B raw yield R_{AA}

KiSoo Lee

Raw yield R_{AA}

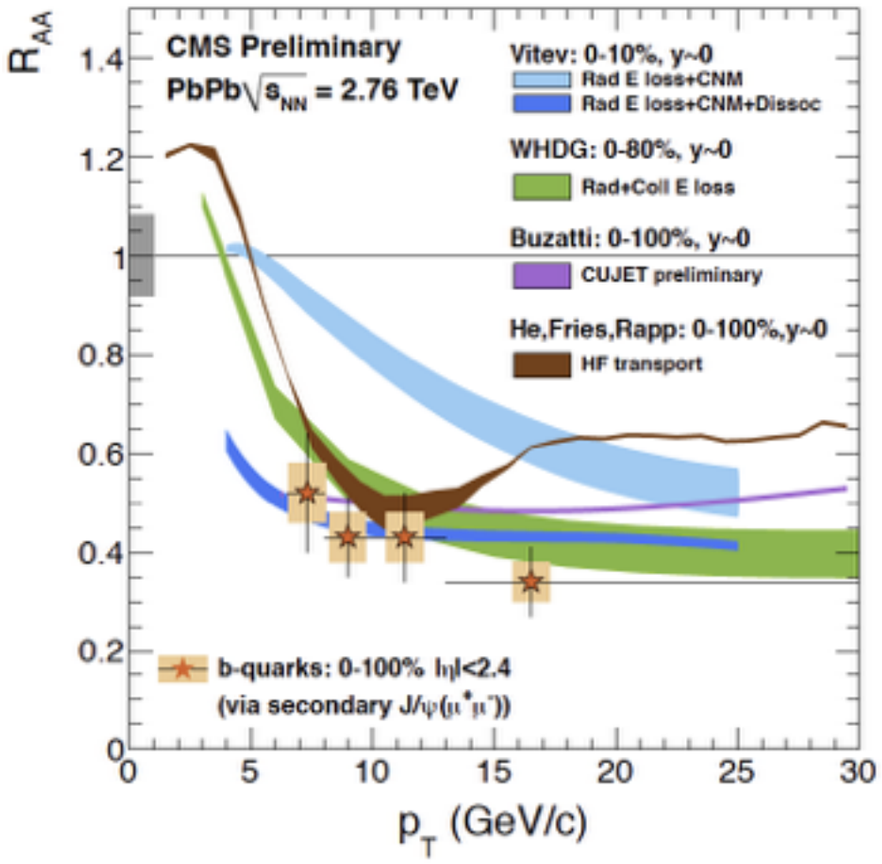
$$R_{AA} = \frac{\left(\frac{d\sigma}{dp_T}\right)_{PbPb}}{AA\left(\frac{d\sigma}{dp_T}\right)_{pp}} = \frac{N_{PbPb}(p_T)\,\mathscr{L}_{pp}}{AAN_{pp}(p_T)\,\mathscr{L}_{PbPb}}$$

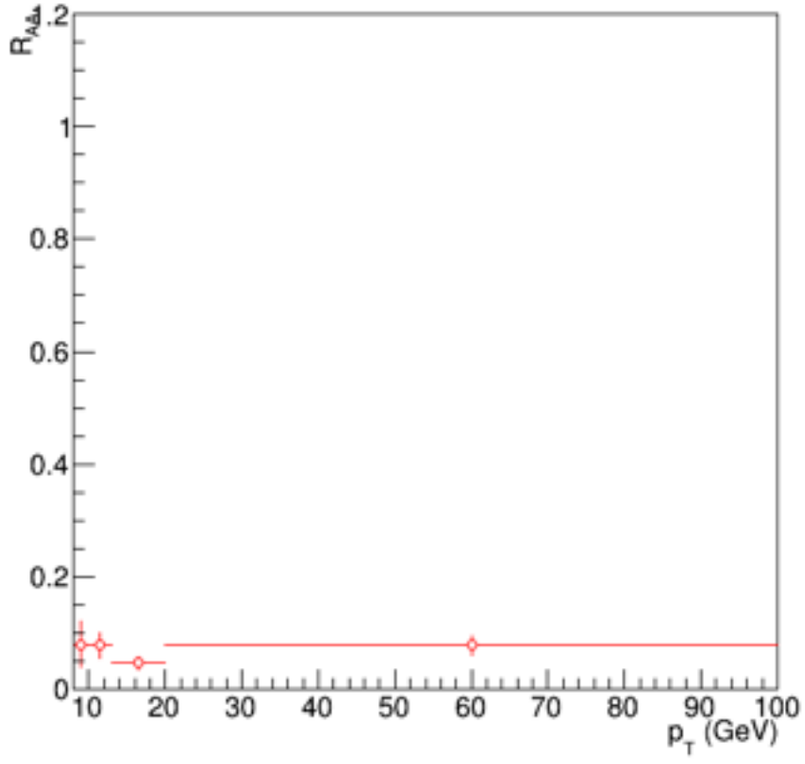
$$\frac{d\sigma(p_T)}{dp_T} = \frac{1}{2}\,\frac{1}{\Delta p_T}\,\frac{N(p_T)}{(Acc\mathcal{E})B\mathscr{L}}$$

A: 208

$\mathscr{L}_{pp}$: 25.8 pb^{-1}

$\mathscr{L}_{PbPb}$: 404 μb^{-1}





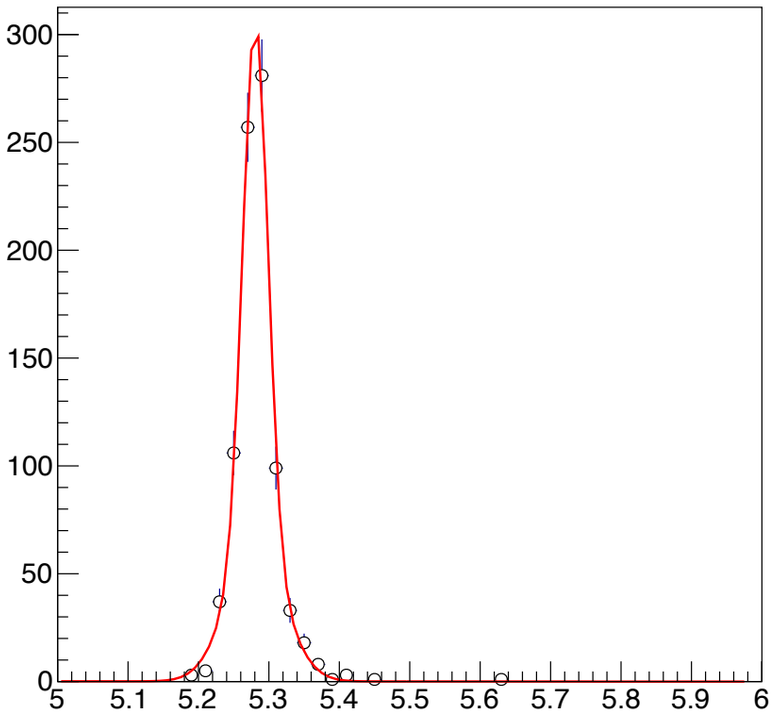
- R_{AA} without efficiency correction is compared with b-quark R_{AA} at 2.76 TeV
- R_{AA} is lower than 0.1

New ntuple

- new ntuple with new skim is ready
- PbPb
- JSON file: /afs/cern.ch/cms/CAF/CMSCOMM/COMM_DQM/certification/Collisions15/HI/Cert_262548-263757_PromptReco_HICollisions15_JSON_MuonPhys_v2.txt
- Global Tag: 75X_dataRun2_v12
- Location: /xrootd/store/user/goni/160323_HIPromptReco**(KISTI)**
- pp
- Location: /xrootd/store/user/goni/PromptReco/DoubleMu_Run2015E-PromptReco-v1_Run_262081_262328_ONIASKIM_160116/DoubleMu/DoubleMu_Run2015E-PromptReco-v1_Run_262081_262328_ONIASKIM_160116/160115_152651/0000**(KISTI)**
- MC
- Hyunchul is working on(Current MC file is not available to obtain correct efficiency)

Fitting function

1. Fit MC with two Gaussian



σ of each Gaussian and ratio between two Gaussian is determined

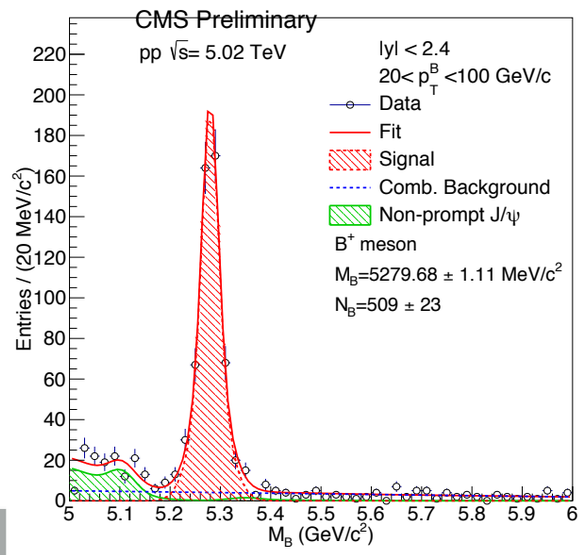
2. Peak from Other B

$$A\times\frac{1}{\sqrt{2\pi}\,\sigma_1}e^{-\frac{(x-\mu_1)^2}{2\sigma_1^2}}+B\times\frac{1}{\sqrt{2\pi}\,\sigma_2}e^{-\frac{(x-\mu_2)^2}{2\sigma_2^2}}+C\left(D\times e^{-\frac{(x-\mu_3)^2}{2\sigma_3^2}}+E\times e^{-\frac{(x-\mu_4)^2}{2\sigma_4^2}}\right)$$

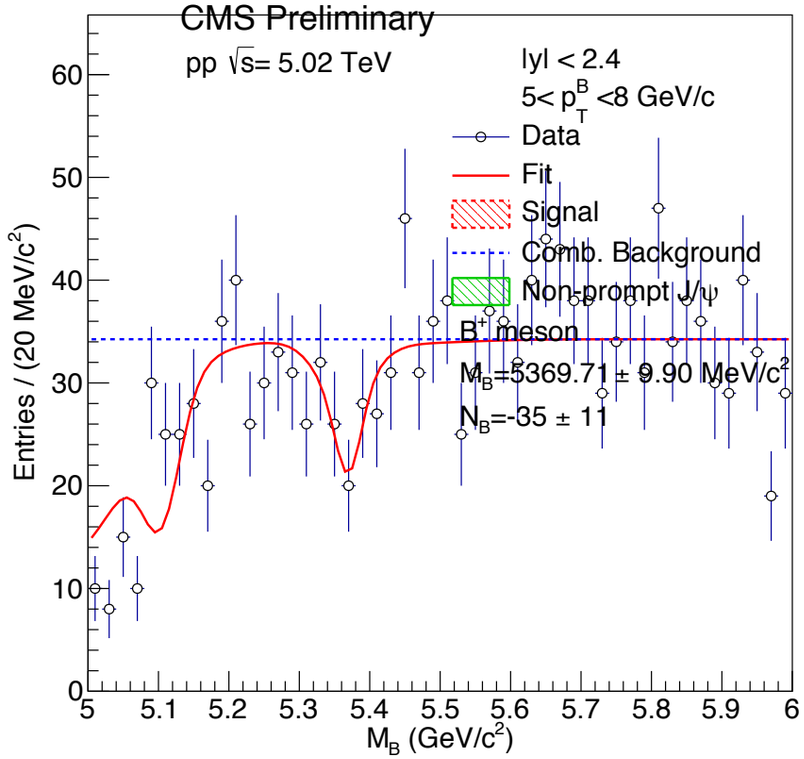
Obtained from MC RECO study
Every parameters are constant

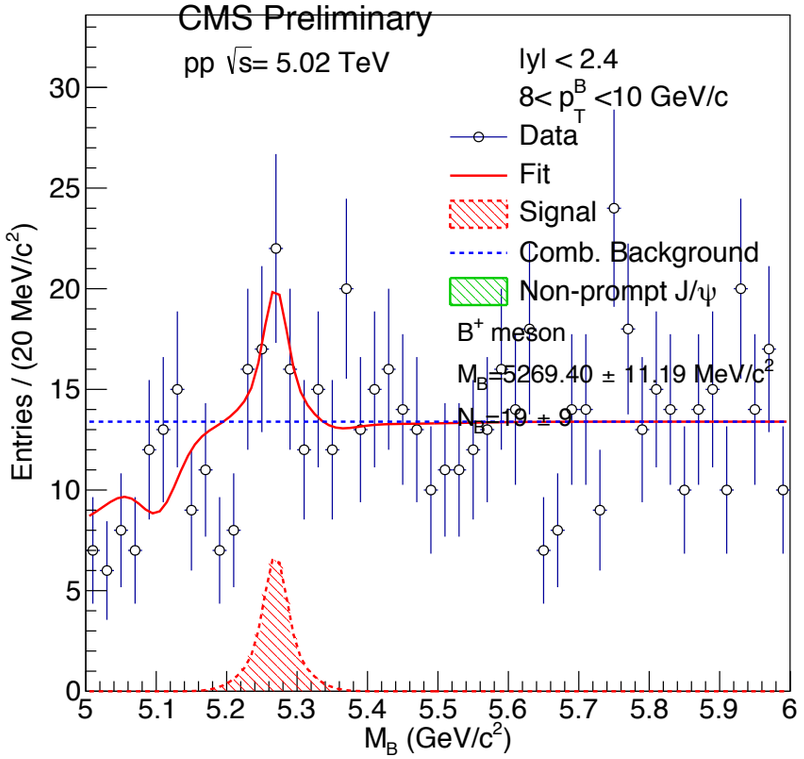
3. Total fit

Signal + Other B + Bkg.

