中国科学院高能物理研究所
Institute of High Energy Physics
Chinese Academy of Sciences

Double Jpsi

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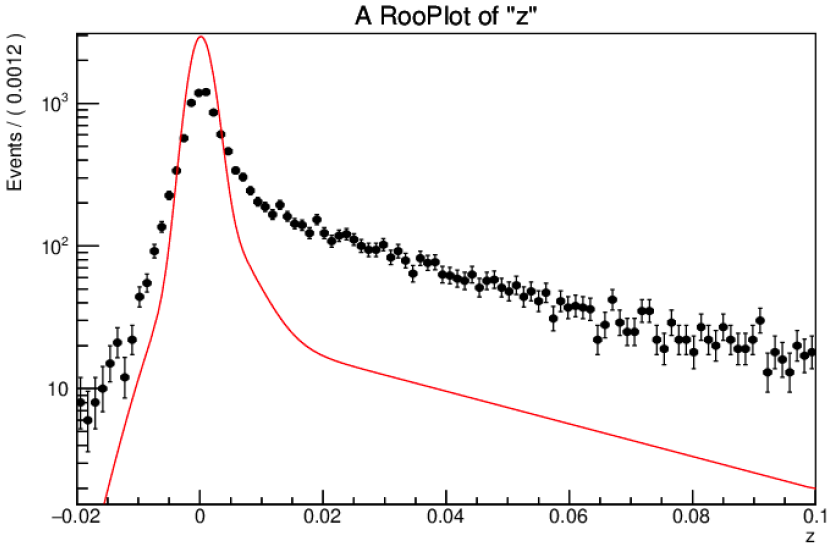
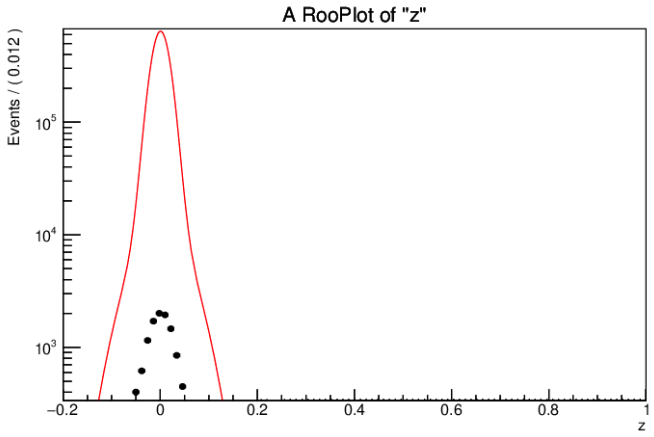
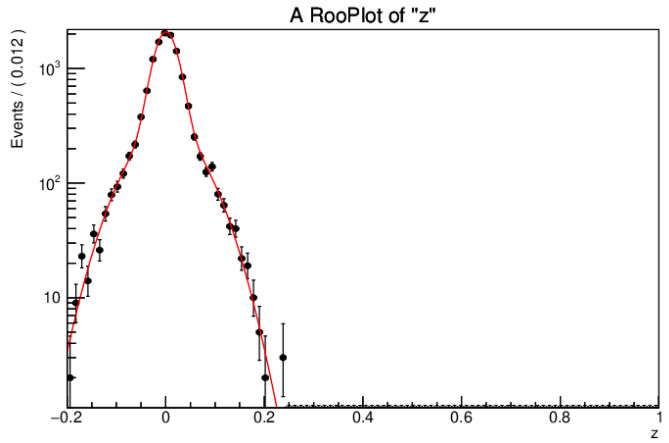
The fit issue

