

# Triggers for $R(\Lambda_c)$



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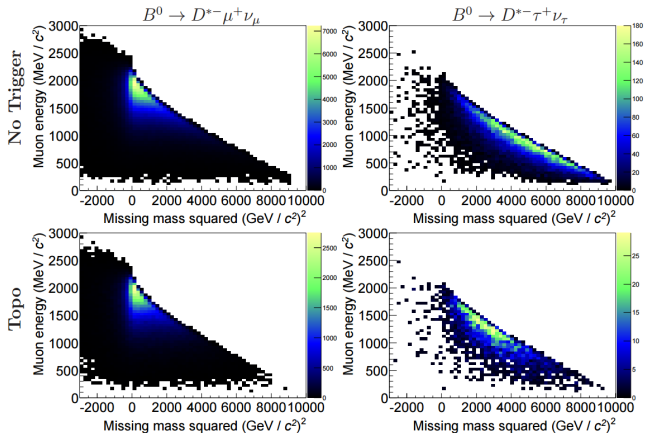
University of  
Zurich<sup>UZH</sup>

Zurich meeting, CERN  
April 12, 2016

# Why Triggers are important

- ⇒ The triggers that were used in  $R(D^*)$  biased the distribution of the variables that were fitted.
- ⇒ The bias was an unlucky one as the  $\tau$  mode was getting more similar to the  $\mu$  mode.
- ⇒ They eventually used a `H1t2CharmHadD02HH_D02KPi` which was not designed for this analysis but by accident pick it up.
- ⇒ Today I will show the impact of the trigger line ⇒ In all cases I will use one stripping line:  
`Strippingb2LcMuXB2DMuNuXLine`

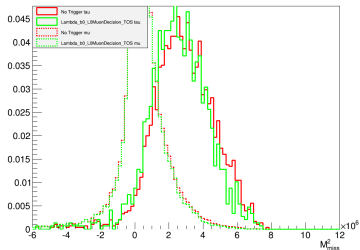
# Why Triggers are important



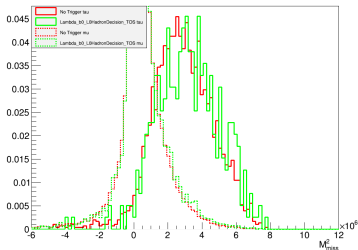
$$\Lambda_b \rightarrow \Lambda_c(2595)\ell\nu$$

# Trigger impact

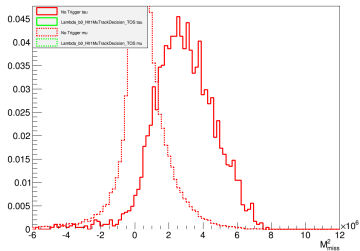
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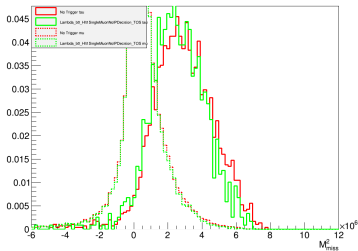
Model [Lambda\_c\_STAR\_TAU02=1129 [Lambda\_c\_STAR\_TAU02=1129]mu\_TAU02=73]mu\_TAU02=13]



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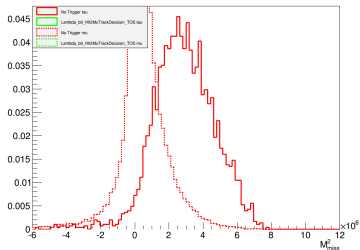


Model [Lambda\_c\_STAR\_TAU02=1129 [Lambda\_c\_STAR\_TAU02=1129]mu\_TAU02=73]mu\_TAU02=13]

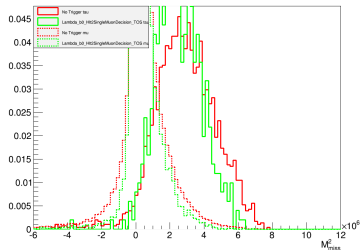


# Trigger impact

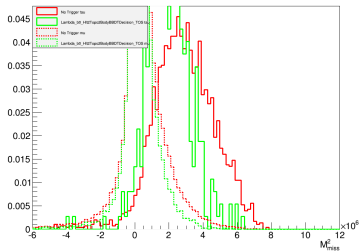
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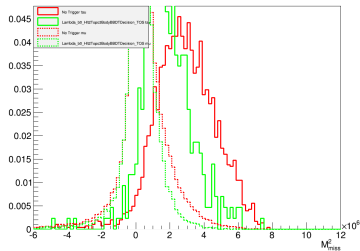
Model [Lambda\_c\_STAR\_TAU02=1122 [Lambda\_c\_STAR\_TAU02=1122] (nu\_TAU02=72) (nu\_TAU02=12)]