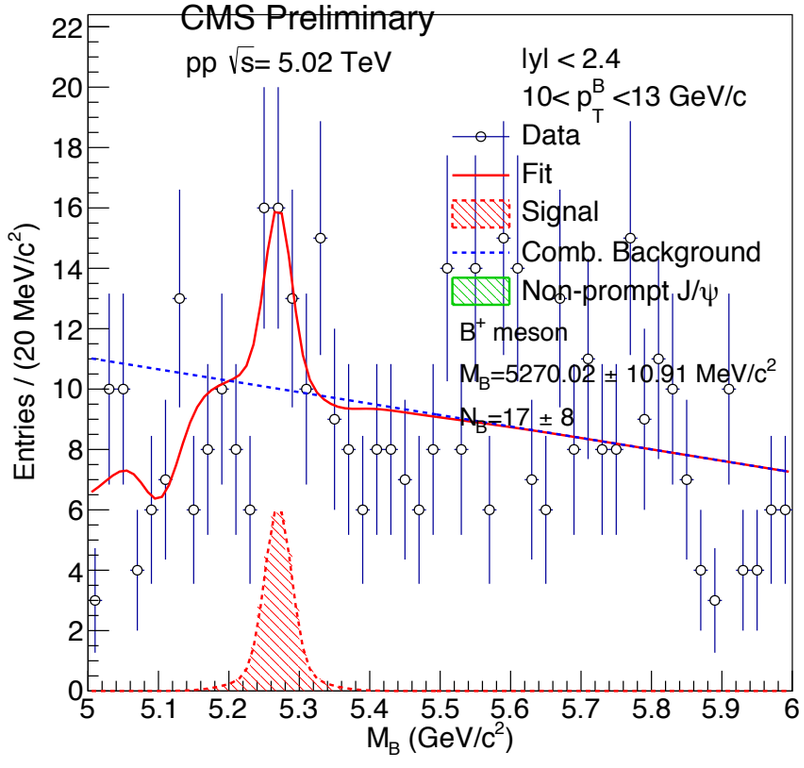


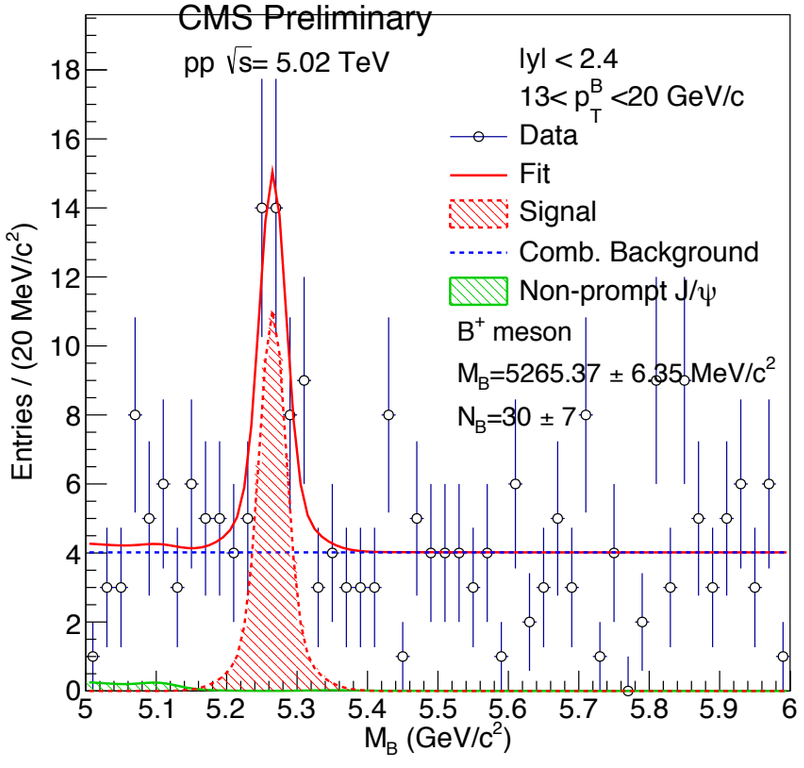
Previously

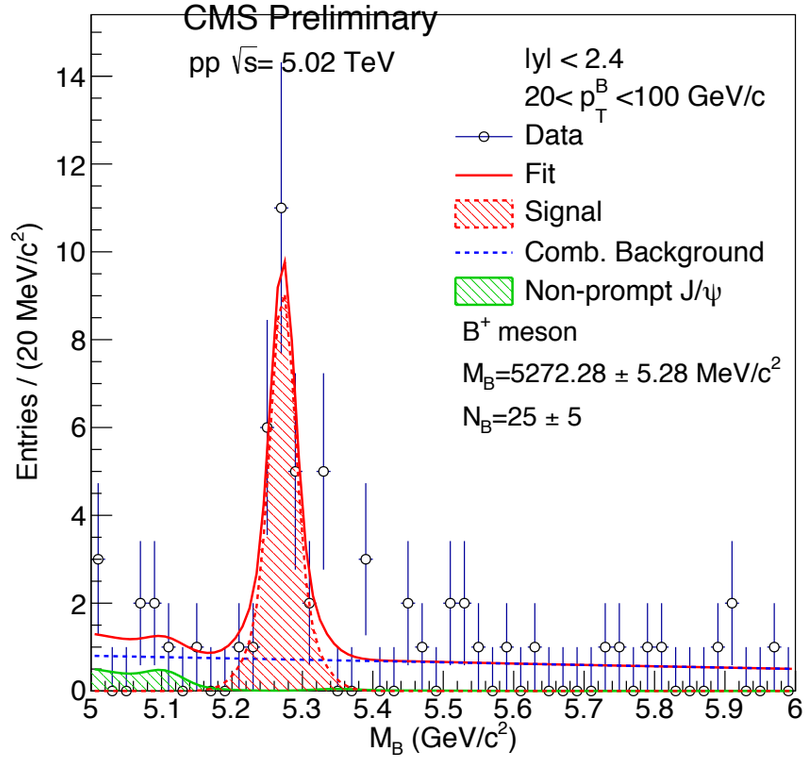




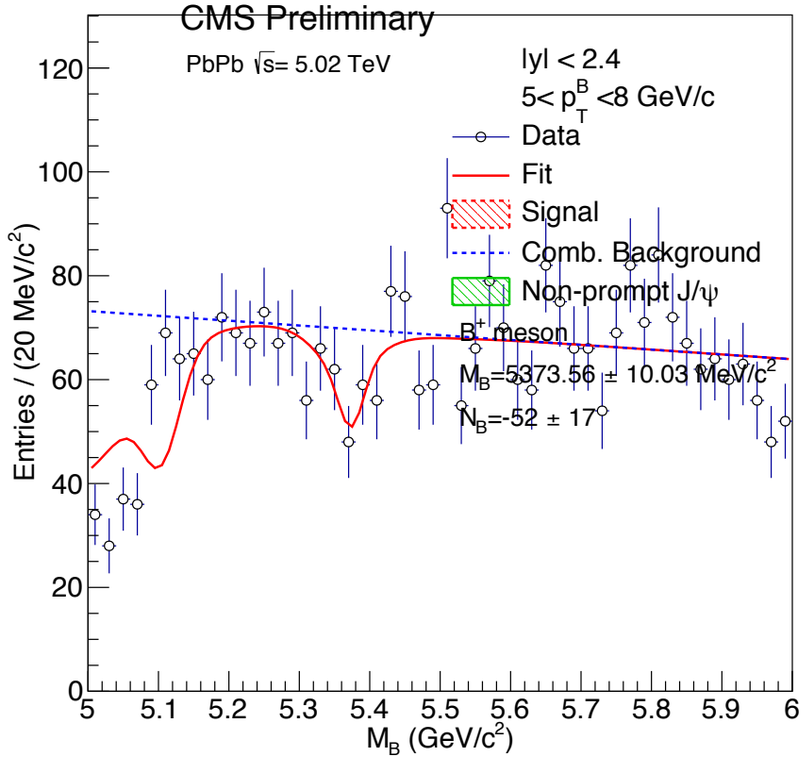
- Peaks from Other B was disappeared at low pT
- J/psi pt cut could be reason