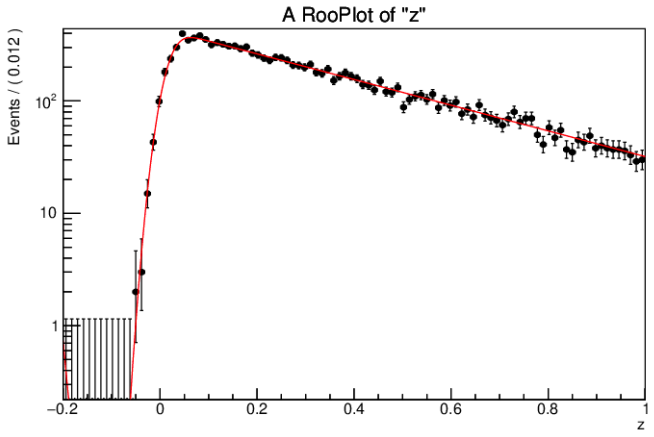




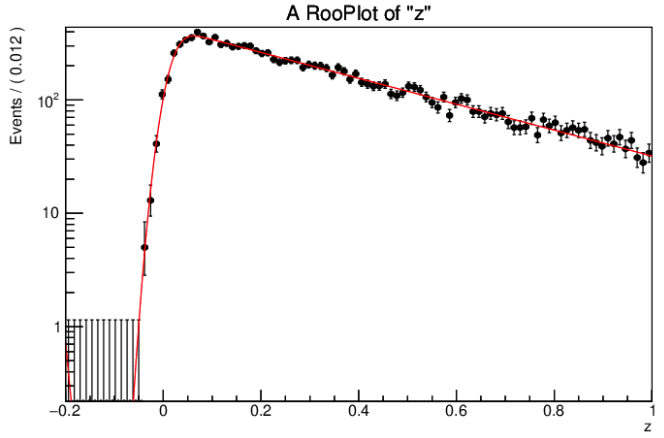
prompt + prompt



prompt + nonprompt



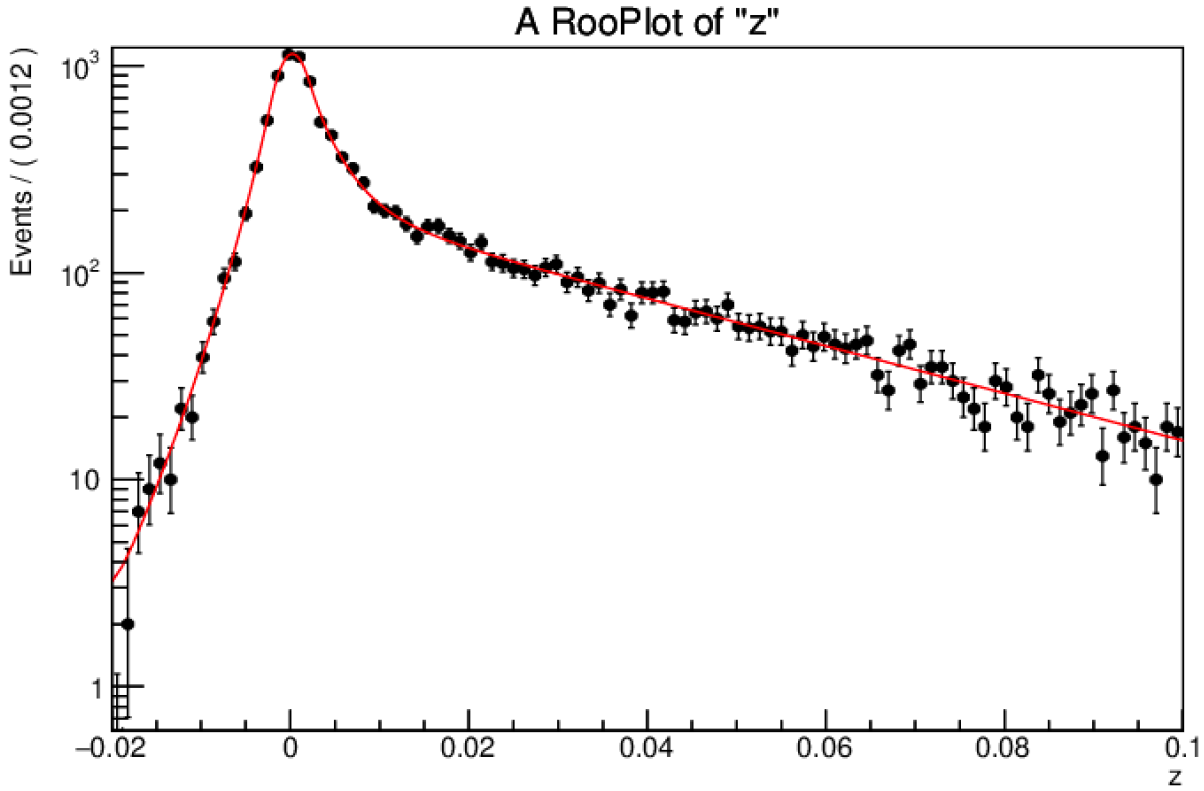