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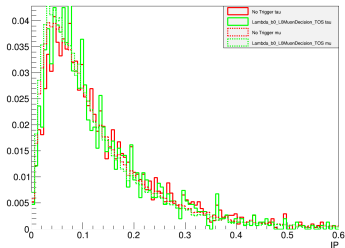


Model [Lambda\_c\_STAR\_TAU02=1122 [Lambda\_c\_STAR\_TAU02=1122] (nu\_TAU02=72) (nu\_TAU02=12)]

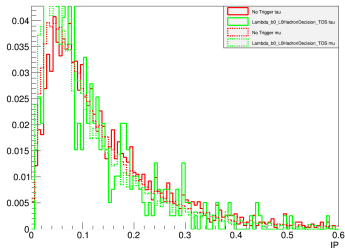


# Trigger impact

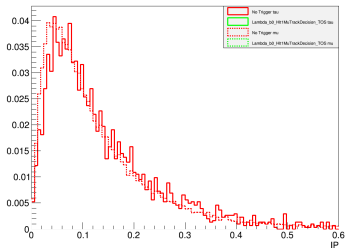
Lambda\_30\_IP\_OWNPY (Lambda\_30\_IP1M, TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112)



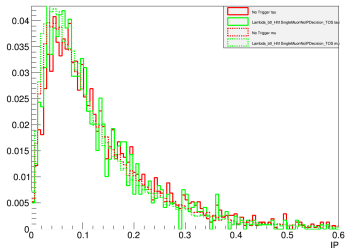
Lambda\_30\_IP\_OWNPY (Lambda\_30\_IP1M, TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112)



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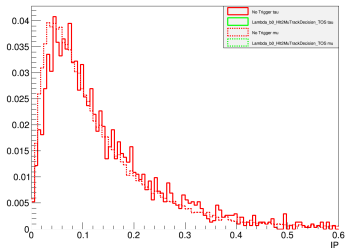


Lambda\_30\_IP\_OWNPY (Lambda\_30\_IP1M, TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112) Lambda\_30\_IP1M\_TOS00=1112 (TOS00=1112)

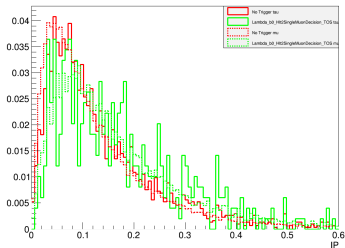


# Trigger impact

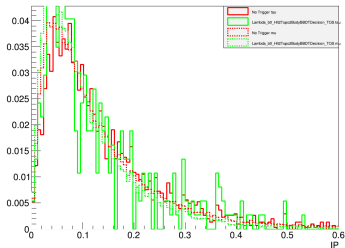
LAMBDA\_30\_IP\_OWNPY(2,LANE0\_C\_81M,TRIG00=1112)LANE0\_C\_81M\_TRIG00=11123031m,TRIG00=03m,TRIG00=10



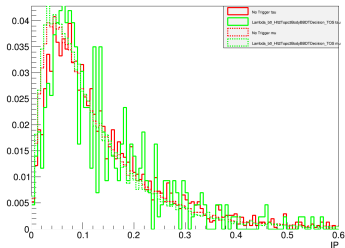
LAMBDA\_30\_IP\_OWNPY(2,LANE0\_C\_81M,TRIG00=1112)LANE0\_C\_81M\_TRIG00=11123031m,TRIG00=03m,TRIG00=10



LAMBDA\_30\_IP\_OWNPY(2,LANE0\_C\_81M,TRIG00=1112)LANE0\_C\_81M\_TRIG00=11123031m,TRIG00=03m,TRIG00=10



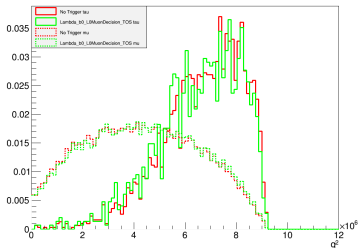
LAMBDA\_30\_IP\_OWNPY(2,LANE0\_C\_81M,TRIG00=1112)LANE0\_C\_81M\_TRIG00=11123031m,TRIG00=03m,TRIG00=10