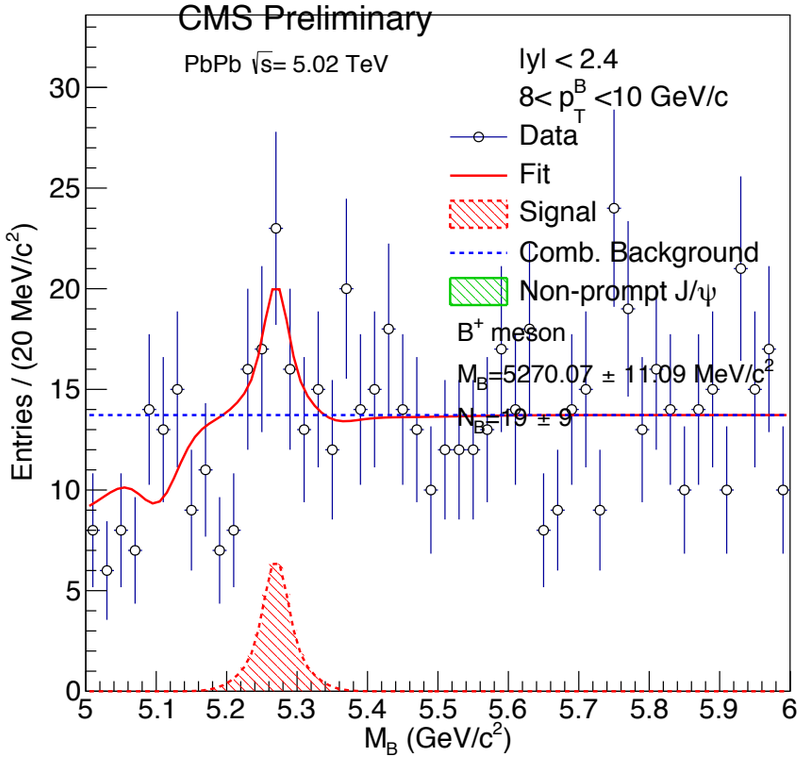




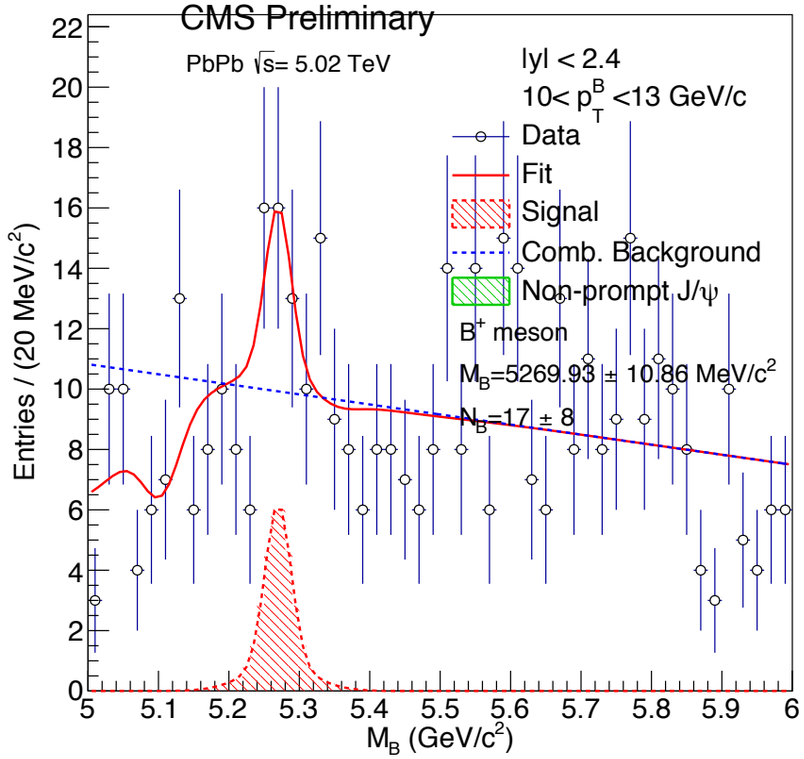


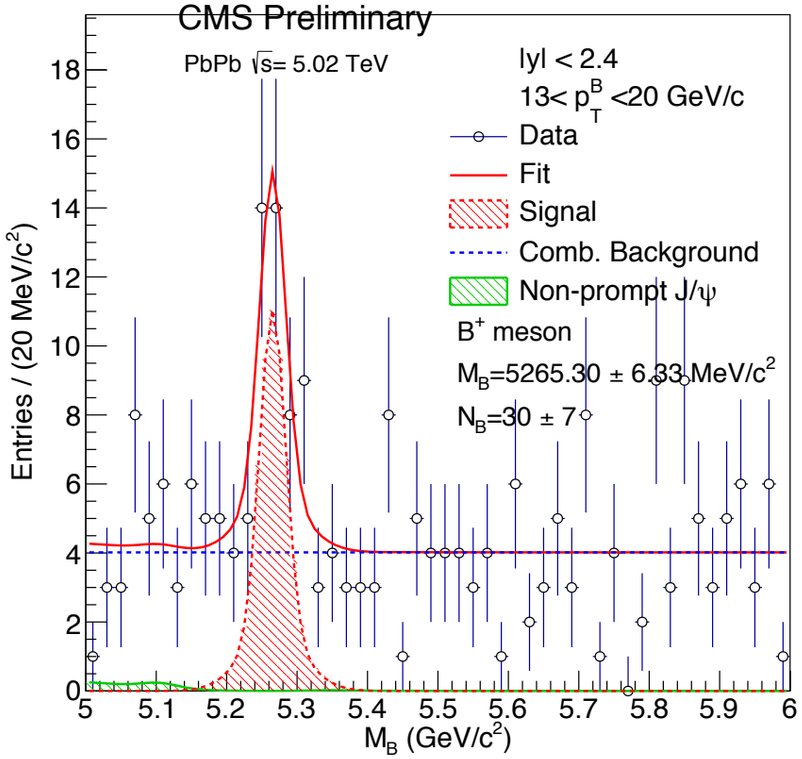
J/psi pt cut 0

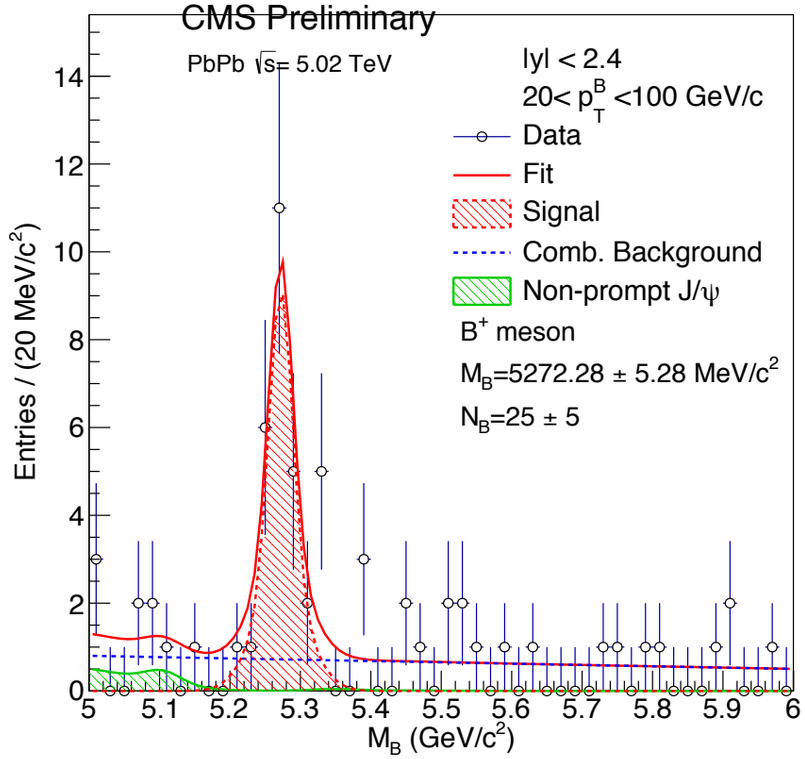




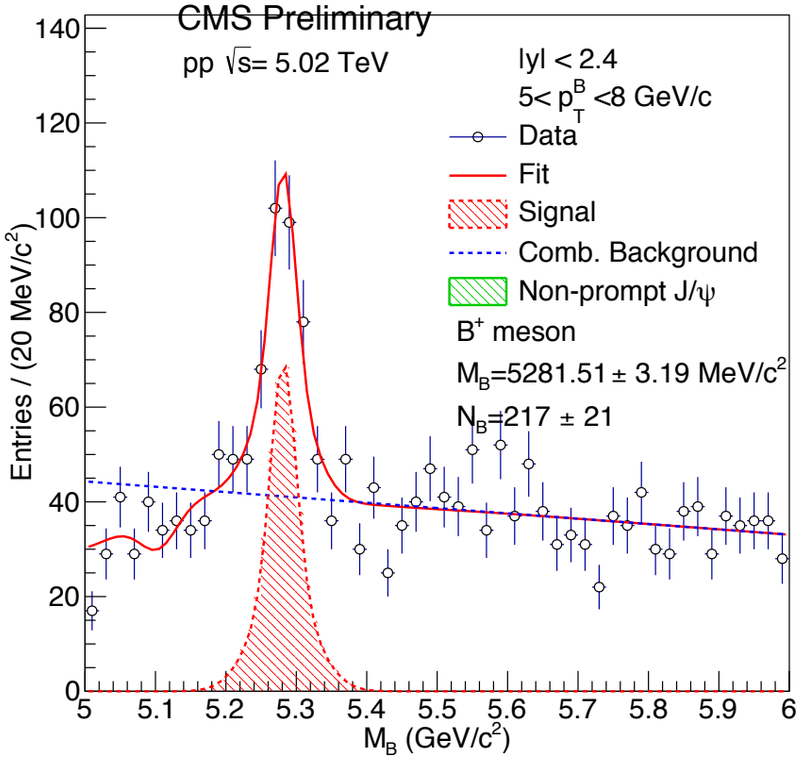
- J/psi pt looks not critical
- Other cuts and pp results study needed to valid fitting function

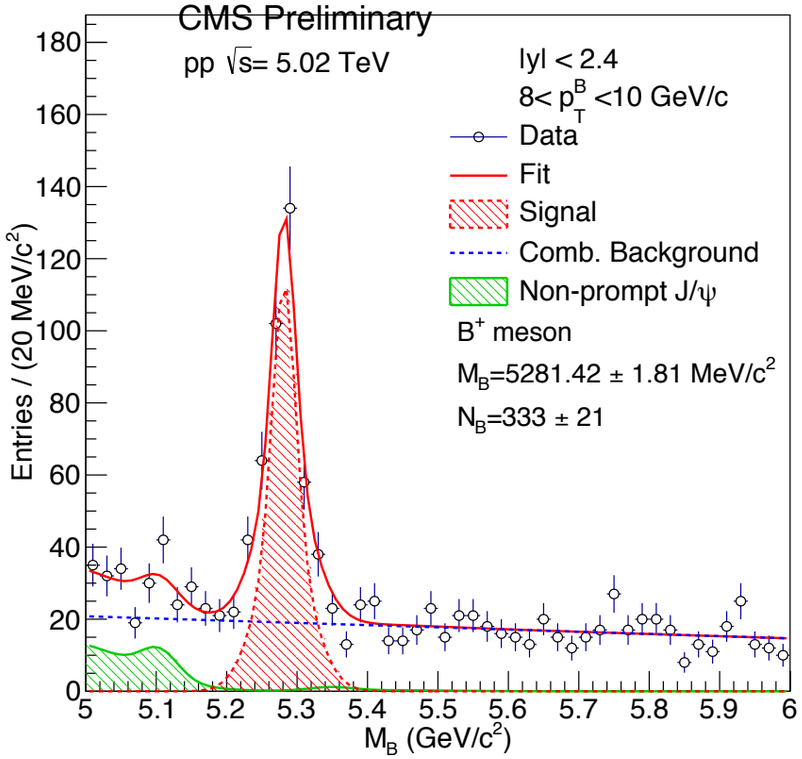


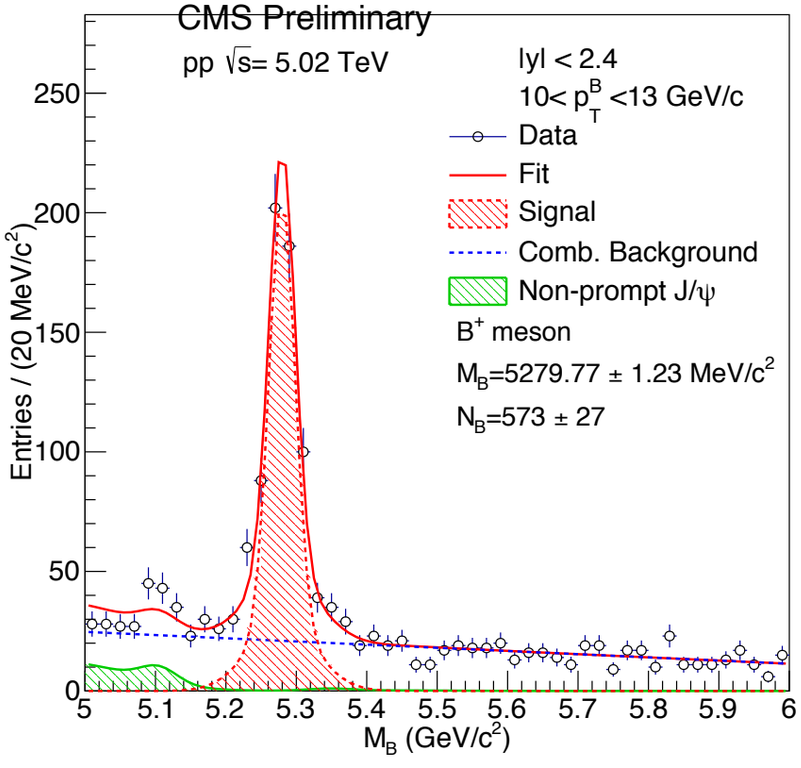


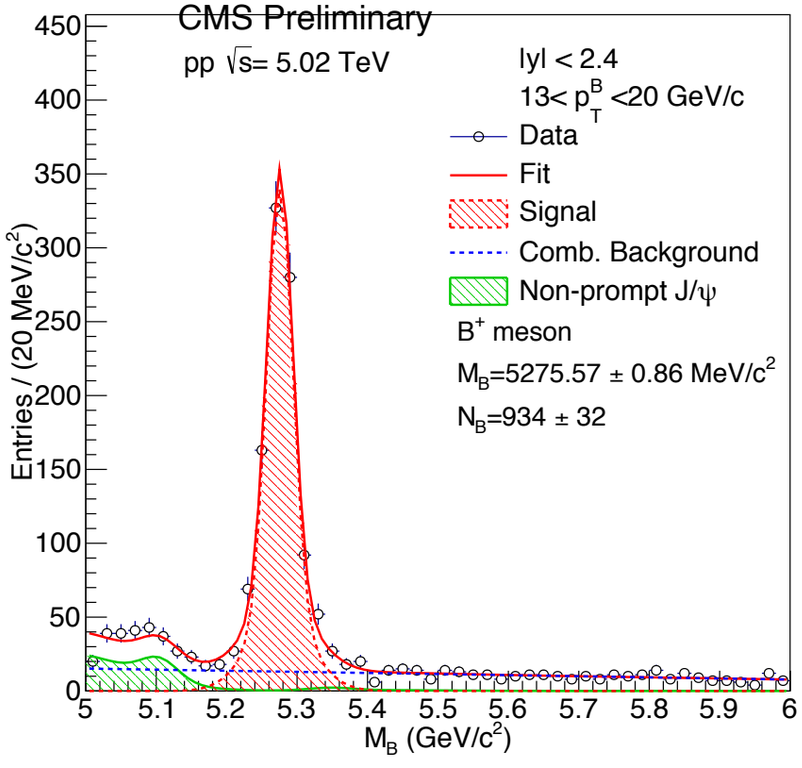


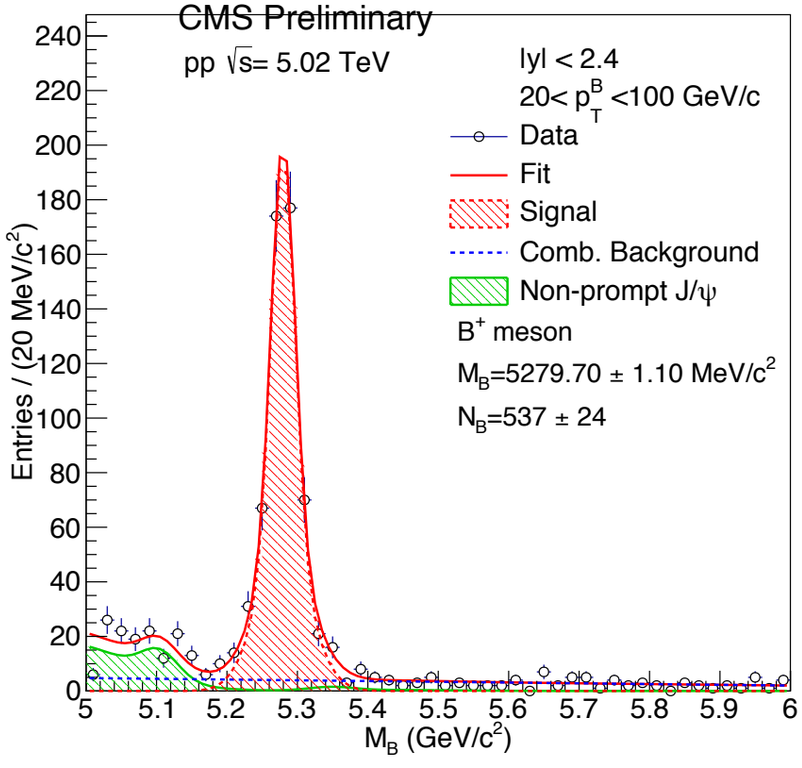
pp Mupt 1.5





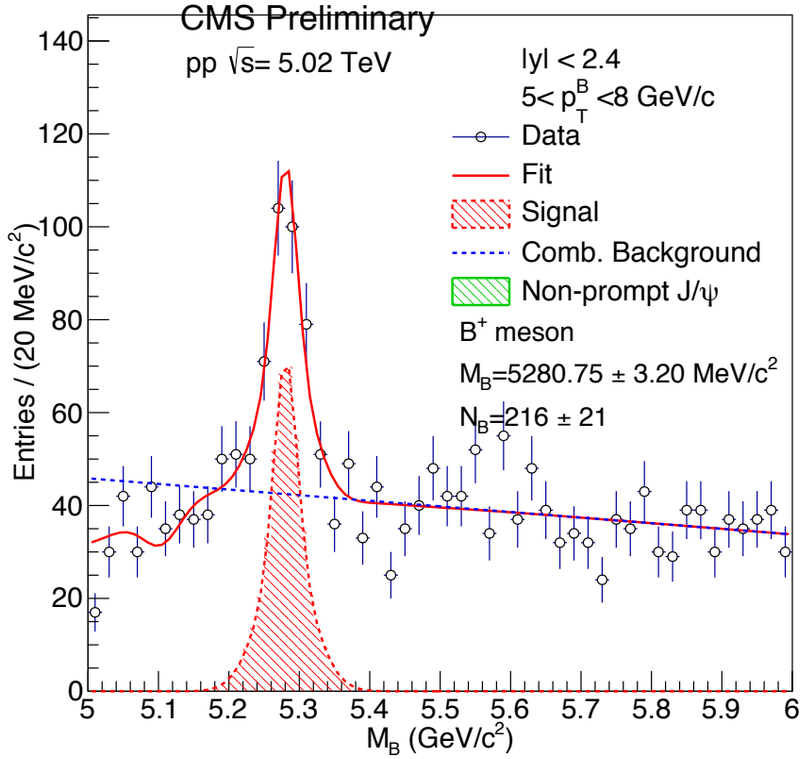


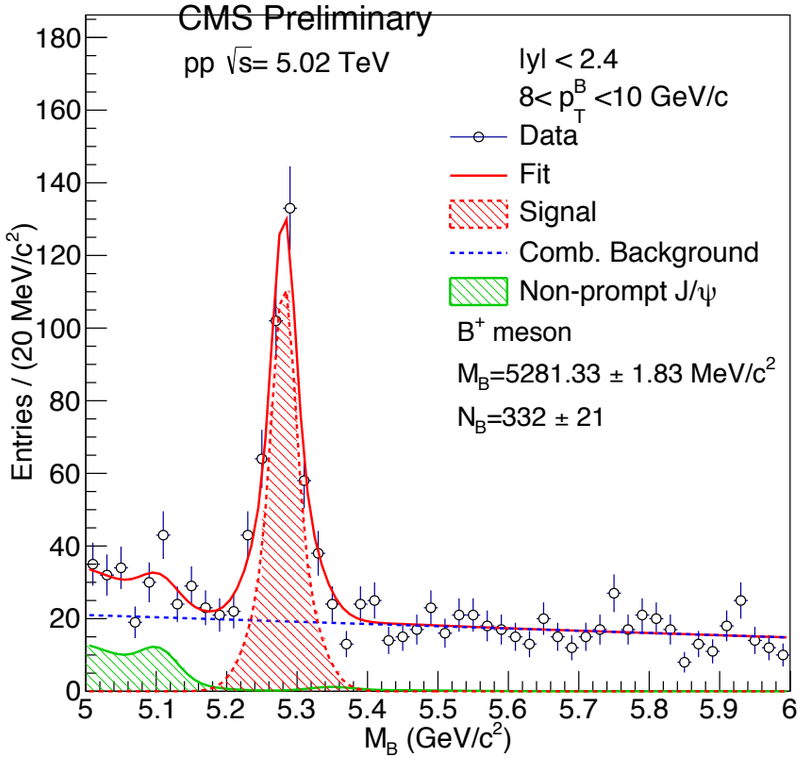




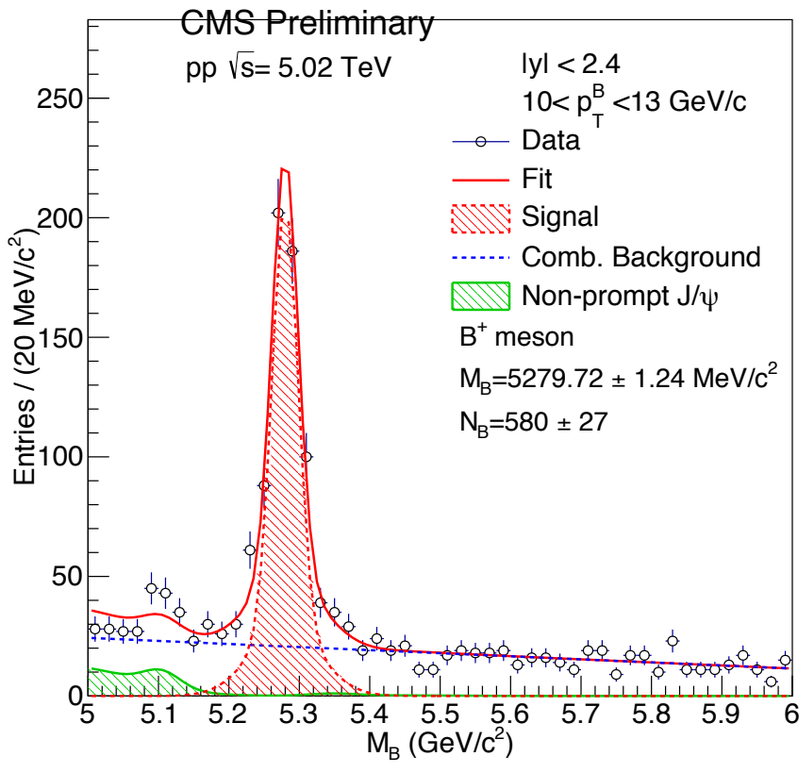
- Fitting looks successful except $5 < p_T < 8$ region
- More study needed for $5 < p_T < 8$ region

