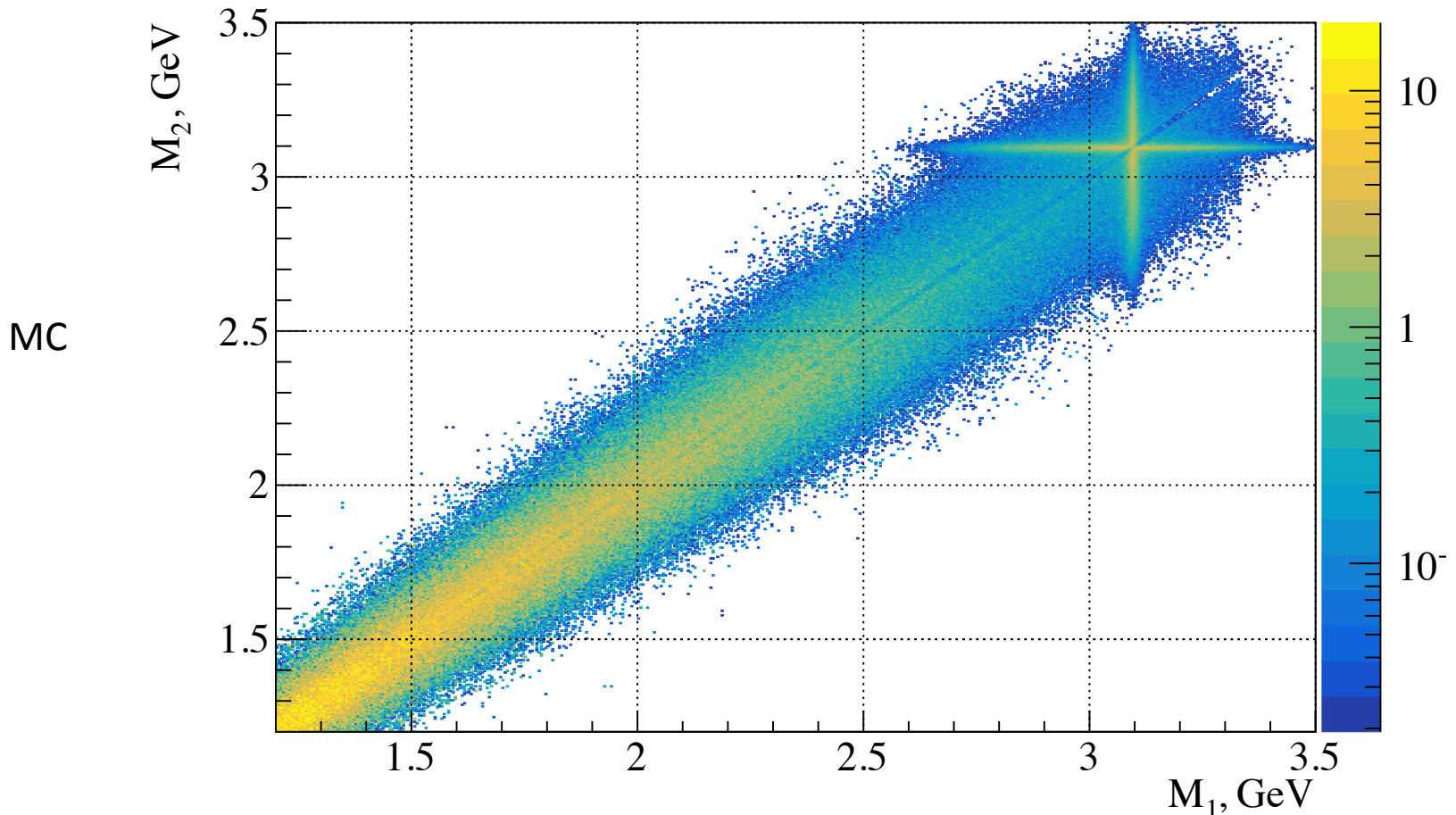


# Checking the uniqueness in $J/\psi$ production

For the  $\gamma p \rightarrow e^+e^-p$  reaction I have this procedure:

