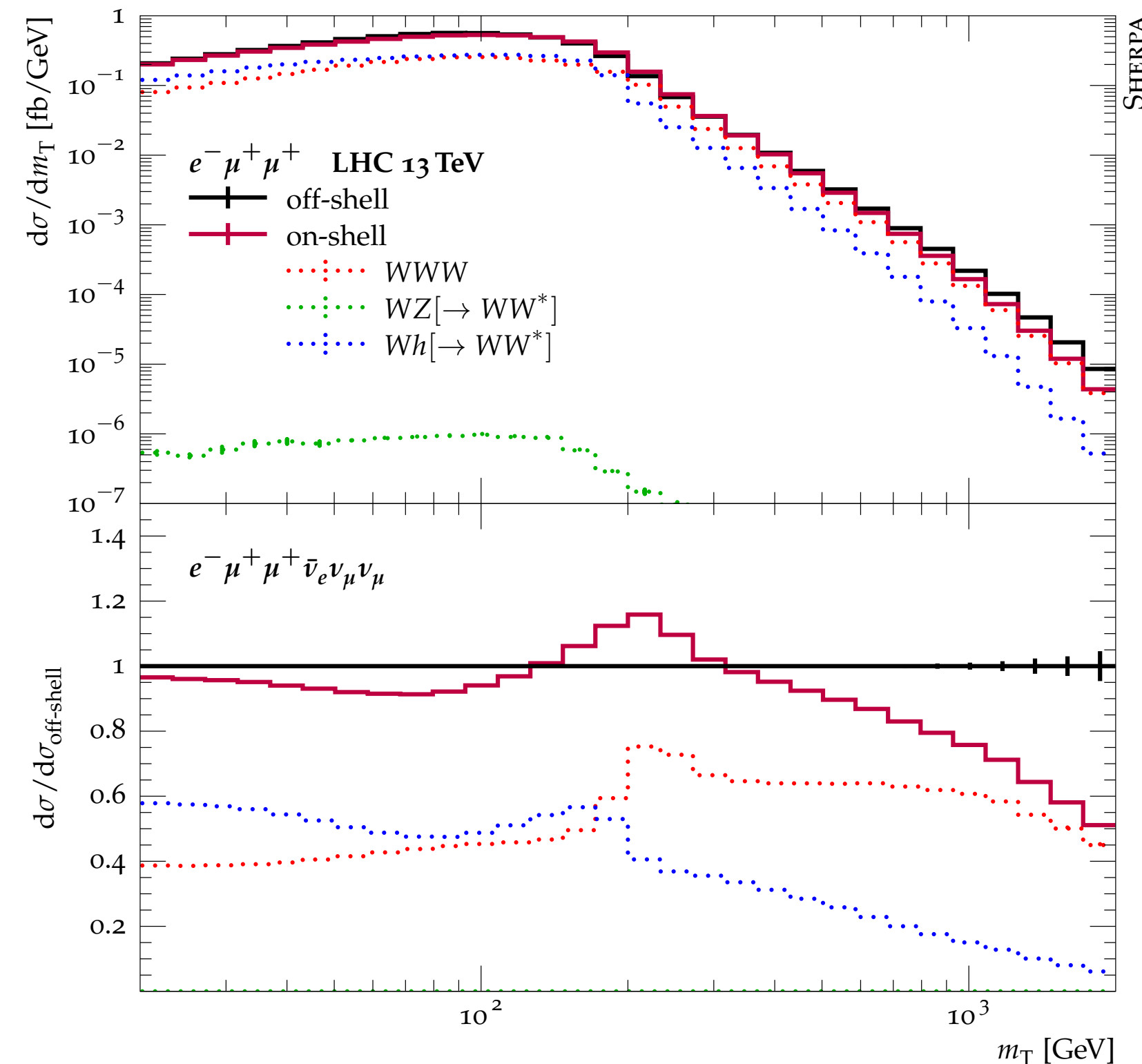
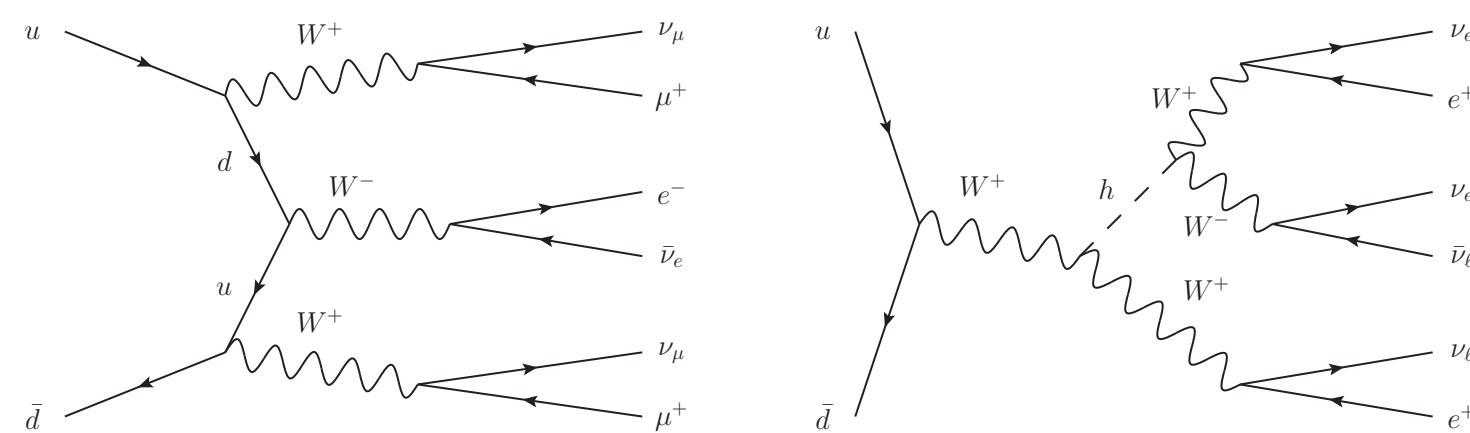
- 4.1 Theory predictions (M. Schönherr)
- 4.2 Experimental review
 - 4.2.1 $\gamma\gamma\gamma$
 - 4.2.2 $W\gamma\gamma$
 - 4.2.3 $Z\gamma\gamma$
 - 4.2.4 $WW\gamma$ and $WZ\gamma$
 - 4.2.5 WWW
 - 4.2.6 WWZ and WZZ