nonprompt + prompt



Nonprompt + nonprompt

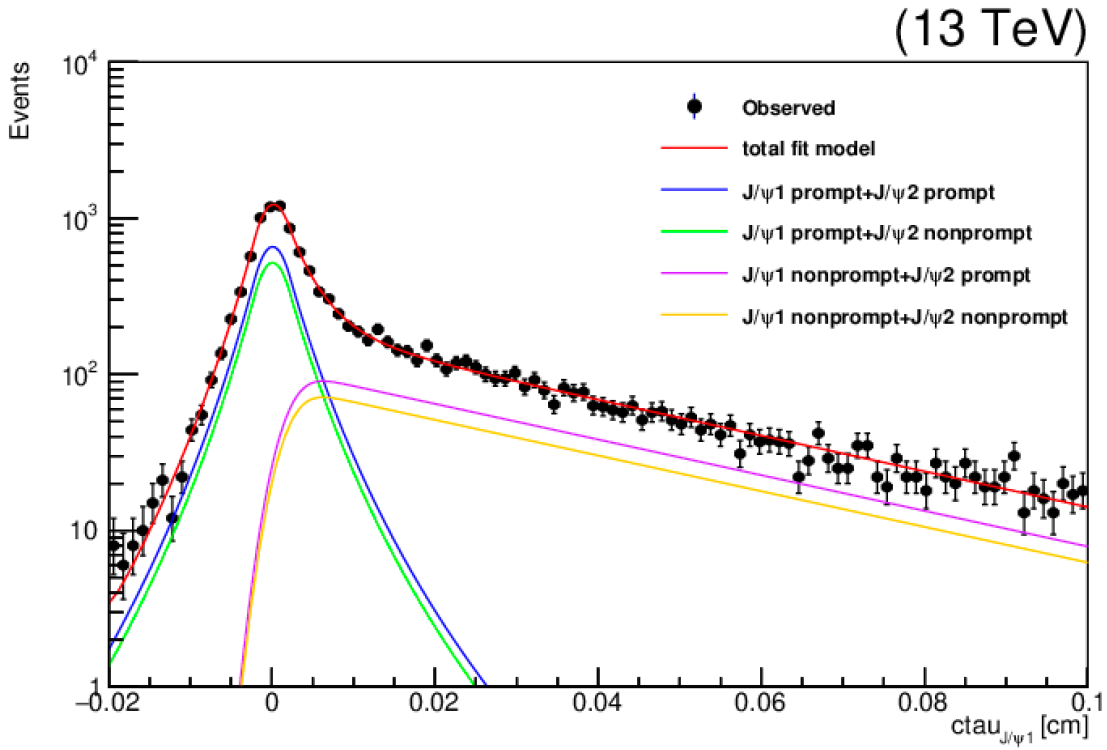
When we multiply two double gauss to fit prompt + prompt components, the normlization will have issue