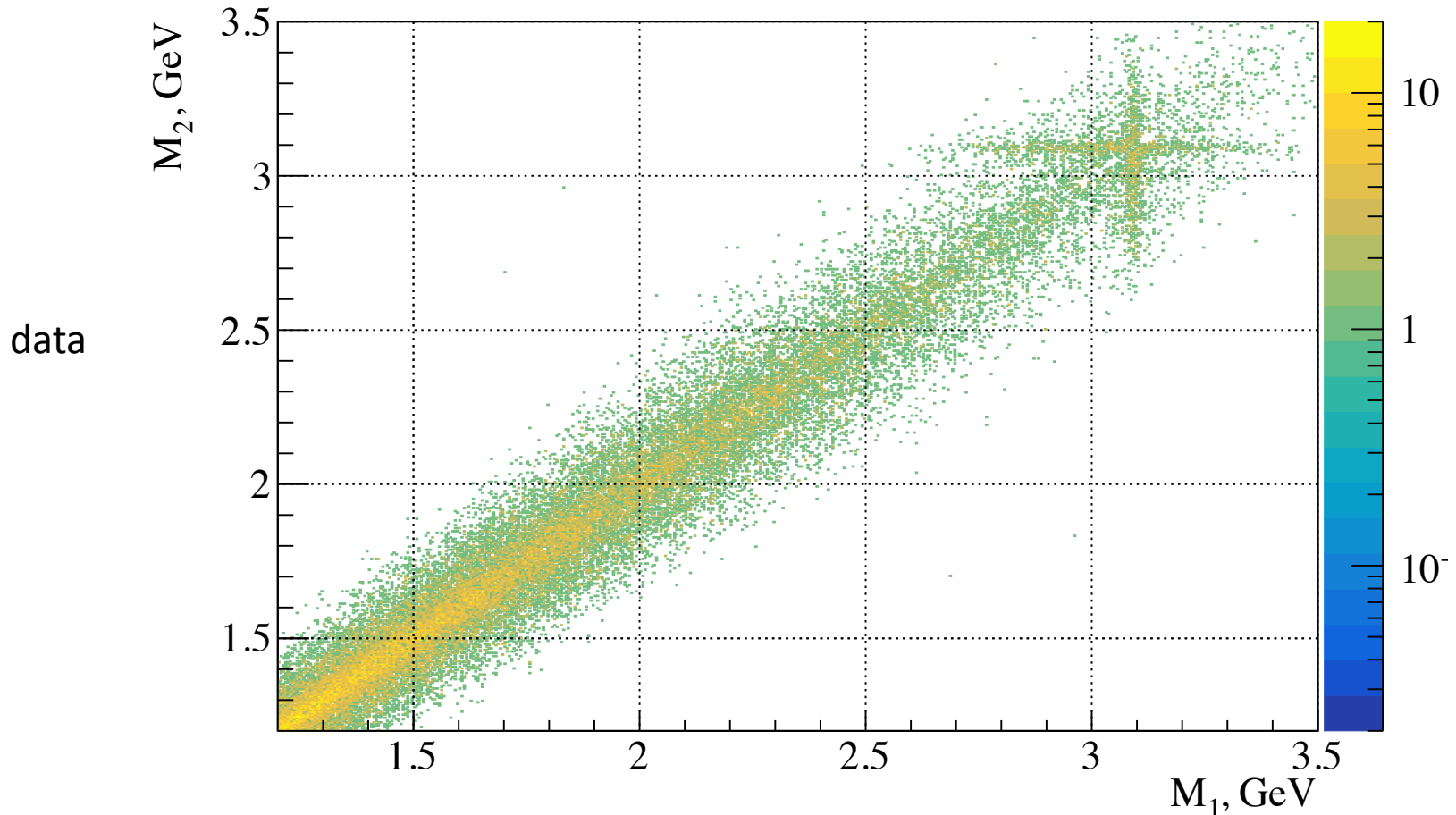
- After applying all cuts, for each event, I separate two types of combos - those with the same beam energy (track combos) and those with different energies (tagger combos)
- If I have more than one **tagger combo** I plot the correlation b/n corresponding  $e^+e^-$  invariant masses:



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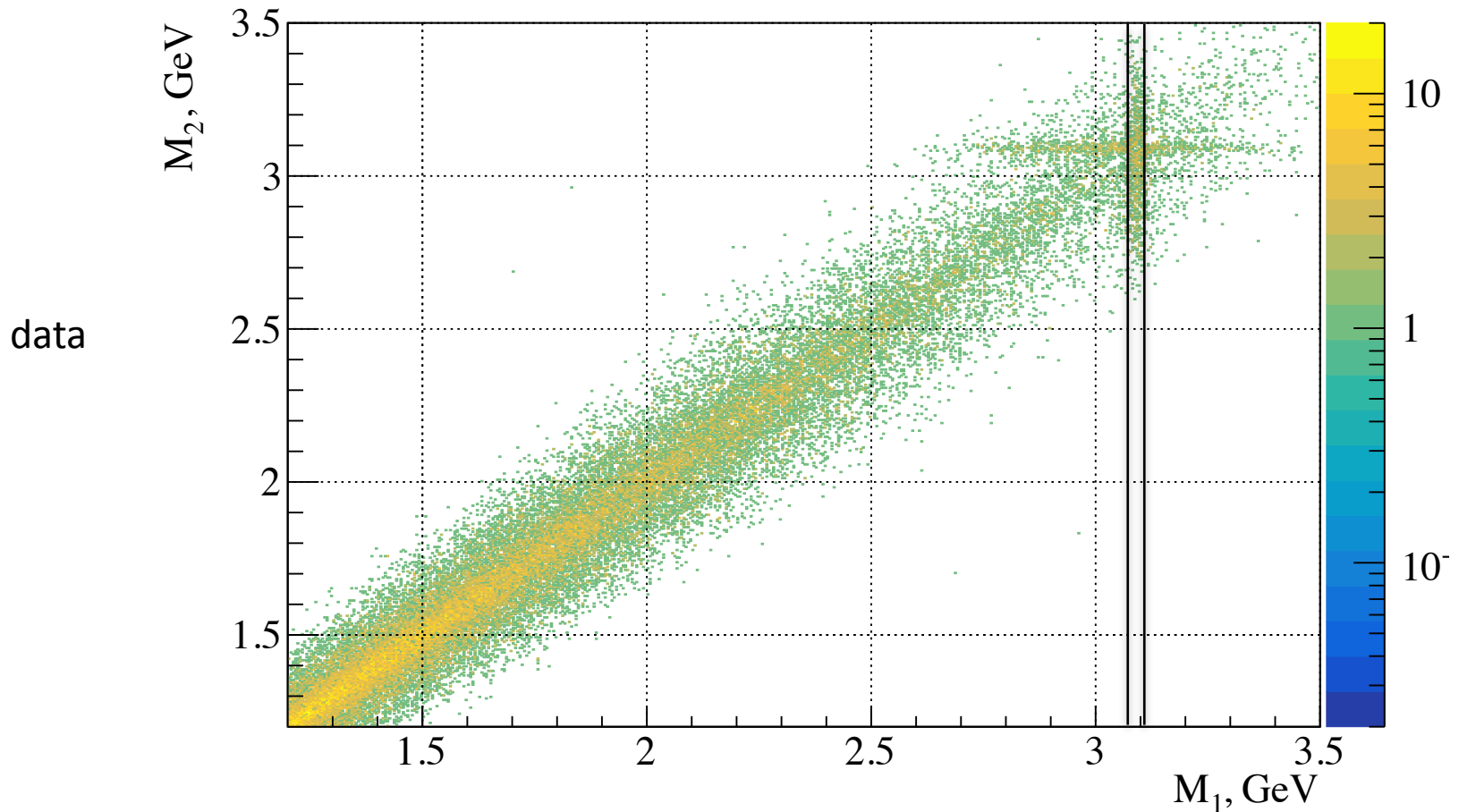
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