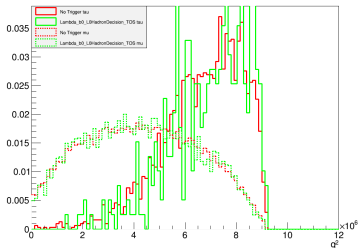


# Trigger impact

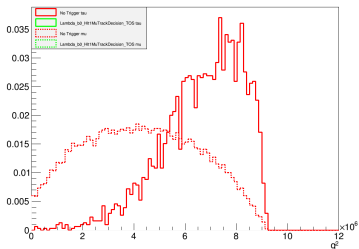
Q [Lambda\_c, STAR, TRUED=14102] [Lambda\_c, STAR, TRUED=14102.68] [mu, TRUED=13] [mu, TRUED=13]



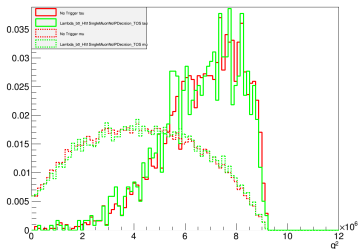
Q [Lambda\_c, STAR, TRUED=14102] [Lambda\_c, STAR, TRUED=14102.68] [mu, TRUED=13] [mu, TRUED=13]



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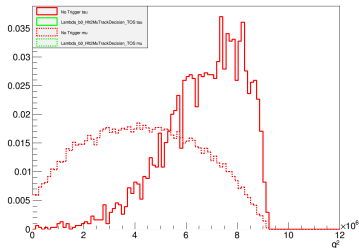


Q [Lambda\_c, STAR, TRUED=14102] [Lambda\_c, STAR, TRUED=14102.68] [mu, TRUED=13] [mu, TRUED=13]

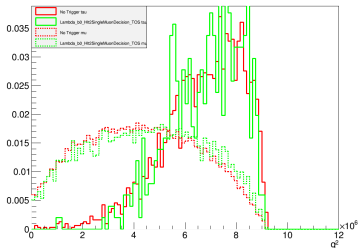


# Trigger impact

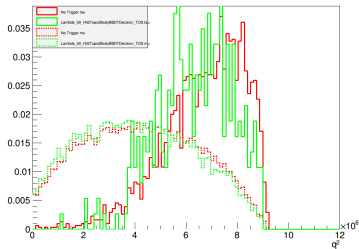
0 [Lambda\_b, c, STAR, TRUED=14102] 3 [Lambda\_b, c, STAR, TRUED=14102] 6 [Lambda\_b, c, STAR, TRUED=13] 9 [Lambda\_b, c, STAR, TRUED=13]



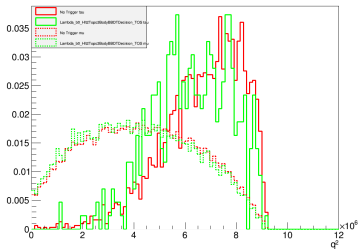
0 [Lambda\_b, c, STAR, TRUED=14102] 3 [Lambda\_b, c, STAR, TRUED=14102] 6 [Lambda\_b, c, STAR, TRUED=13] 9 [Lambda\_b, c, STAR, TRUED=13]



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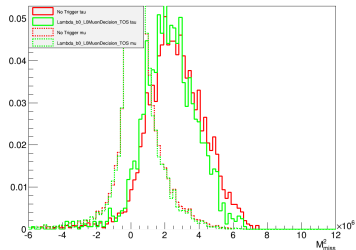


## Why Triggers are important

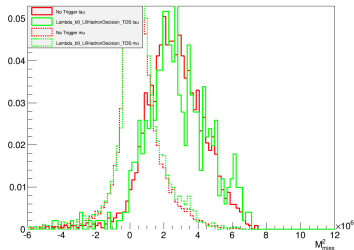
$$\Lambda_b \rightarrow \Lambda_c(2625)\ell\nu$$

# Trigger impact

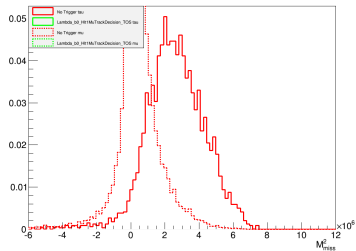
MiniEM (Lambda\_30\_37APL\_TFRID=1012H [Lambda\_30\_37APL\_TFRID=1012K&mu\_TFRID=0]mu\_TFRID=10)