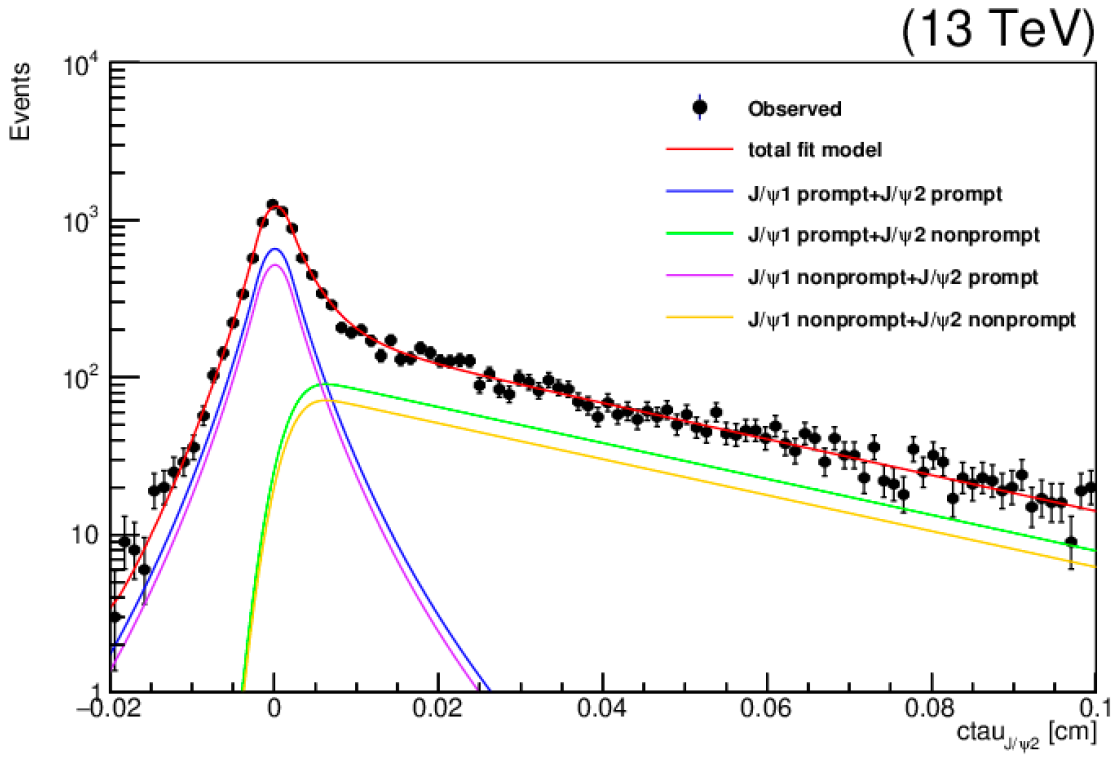
Solve the issue



- I use DSCB function to replace the double gauss function to fit prompt components
- The Normalization seems reasonable