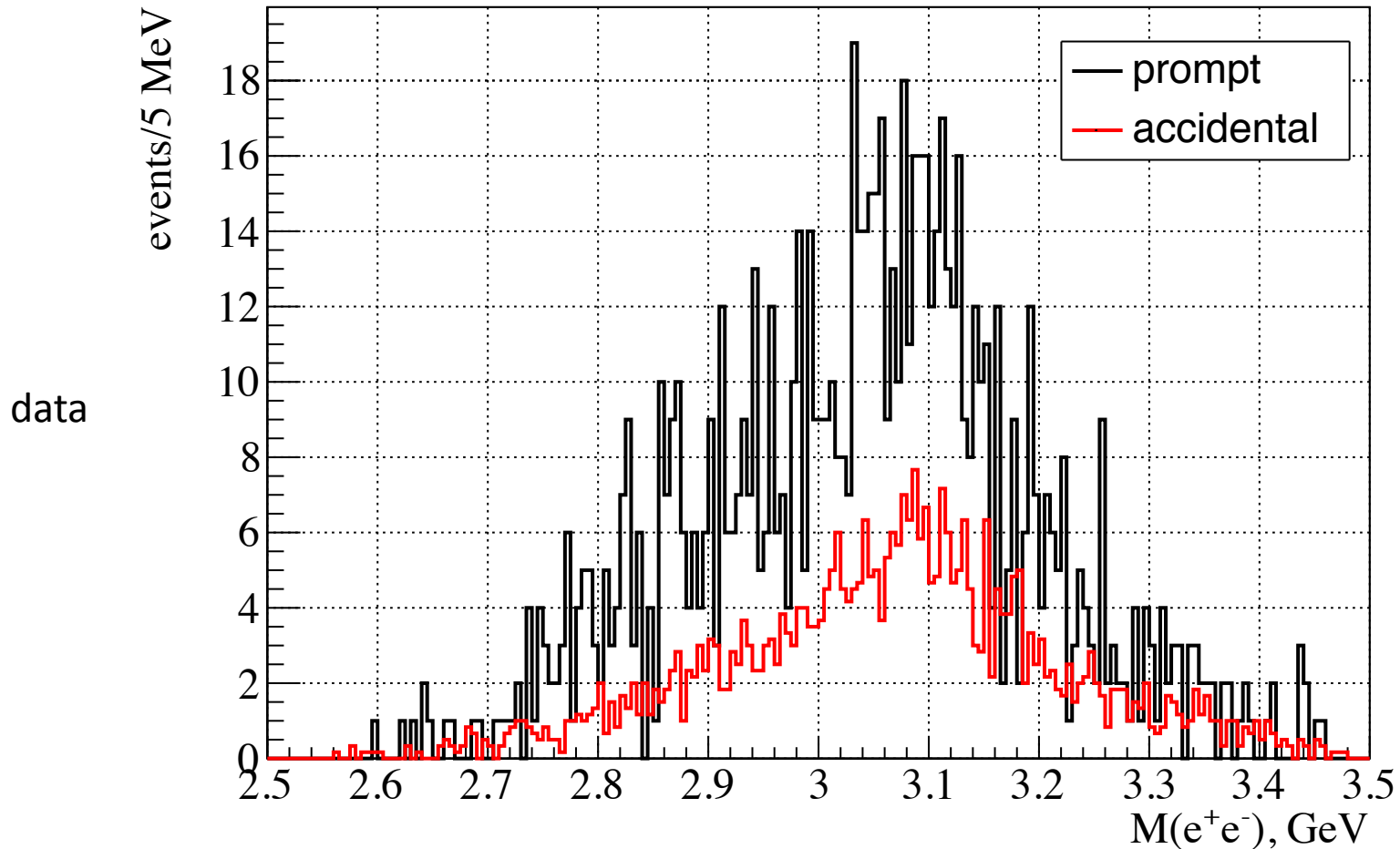
- Then I require one of the combo to be “real”  $J/\psi$  event:  $\text{abs}(M-3.097) < 1.5\sigma$