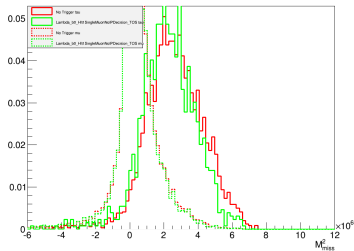
MiniEM (Lambda\_30\_37APL\_TFRID=1012H [Lambda\_30\_37APL\_TFRID=1012K&mu\_TFRID=0]mu\_TFRID=10)



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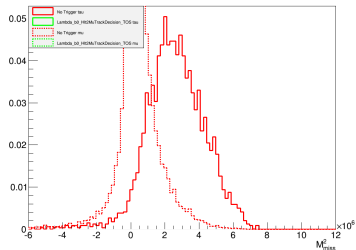


MiniEM (Lambda\_30\_37APL\_TFRID=1012H [Lambda\_30\_37APL\_TFRID=1012K&mu\_TFRID=0]mu\_TFRID=10)

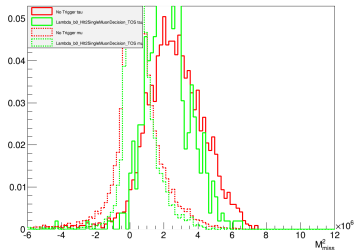


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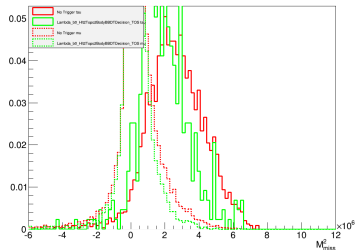
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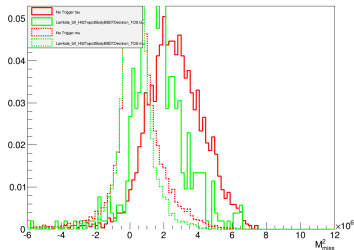
MiniEM (Lambda\_c\_3TAPL\_TFRID=1912H [Lambda\_c\_3TAPL\_TFRID=1912H], TFRID=1912H, TFRID=1912H)



MiniEM (Lambda\_c\_3TAPL\_TFRID=1912H [Lambda\_c\_3TAPL\_TFRID=1912H], TFRID=1912H, TFRID=1912H)

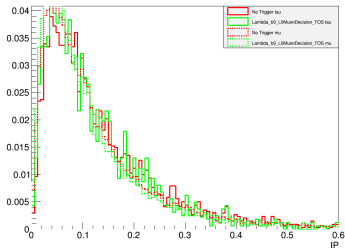


MiniEM (Lambda\_c\_3TAPL\_TFRID=1912H [Lambda\_c\_3TAPL\_TFRID=1912H], TFRID=1912H, TFRID=1912H)

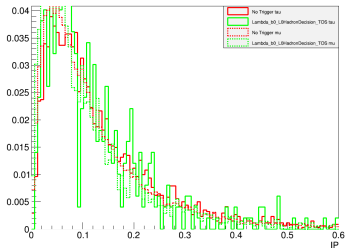


# Trigger impact

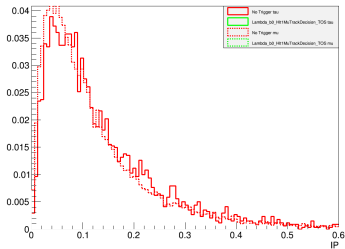
LAMBDA\_30\_P\_DMPPY (LAMBDA\_30\_STAT1\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1)



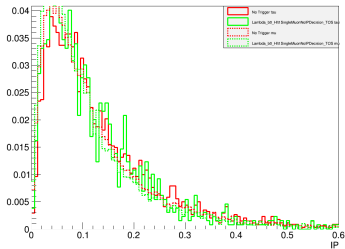
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LAMBDA\_30\_P\_DMPPY (LAMBDA\_30\_STAT1\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1)



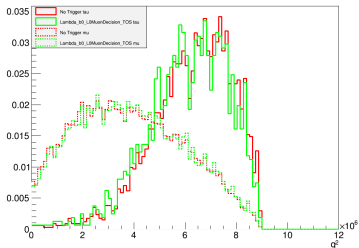
LAMBDA\_30\_P\_DMPPY (LAMBDA\_30\_STAT1\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1) (IP\_TRIGGER=1)