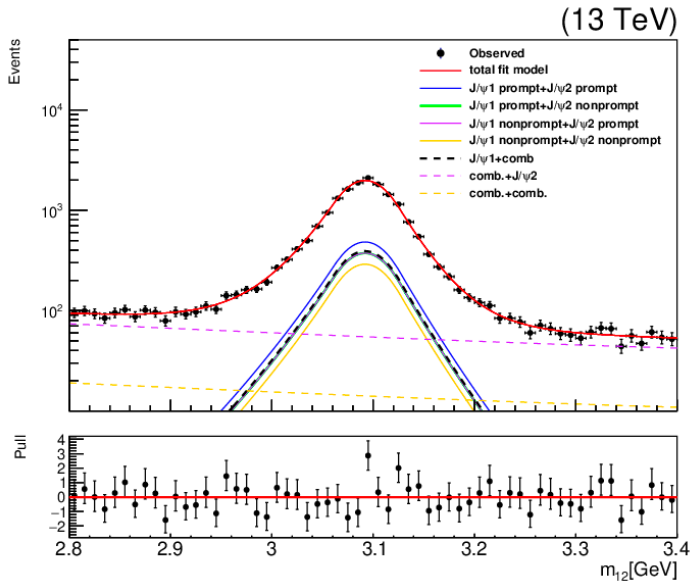
Ctau 2D fit

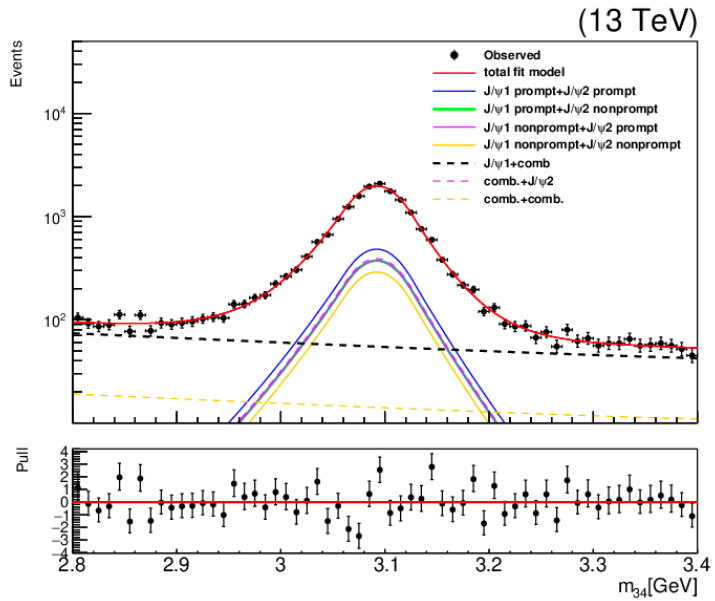


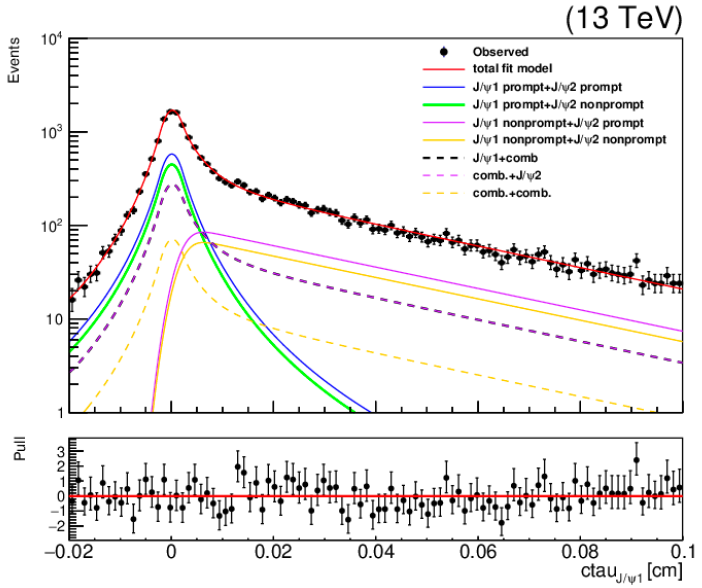


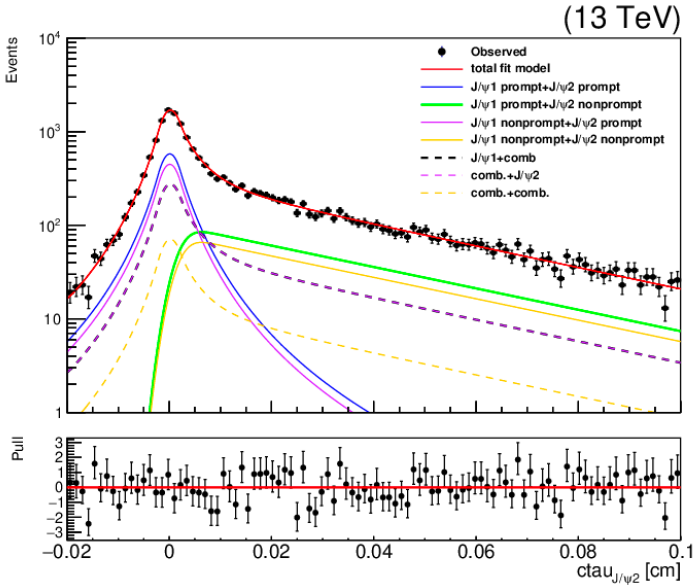
- Ctau two dimension fit
  - DSCB function to fit prompt components
  - Gauss Convolution Exp function to fit non-prompt components

4D fit









- 4D fit
  - Use DSCB function to fit J/ψ invariance mass
  - The mu pair maybe comb. or J/ψ and J/ψ(comb) maybe prompt or non-prompt, so there are total 16 categories for two mu pairs
  - The invariance mass dimension can distinguish the J/ψ and comb.
  - The ctau dimension can distinguish prompt and non-prompt components
  - For brief, I combine the prompt and non-prompt components for two mu pairs included comb.