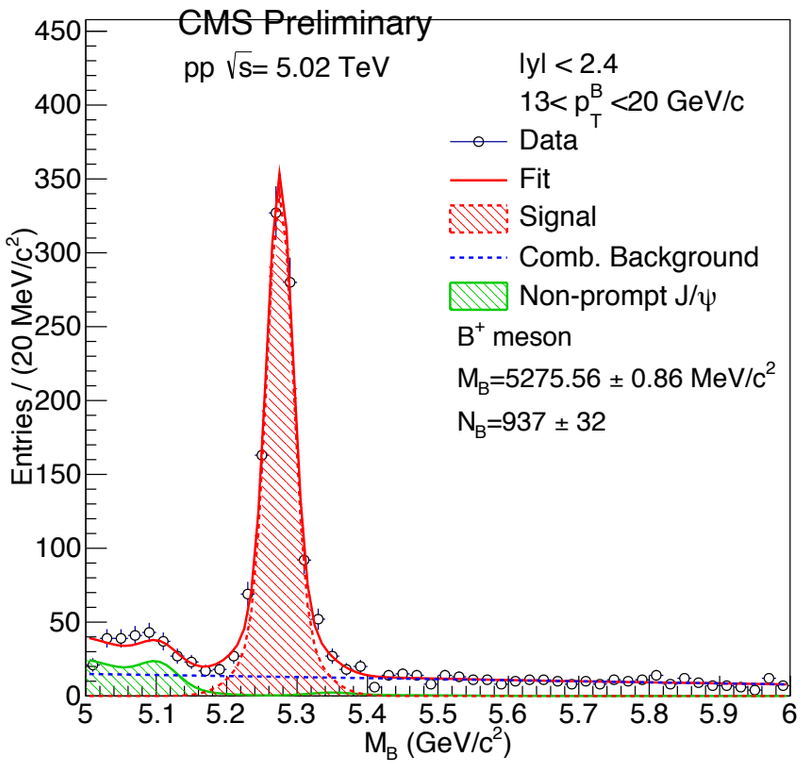
pp Mupt 0

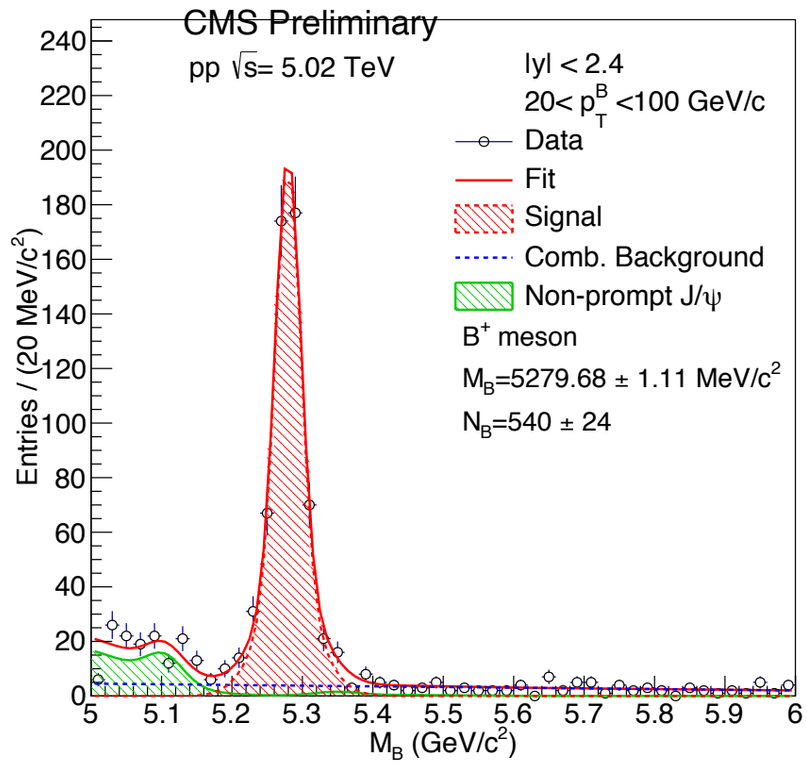




- Muon p_T variation does not improve $5 < p_T < 8$ region result

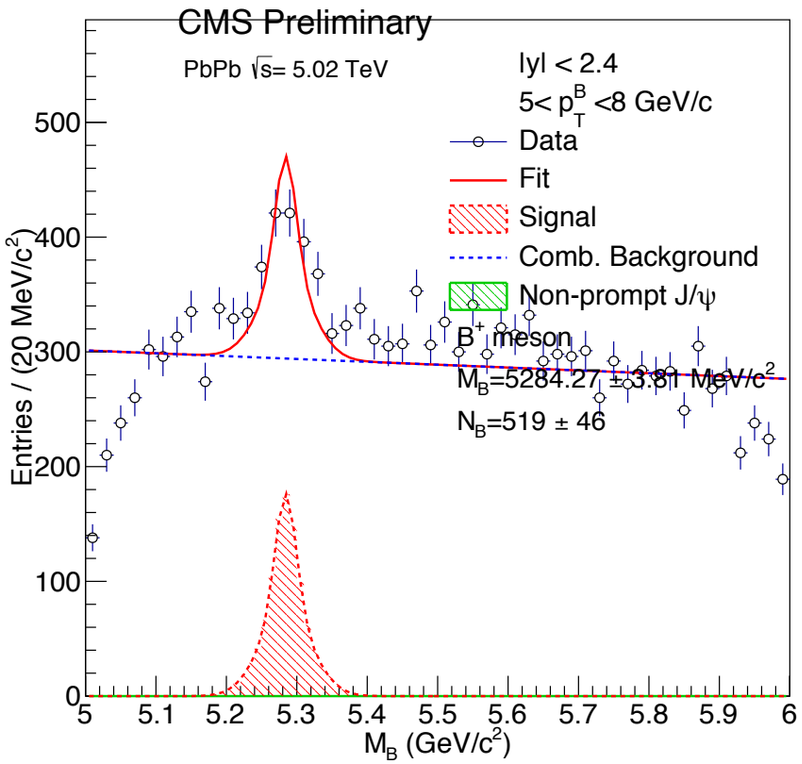




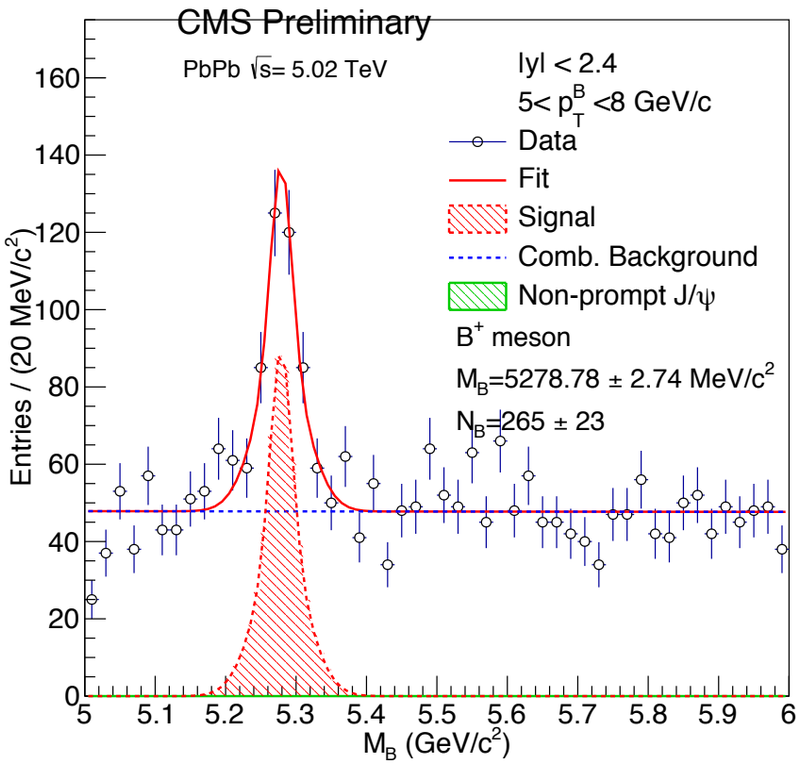


pp track pT variation($5 < pT_B < 8$)

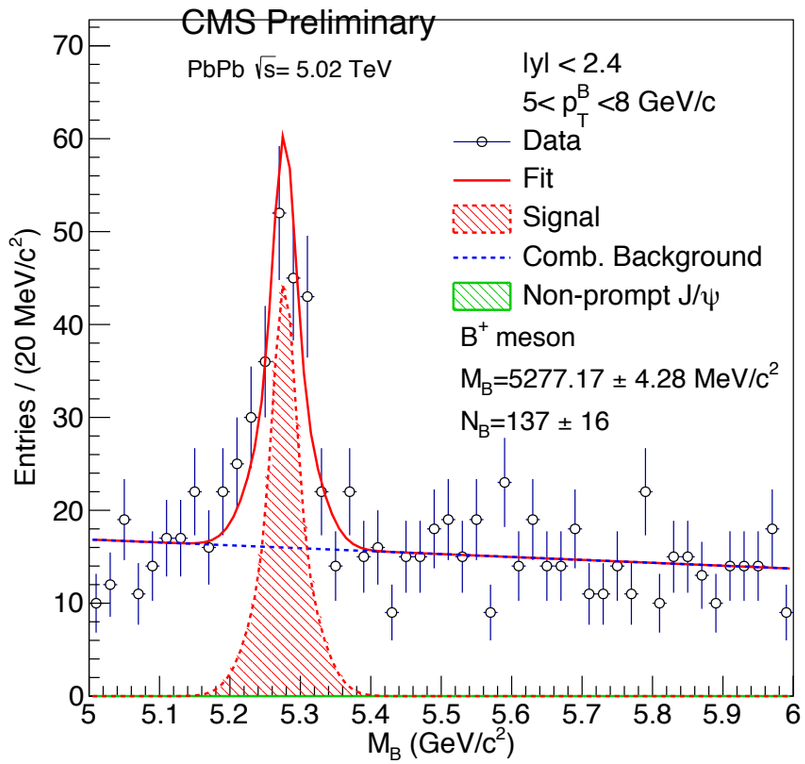
$pT_{trk} > 0.5$



$pT_{trk} > 1.0$



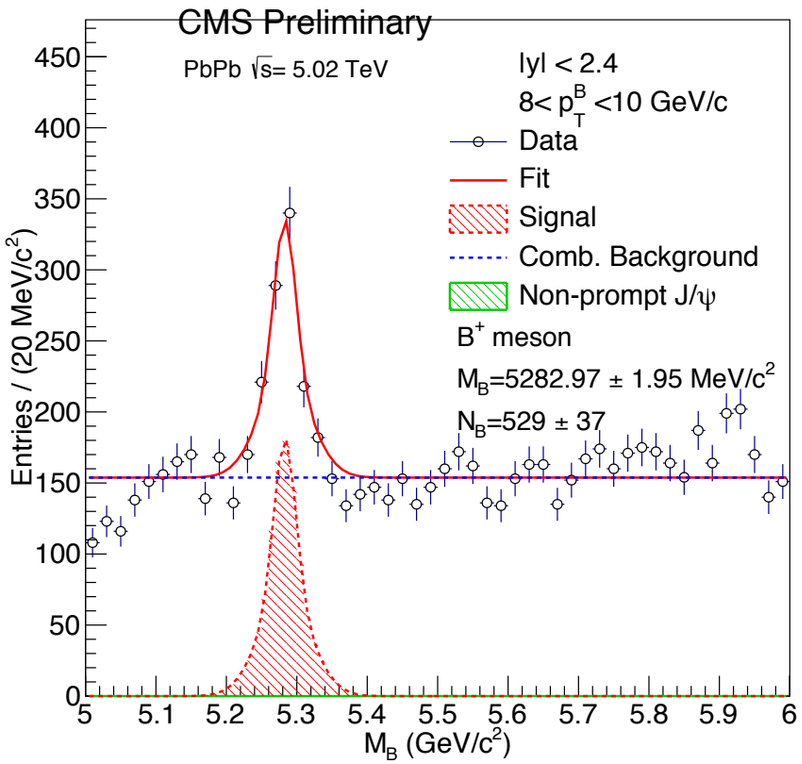
$pT_{trk} > 1.5$



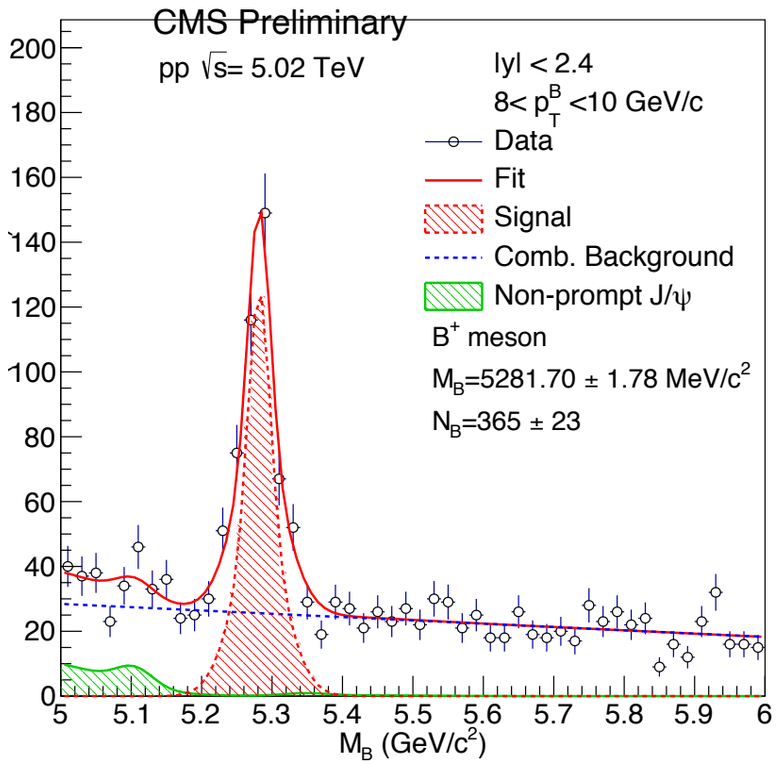
- pT track variation does not improve background shape in the $5 < pT_B < 8$ region

pp track pT variation($8 < B_{pT} < 10$)