Necessity of off-shell calculations

Example WWW :

Typically $3\ell + \text{MET}$ with $\ell = e, \mu$,
thus 0/ 1/ 2 SFOS lepton pairs.

This means that 0 SFOS channel
contains interference of WWW ,
 $Wh[\rightarrow WW^*]$, $WZ[\rightarrow WW^*]$ at
Born level, more at NLO EW.

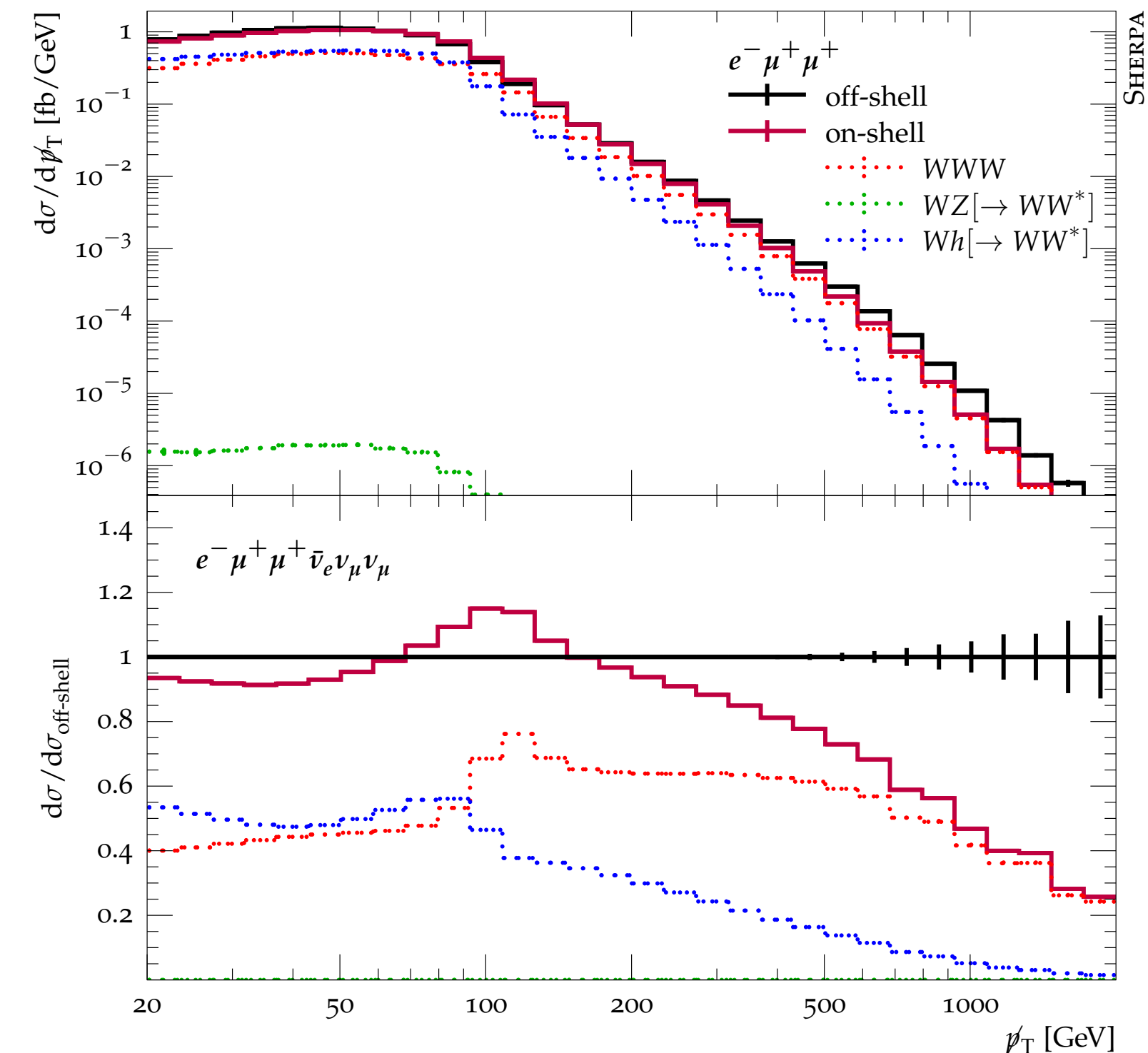


1/ 2 SFOS additionally contain WZZ , $Wh[\rightarrow ZZ^*]$, etc.

off-shell effects of $\mathcal{O}(20\%)$ or larger

Interplay of WWW and $Wh[\rightarrow WW^*]$

- due to interference, Wh cannot be treated as independent background, but is part of the signal
→ should not be subtracted



⇒ **measure signature (e.g. $3\ell + \text{MET}$) in fiducial volume**

→ for limits on, e.g., AGCs: define fiducial region that has large WWW component, still measure signature, interferences can be as important as sought-after signal

Recommendations

- Always measure fiducial cross-sections
- do not try to separate Vh from VVV as they interfere (with interference effects of $O(20\%)$), define specific fiducial regions if VVV enriched data needed (eg. for AGCs)
- off-shell MC should be the standard, available at NLO QCD
- approximate EW corrs in principle available, but need validation (in particular in view of the large photon-induced contributions)
- ?