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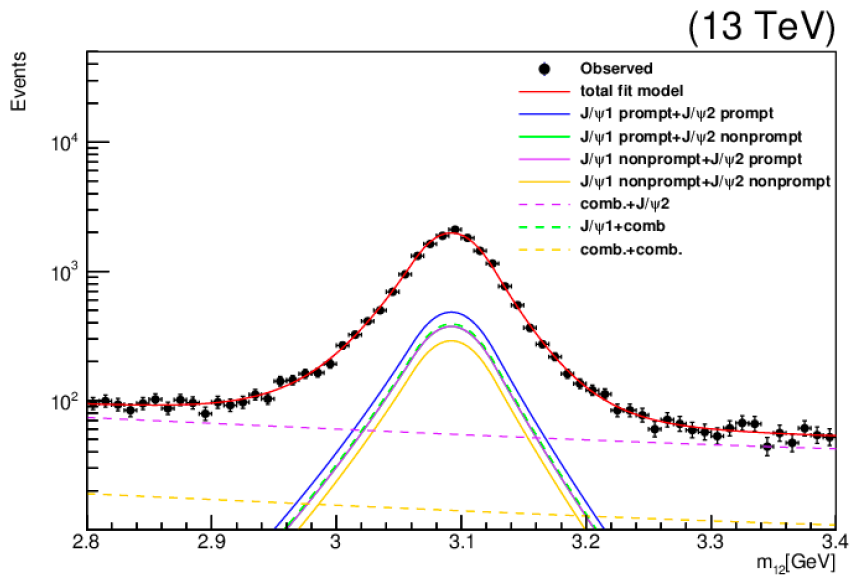
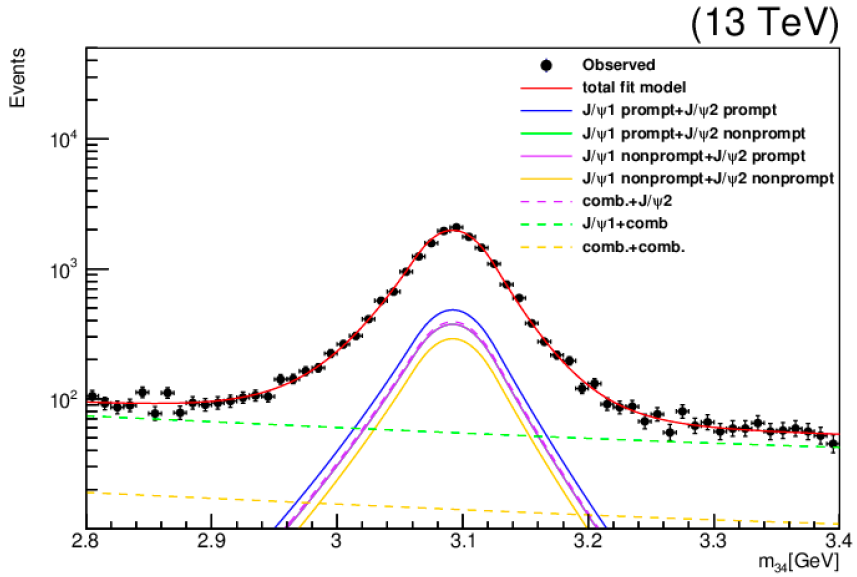
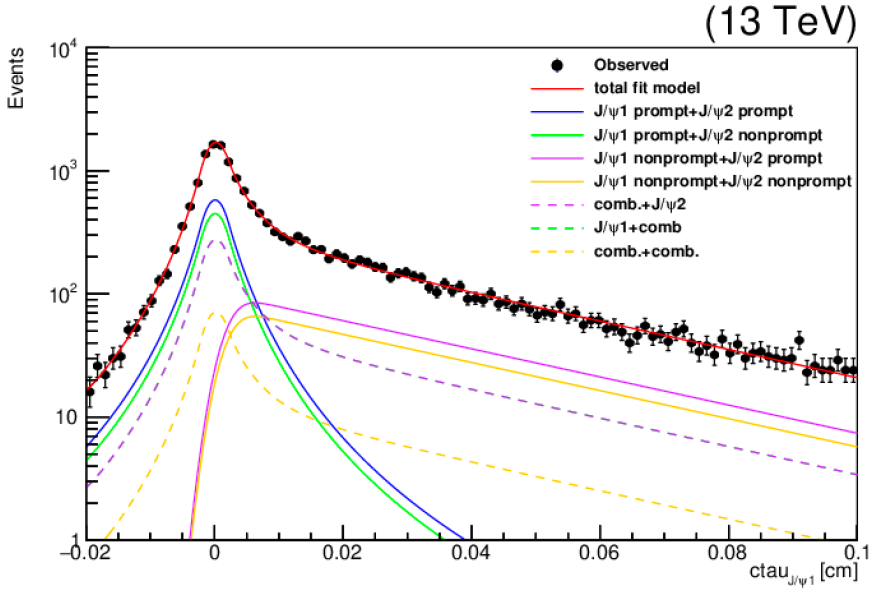
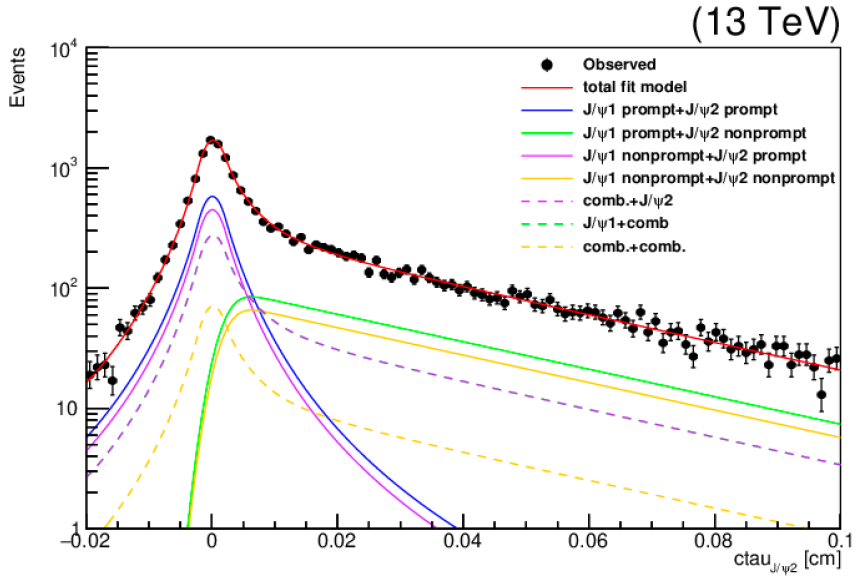
Backup