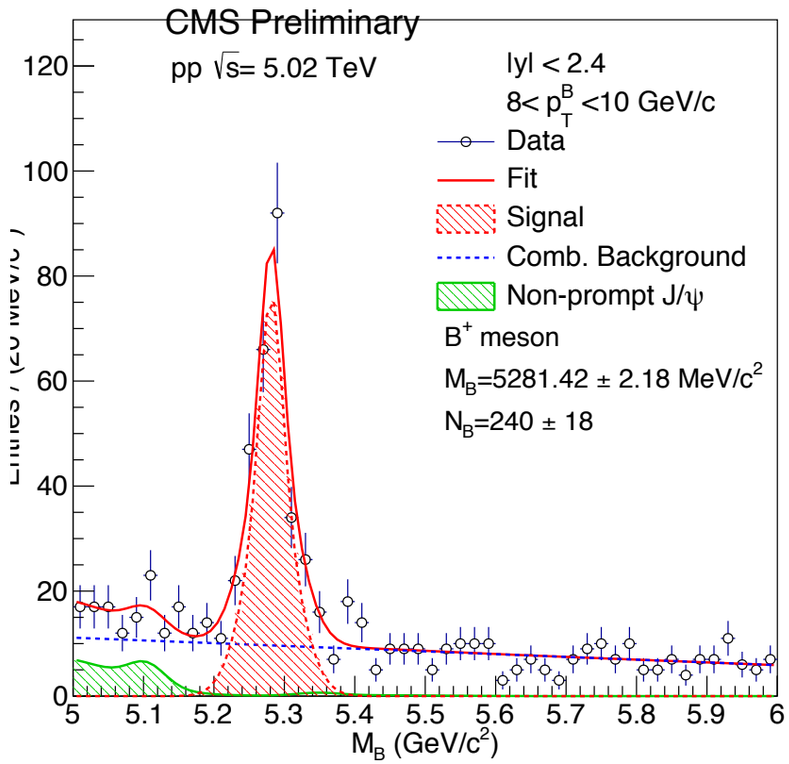
$pT_{trk} > 0.5$



$pT_{trk} > 1.0$



$pT_{trk} > 1.5$



- Too low pT track cut breaks background fitting
- Raw yield R_{AA} measured without $5 < pT_B < 8$ region

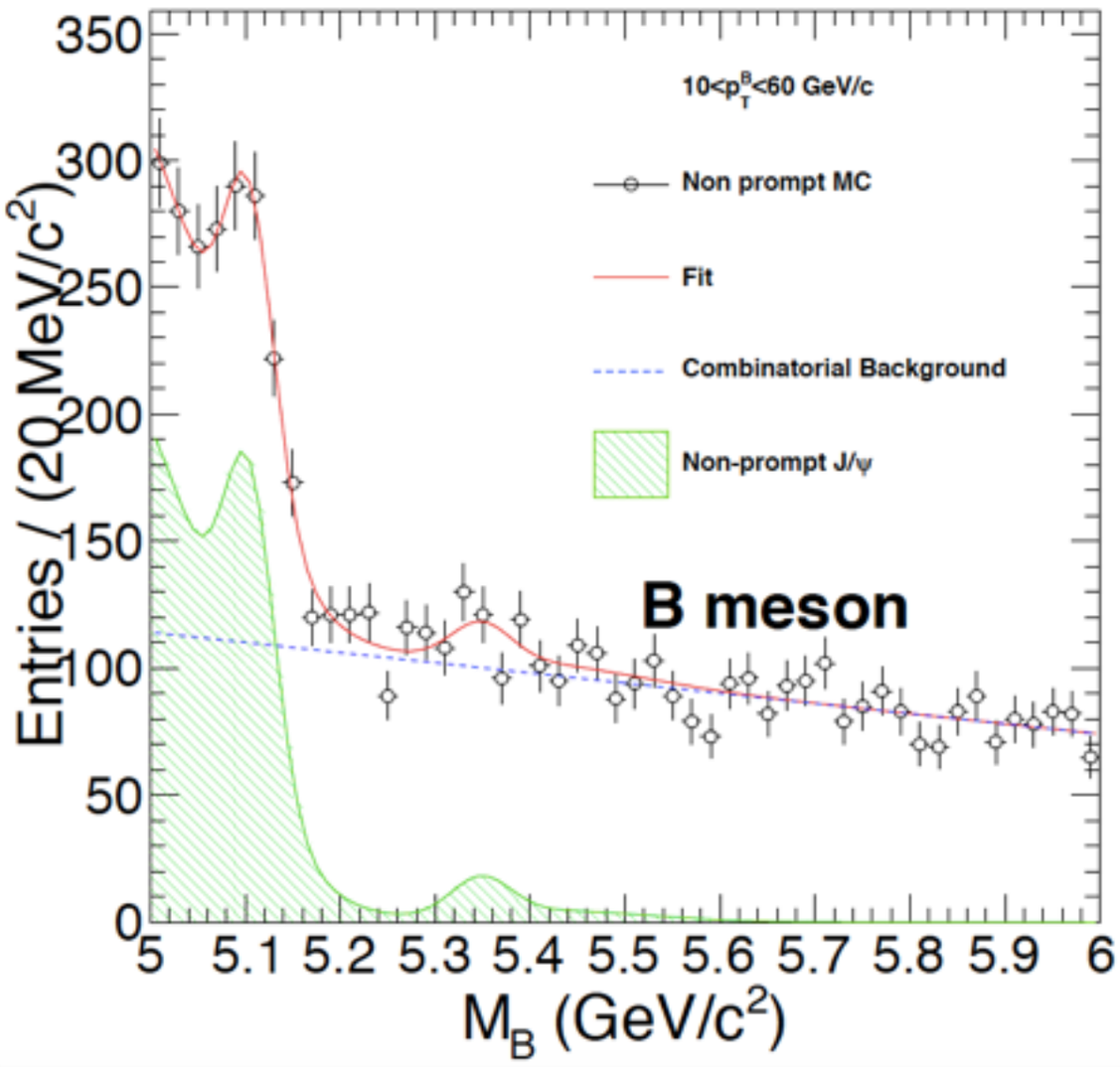
Summary

- Fitting function describes pp result well except B meson p_T < 8 region
- Variation of track, muon, J/psi p_T is not solution of p_T < 8 region issue
- Optimal cut study for PbPb is needed
- R_{AA} with raw yield is lower than 0.1

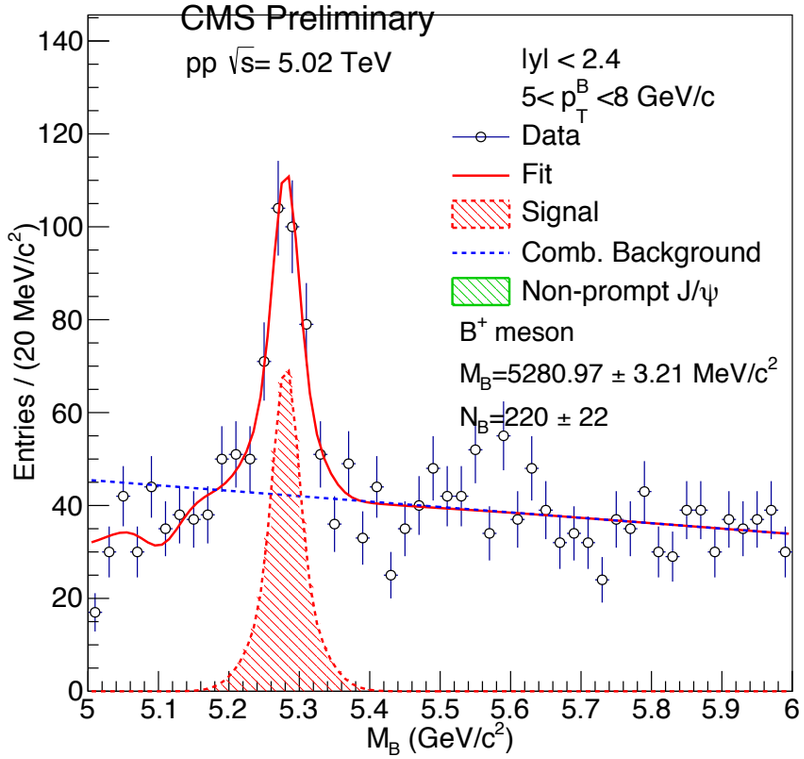
back up

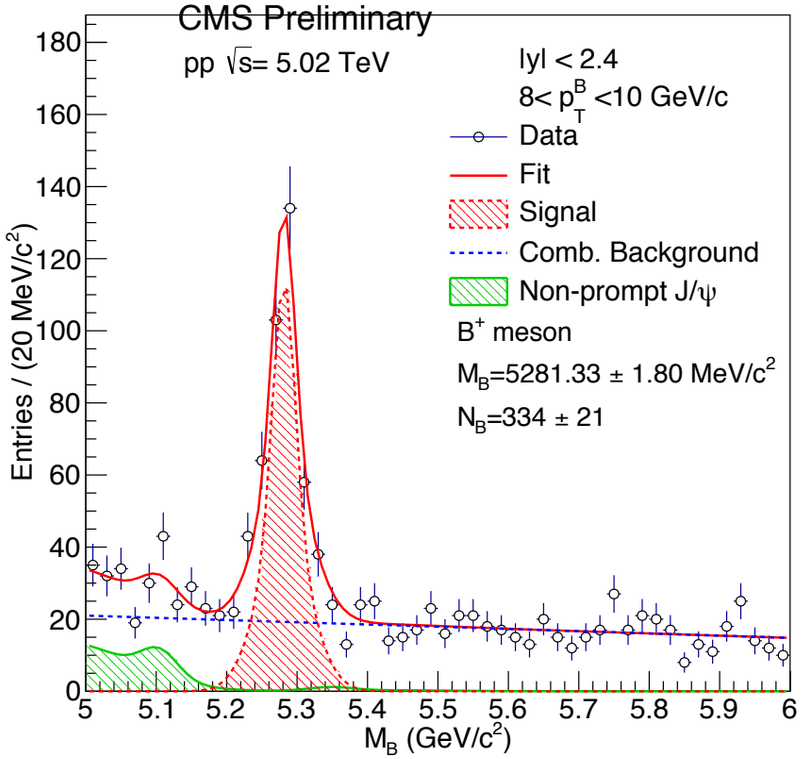
Non-Prompt shape

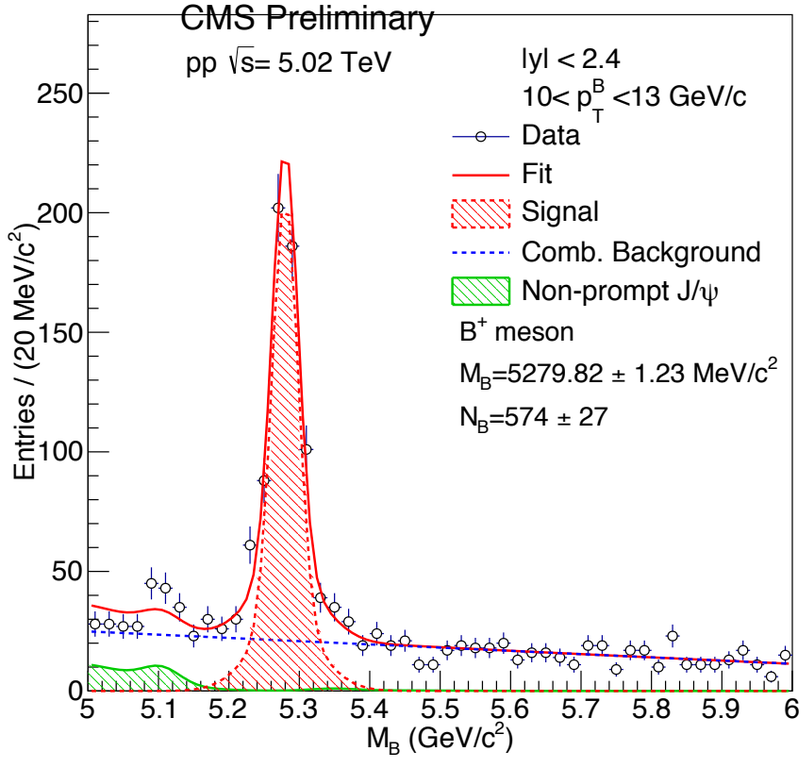
- 1. $B^+ \rightarrow J/\psi + \pi^+$(Double Gaussian)
- 2. Muti-body decay(Gaussian)
  - e.g.) $B^+ \rightarrow J/\psi + K^*(892)^+$