# Checking the uniqueness in $J/\psi$ production

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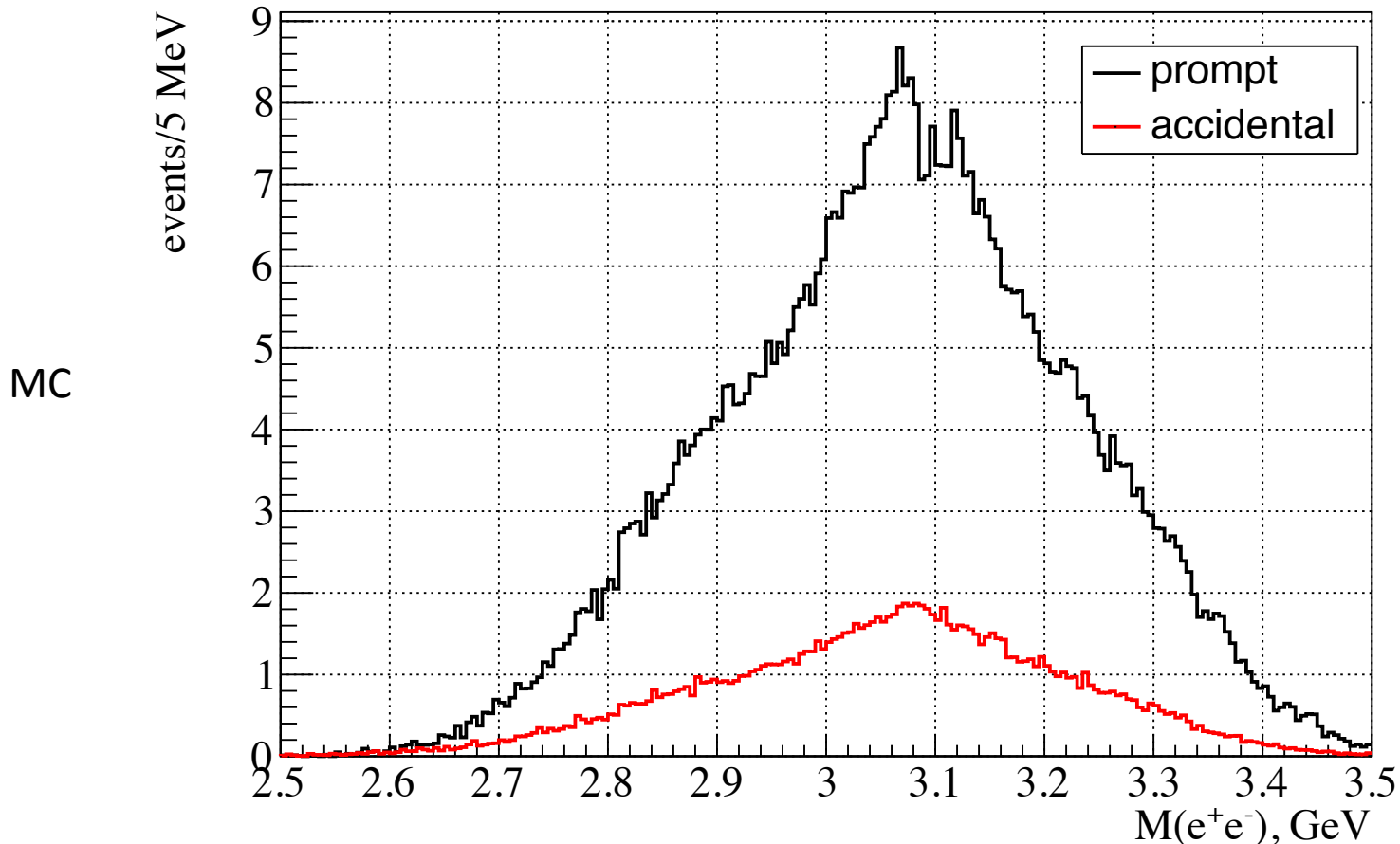
- ... and look at the  $M$  distribution of the other combo (in- and out-of time separately), that is suppose to be accidental and should vanish after subtraction using out-of-time events, but it doesn't:



# Checking the uniqueness in $J/\psi$ production

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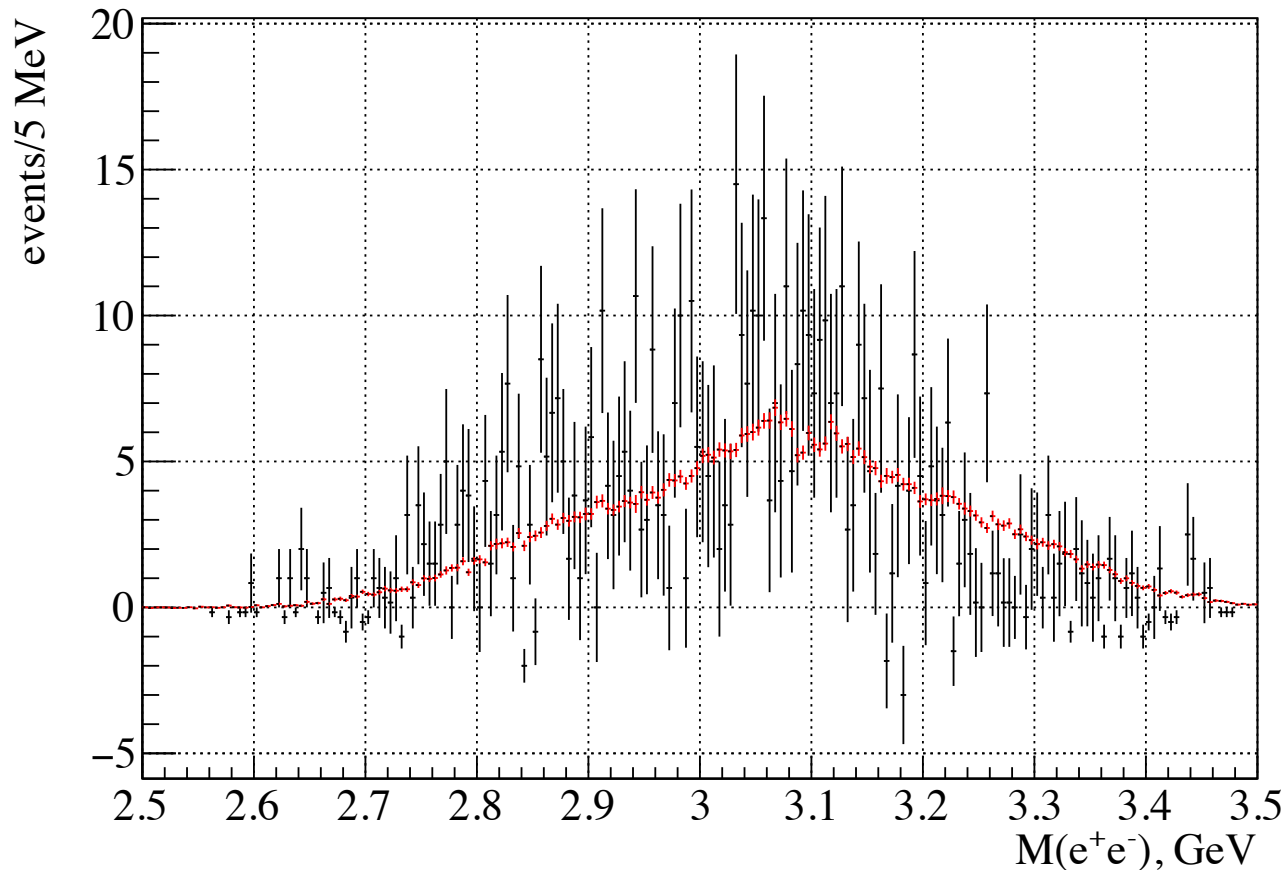
- ... and look at the  $M$  distribution of the other combo (in- and out-of time separately), that is suppose to be accidental and should vanish after subtraction using out-of-time events, but it doesn't:



# Checking the uniqueness in $J/\psi$ production

For the  $\gamma p \rightarrow e^+e^-p$  reaction I have this procedure:

- ... fortunately, the subtracted distributions in data and MC are very similar and the fraction of such events is at a few percent level compared to the total