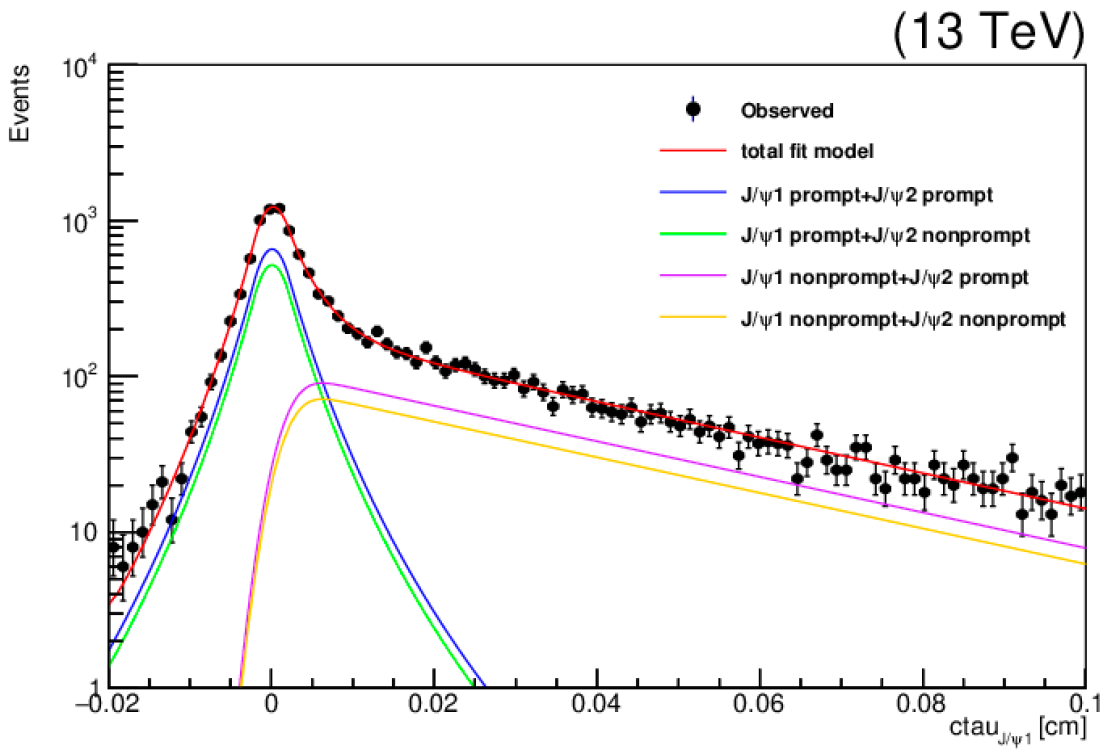
4D fit


(13 TeV)
Events
Observed
total fit model
J/ψ1 prompt+J/ψ2 prompt
J/ψ1 prompt+J/ψ2 nonprompt
J/ψ1 nonprompt+J/ψ2 prompt
J/ψ1 nonprompt+J/ψ2 nonprompt
comb.+J/ψ2
J/ψ1+comb
comb.+comb.
m12[GeV]