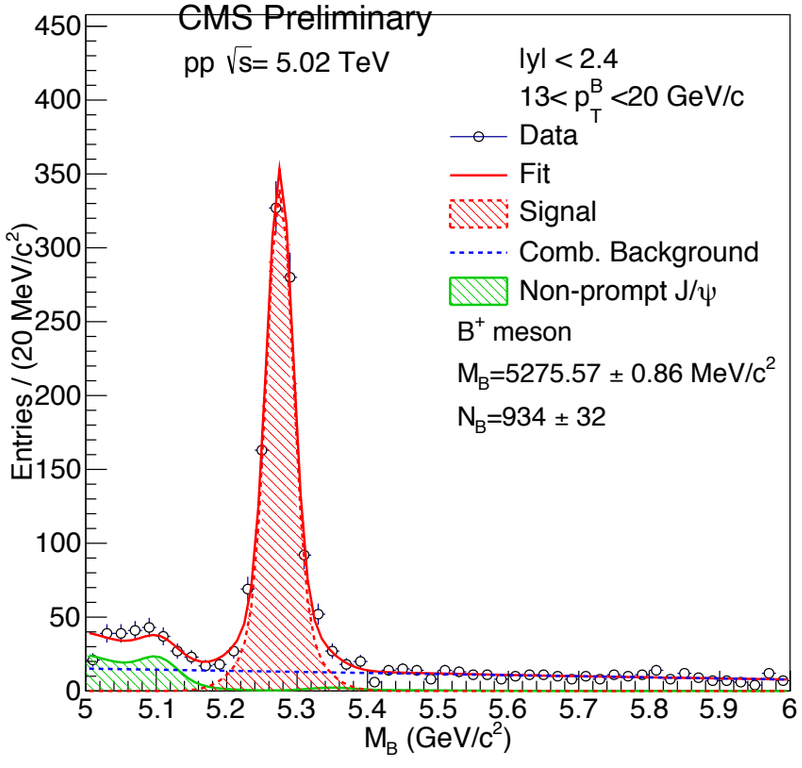


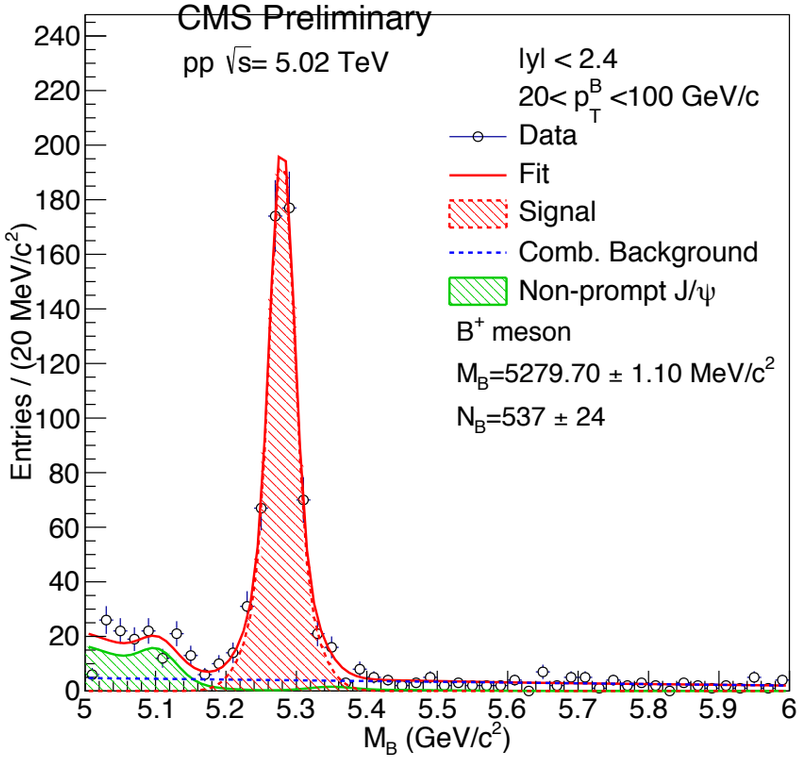
pp Mupt 1.0


CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
5< p_T^B <8 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5280.97 ± 3.21 MeV/c²
N_B=220 ± 22
Entries / (20 MeV/c²)
M_B (GeV/c²)

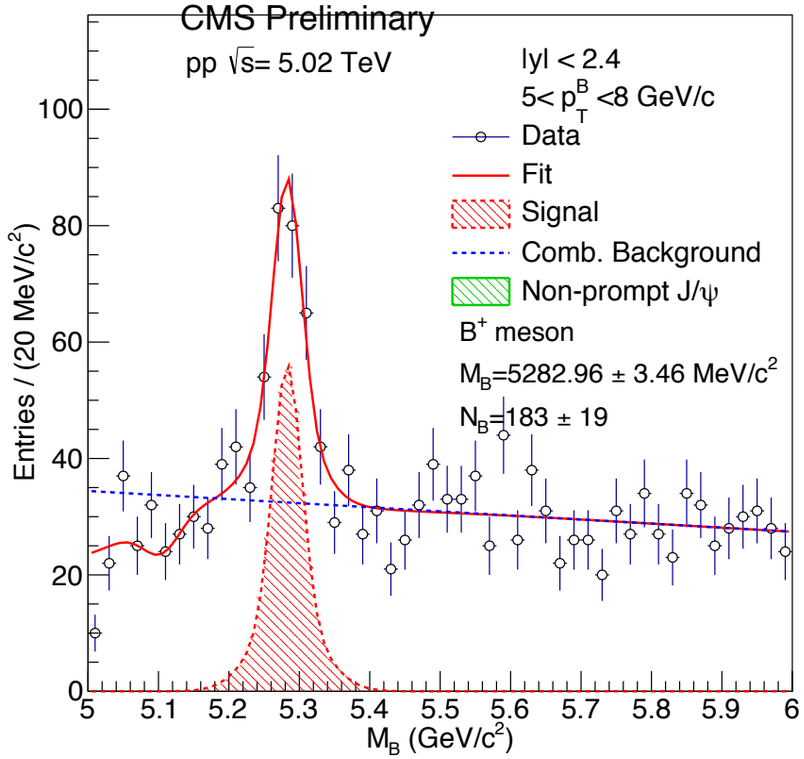

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
8< p_T^B <10 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5281.33 ± 1.80 MeV/c²
N_B=334 ± 21
Entries / (20 MeV/c²)
M_B (GeV/c²)

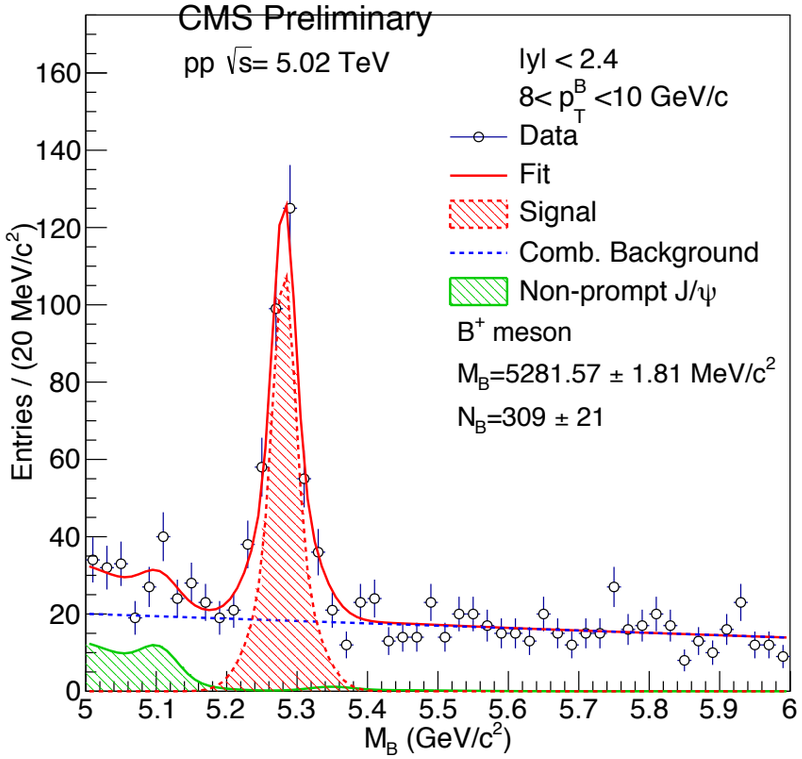

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
10< p_T^B <13 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5279.82 ± 1.23 MeV/c²
N_B=574 ± 27
Entries / (20 MeV/c²)
M_B (GeV/c²)

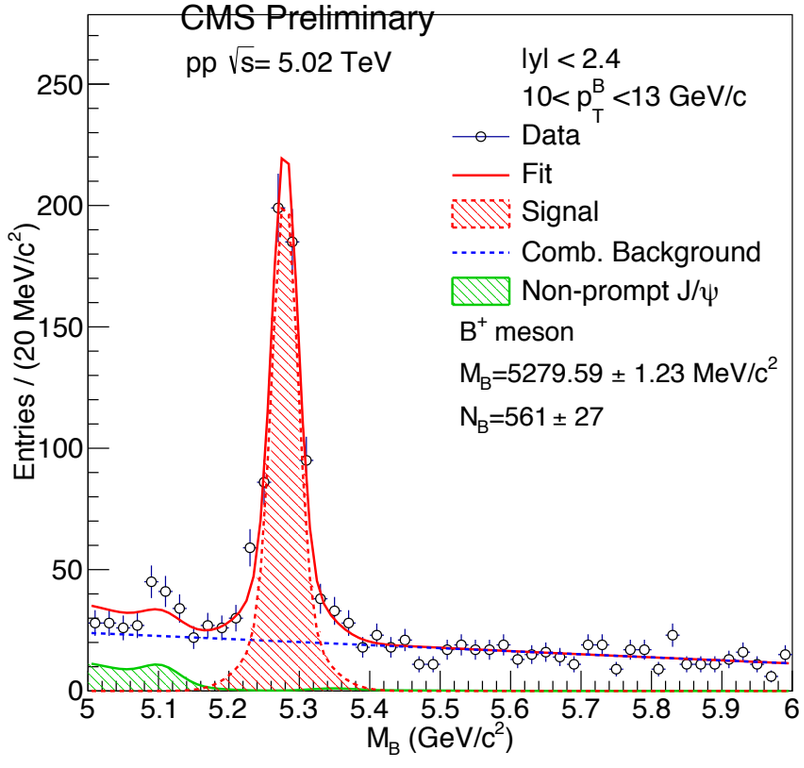

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
13< p_T^B <20 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5275.57 ± 0.86 MeV/c²
N_B=934 ± 32
Entries / (20 MeV/c²)
M_B (GeV/c²)

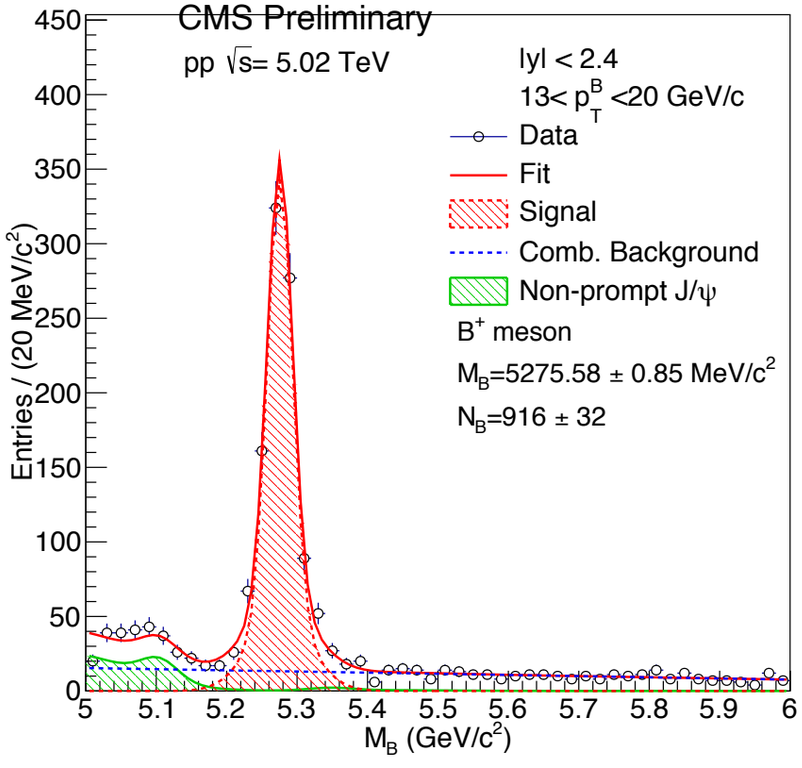

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
20< p_T^B <100 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5279.70 ± 1.10 MeV/c²
N_B=537 ± 24
Entries / (20 MeV/c²)
M_B (GeV/c²)

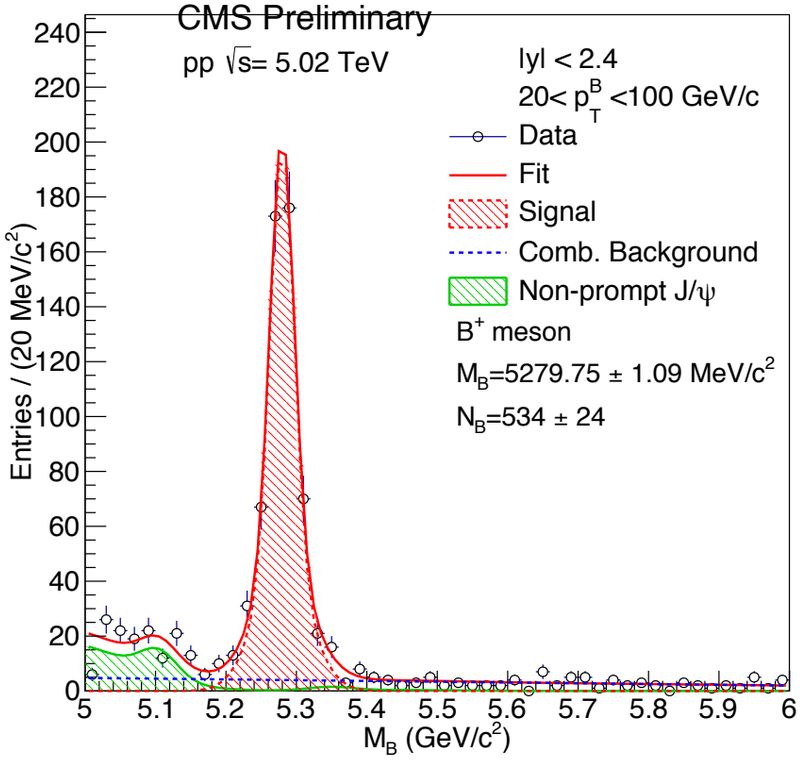
pp Mupt 2.0


CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
5< p_T^B <8 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5282.96 ± 3.46 MeV/c²
N_B=183 ± 19
Entries / (20 MeV/c²)
M_B (GeV/c²)

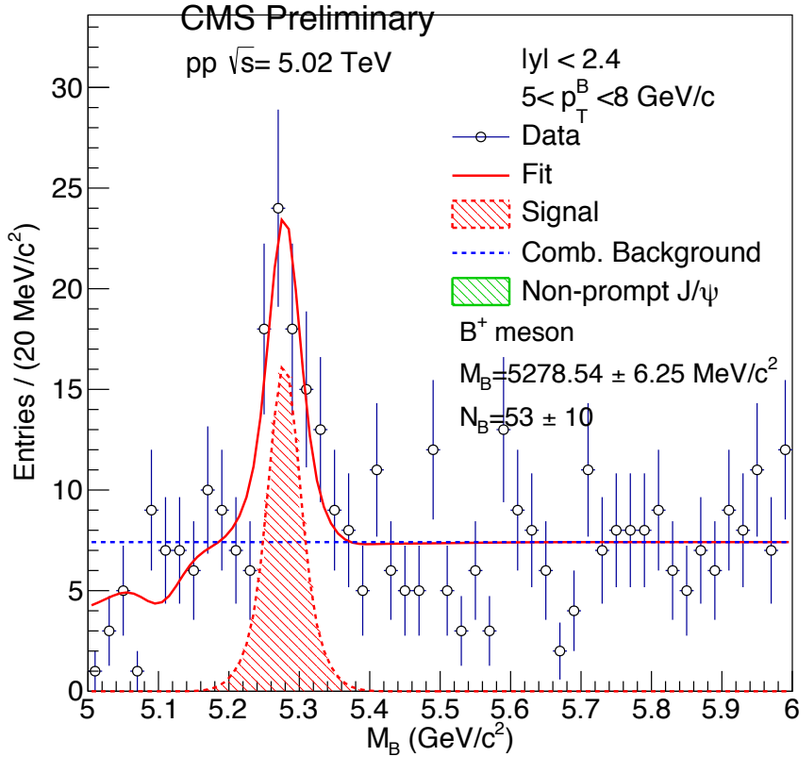

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
8< p_T^B <10 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5281.57 ± 1.81 MeV/c²
N_B=309 ± 21
Entries / (20 MeV/c²)
M_B (GeV/c²)