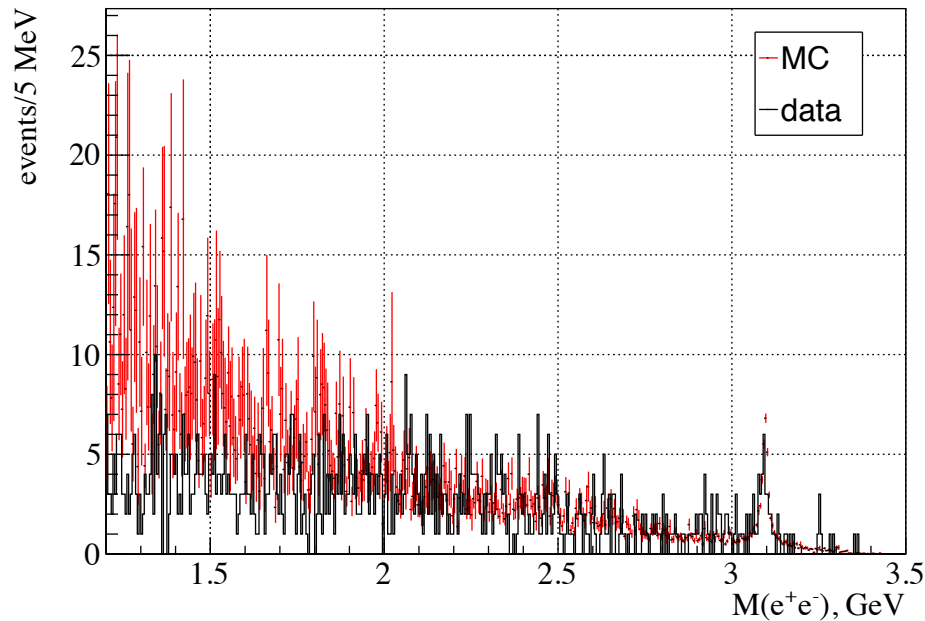


# Checking the uniqueness in $J/\psi$ production

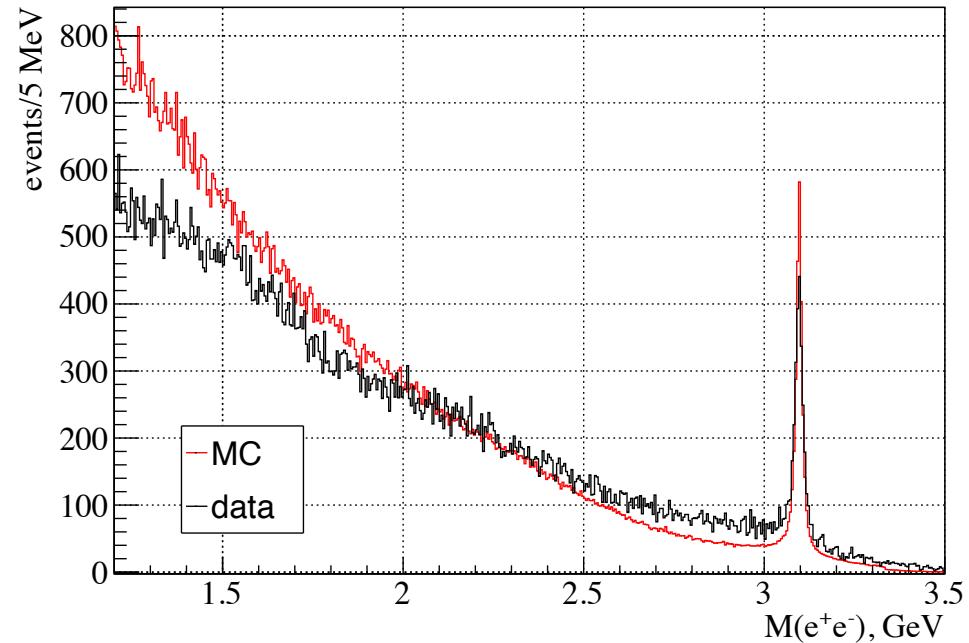
For the  $\gamma p \rightarrow e^+e^-p$  reaction I have this procedure:

- As for the **track combos** we can just count them - fortunately the double counts are only  $\sim 1\%$  of the total number of events and very similar in data and MC:

Events with  $>1$  track combo



All track combos



# Checking the uniqueness in $J/\psi$ production

## Conclusions:

- The accidental **tagger combos** do not vanish completely after subtraction using out-of-time events, but the difference is at a percent level w.r.t. total number of events
- The extra **track combos** are  $\sim 1\%$  of the total
- In both cases there's a good agreement b/n data and MC