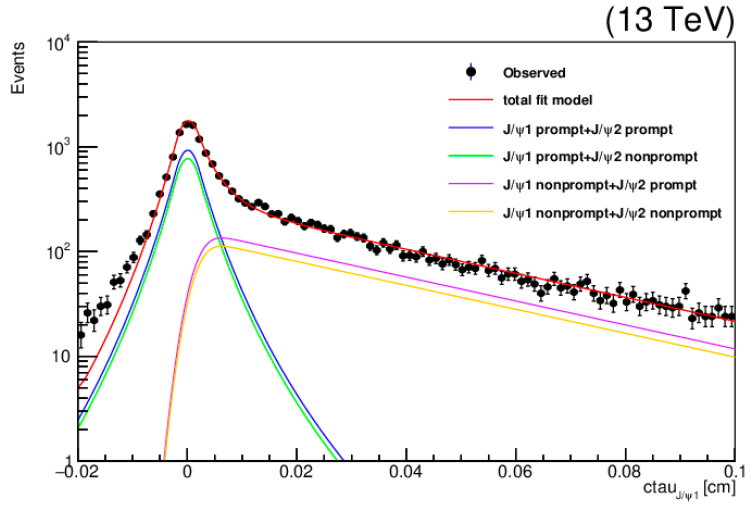

(13 TeV)
Events
Observed
total fit model
J/ψ1 prompt+J/ψ2 prompt
J/ψ1 prompt+J/ψ2 nonprompt
J/ψ1 nonprompt+J/ψ2 prompt
J/ψ1 nonprompt+J/ψ2 nonprompt
comb.+J/ψ2
J/ψ1+comb
comb.+comb.
m34[GeV]

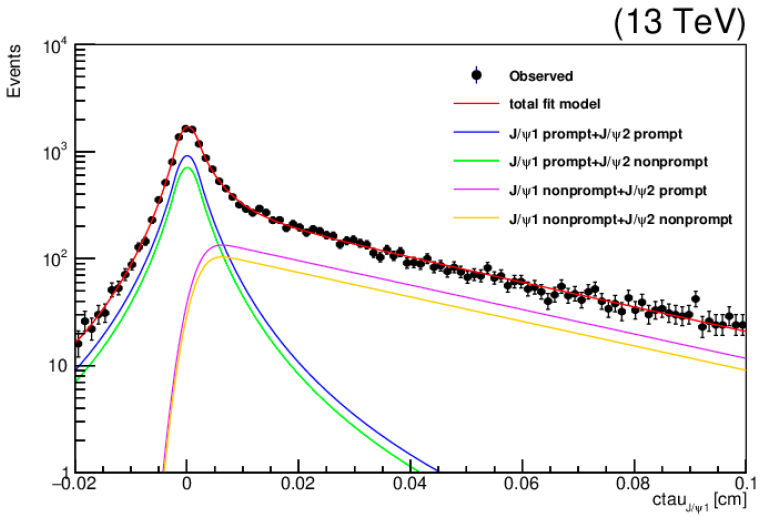

(13 TeV)
Events
Observed
total fit model
J/ψ1 prompt+J/ψ2 prompt
J/ψ1 prompt+J/ψ2 nonprompt
J/ψ1 nonprompt+J/ψ2 prompt
J/ψ1 nonprompt+J/ψ2 nonprompt
comb.+J/ψ2
J/ψ1+comb
comb.+comb.
ctauJ/ψ1 [cm]


(13 TeV)
Events
Observed
total fit model
J/ψ1 prompt+J/ψ2 prompt
J/ψ1 prompt+J/ψ2 nonprompt
J/ψ1 nonprompt+J/ψ2 prompt
J/ψ1 nonprompt+J/ψ2 nonprompt
comb.+J/ψ2
J/ψ1+comb
comb.+comb.
ctauJ/ψ2 [cm]



J/ψ1/2 mass [3.0, 3.2] GeV





J/ψ1/2 mass [2.8, 3.4] GeV

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