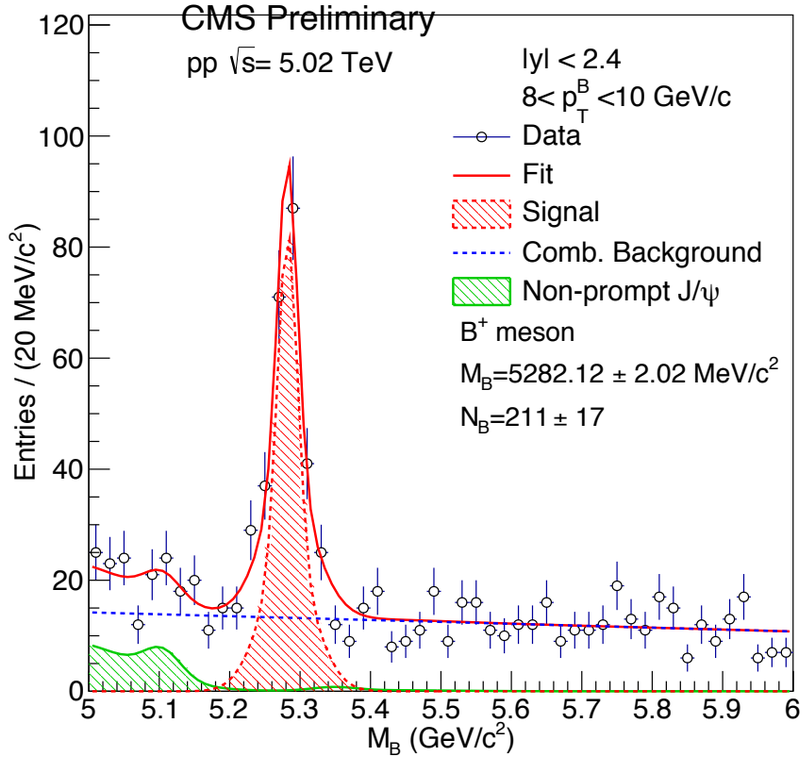

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
10< p_T^B <13 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5279.59 ± 1.23 MeV/c²
N_B=561 ± 27
Entries / (20 MeV/c²)
M_B (GeV/c²)


CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
13< p_T^B <20 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5275.58 ± 0.85 MeV/c²
N_B=916 ± 32
Entries / (20 MeV/c²)
M_B (GeV/c²)

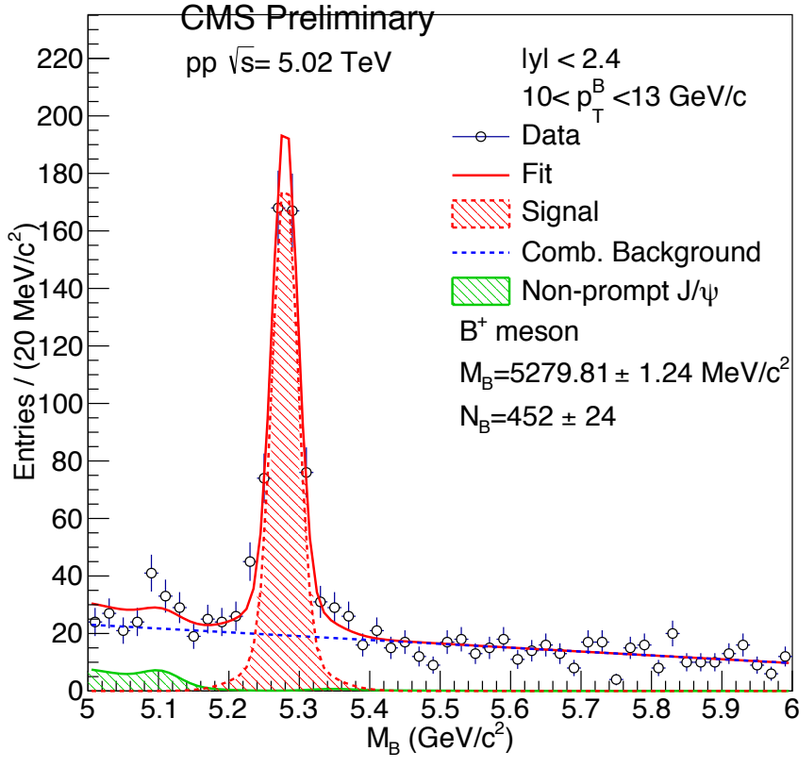

CMS Preliminary
pp √s= 5.02 TeV
|y| < 2.4
20< p_T^B <100 GeV/c
Data
Fit
Signal
Comb. Background
Non-prompt J/ψ
B+ meson
M_B=5279.75 ± 1.09 MeV/c²
N_B=534 ± 24
Entries / (20 MeV/c²)
M_B (GeV/c²)

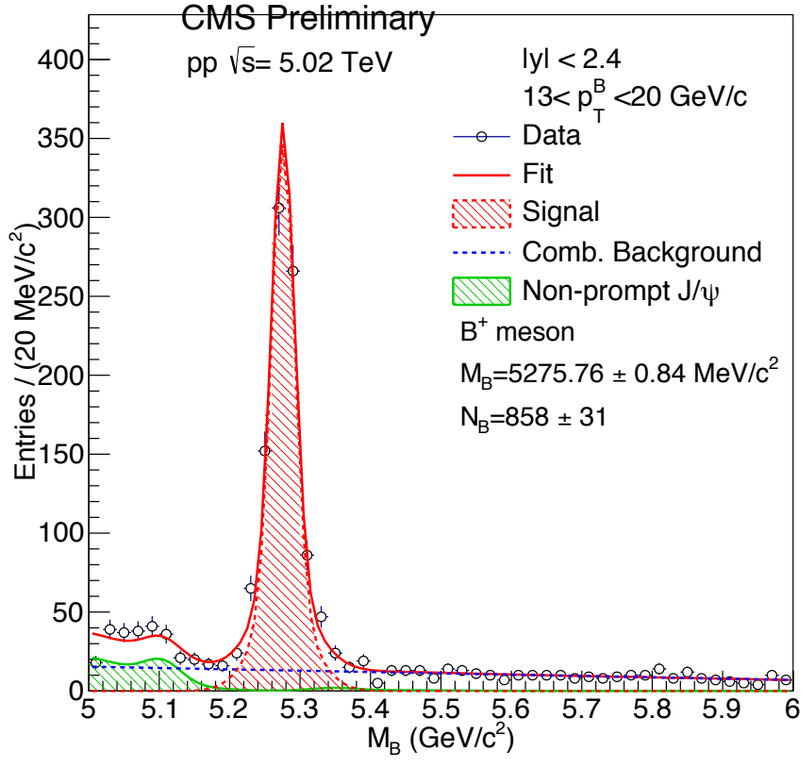
pp Mupt 3.0

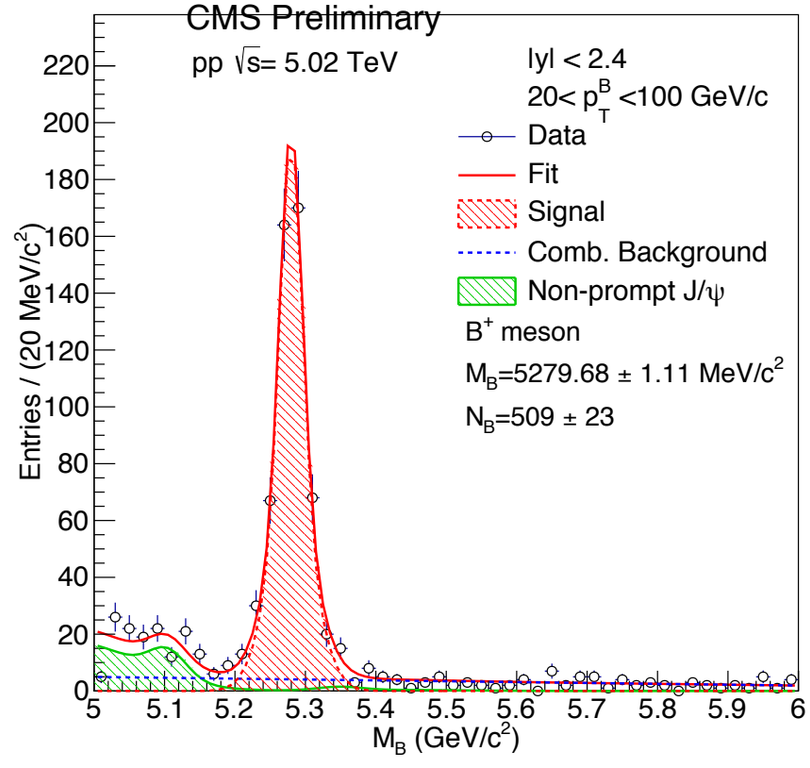




- Tight Muon pt cut is not solution of low pt B meson background







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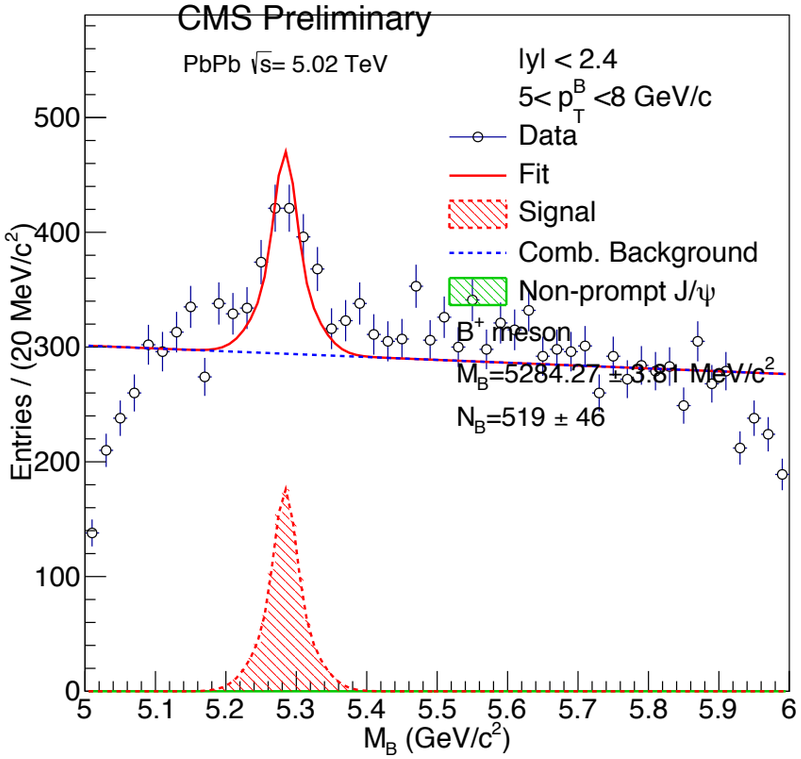