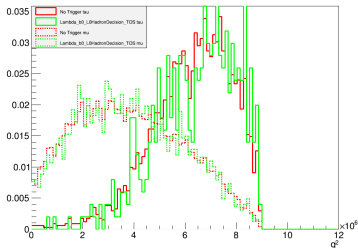


# Trigger impact

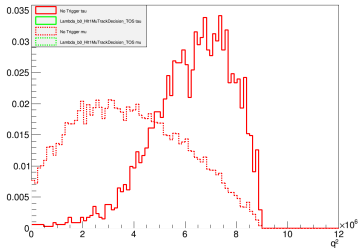
$q^2$  [Lambda\_b -> STAR, TRUED=13124] [Lambda\_b -> STAR, TRUED=104124] [mu, TRUED=13]



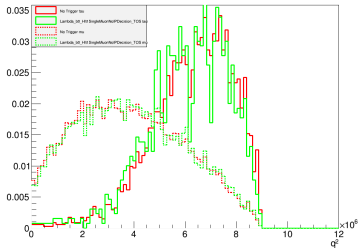
$q^2$  [Lambda\_b -> STAR, TRUED=13124] [Lambda\_b -> STAR, TRUED=104124] [mu, TRUED=13]



$q^2$  [Lambda\_b -> STAR, TRUED=13124] [Lambda\_b -> STAR, TRUED=104124] [mu, TRUED=13]



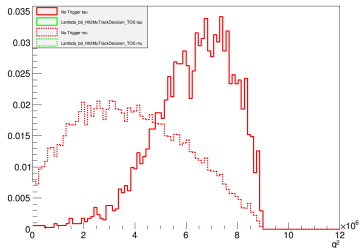
$q^2$  [Lambda\_b -> STAR, TRUED=13124] [Lambda\_b -> STAR, TRUED=104124] [mu, TRUED=13]



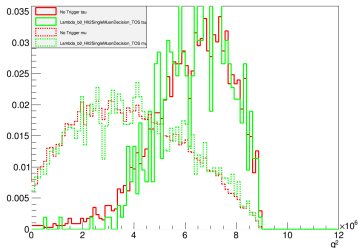


# Trigger impact

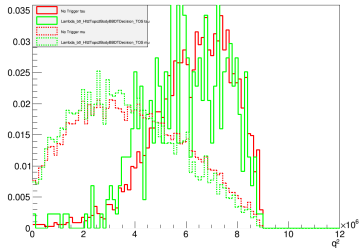
q2 [Lambda\_b, STAR, TRUED=13124] [Lambda\_b, STAR, TRUED=104124] [mu, TRUED=13]



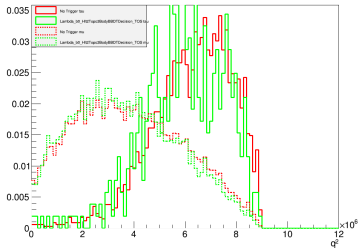
q2 [Lambda\_b, STAR, TRUED=13124] [Lambda\_b, STAR, TRUED=104124] [mu, TRUED=13]



q2 [Lambda\_b, STAR, TRUED=13124] [Lambda\_b, STAR, TRUED=104124] [mu, TRUED=13]



q2 [Lambda\_b, STAR, TRUED=13124] [Lambda\_b, STAR, TRUED=104124] [mu, TRUED=13]



# New Hope

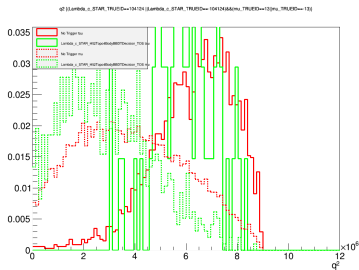
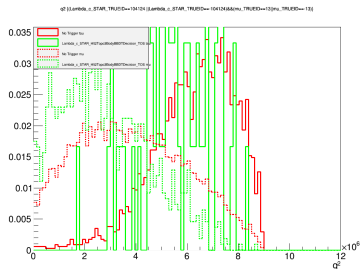
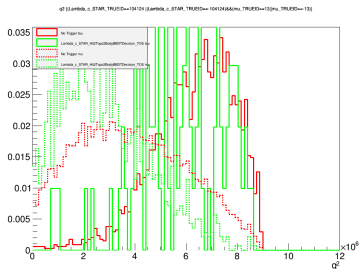


# New Hope



⇒ Trigger on  $\Lambda_c^*$

# Trigger impact



# Conclusion

- The trigger biases our discriminating power between  $\tau$  and  $\mu$  sample.
- Showed this to Greg and he said they look exactly like the ones they had.
- If this gets confirmed we won't be able to do this analysis on Run1 data.