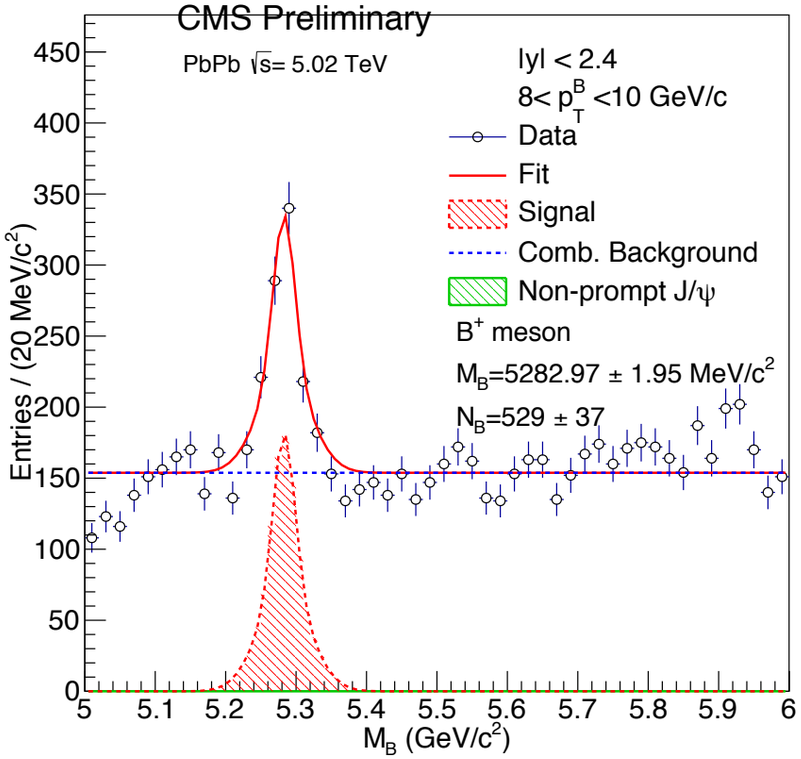

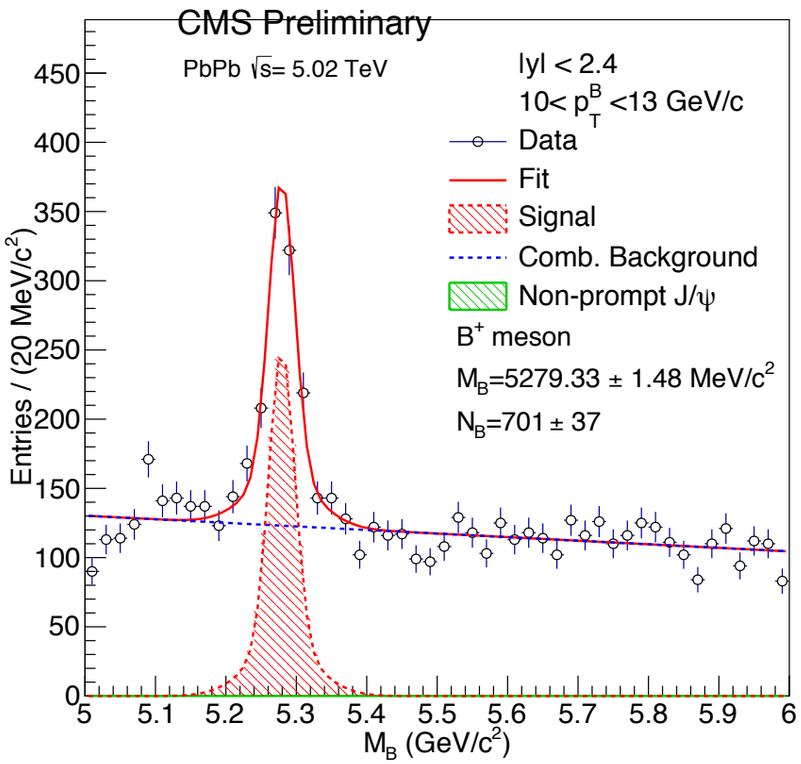

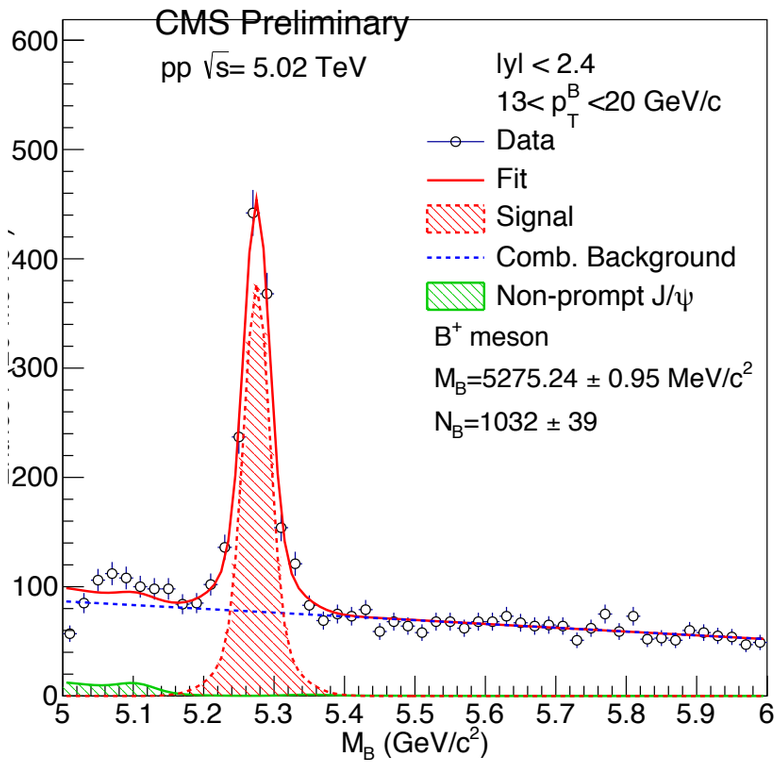

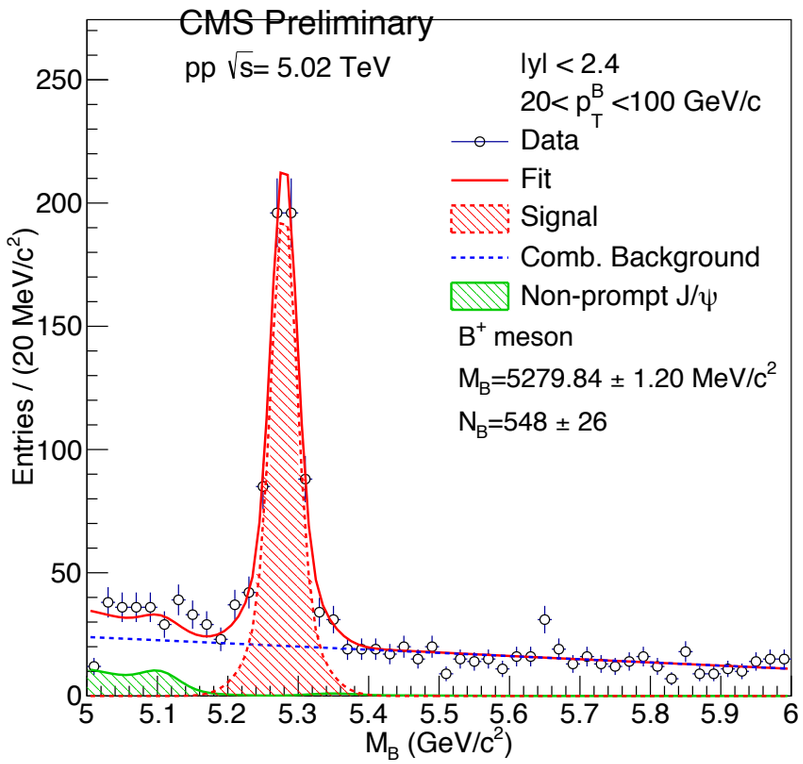

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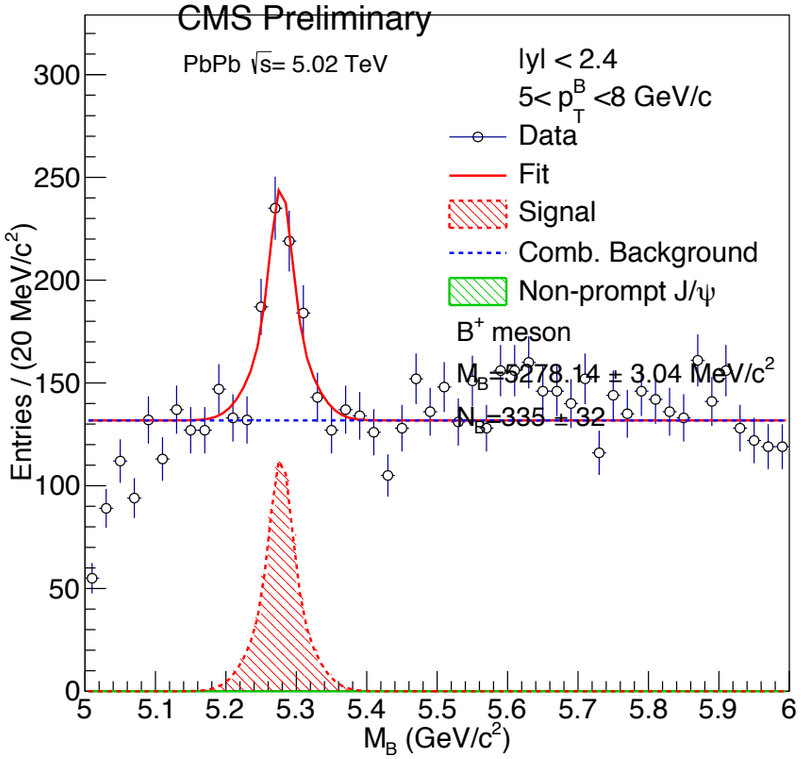

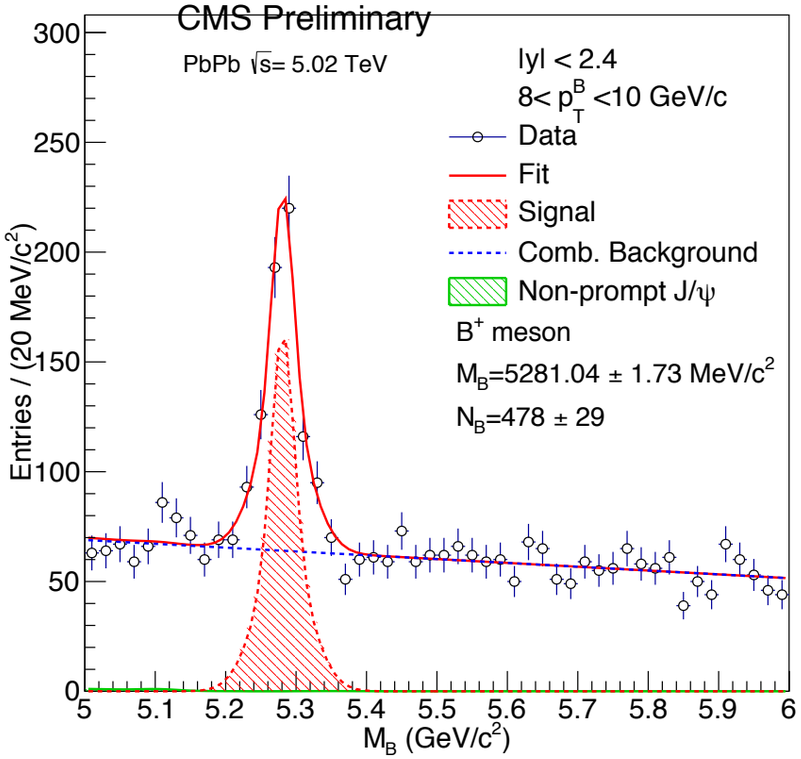

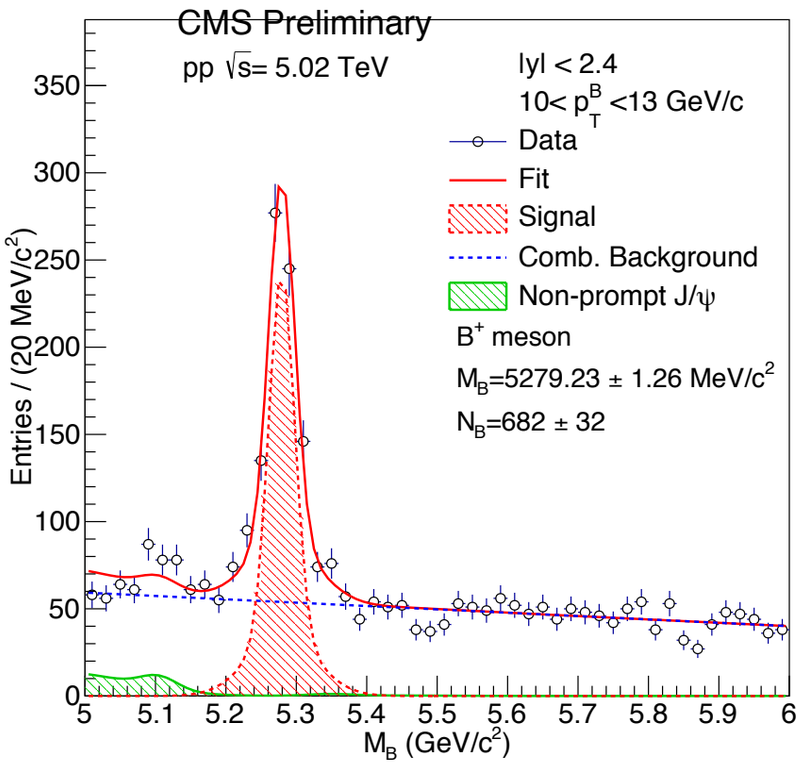

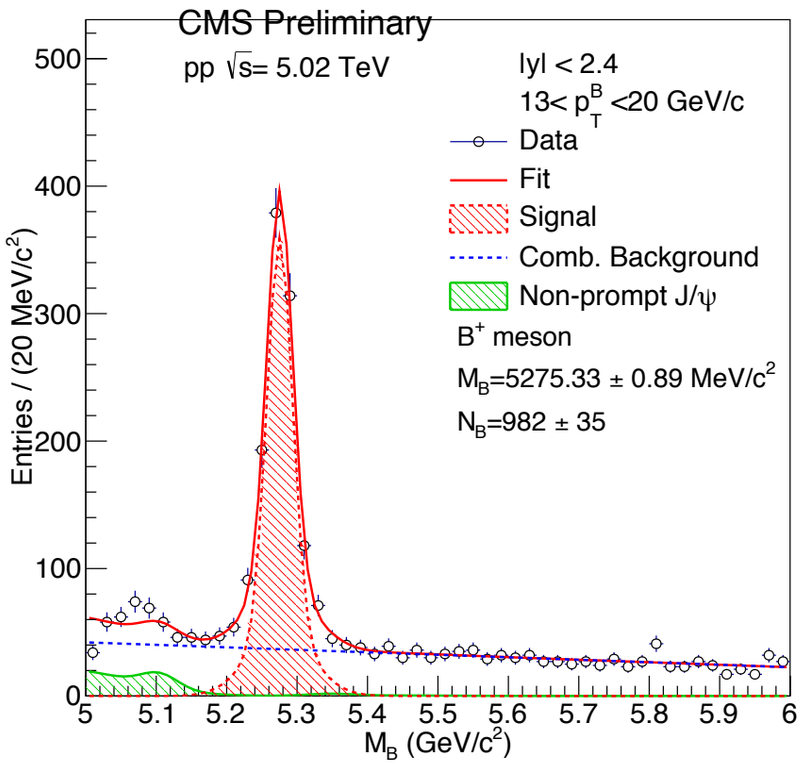

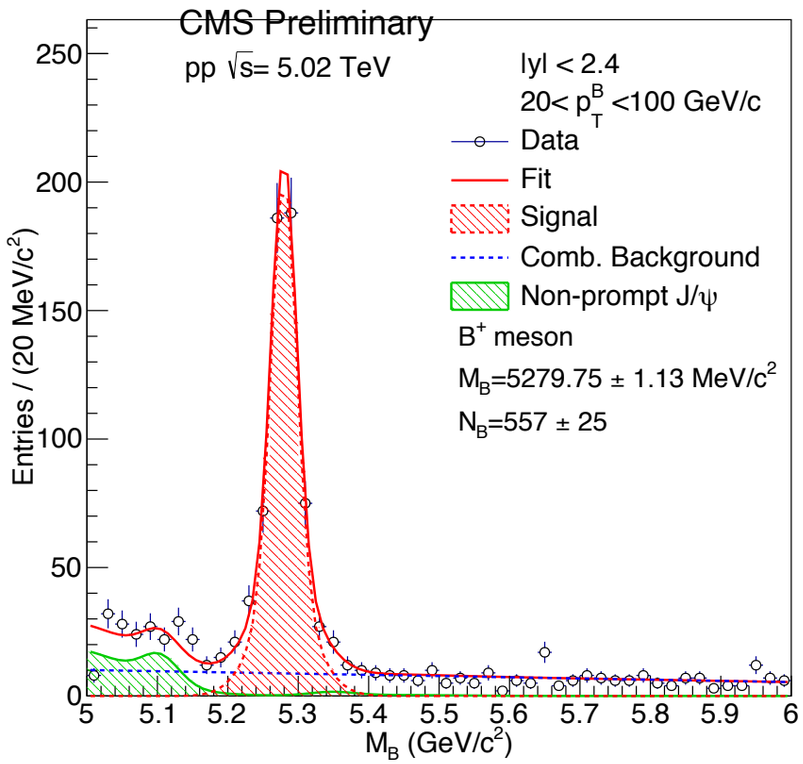

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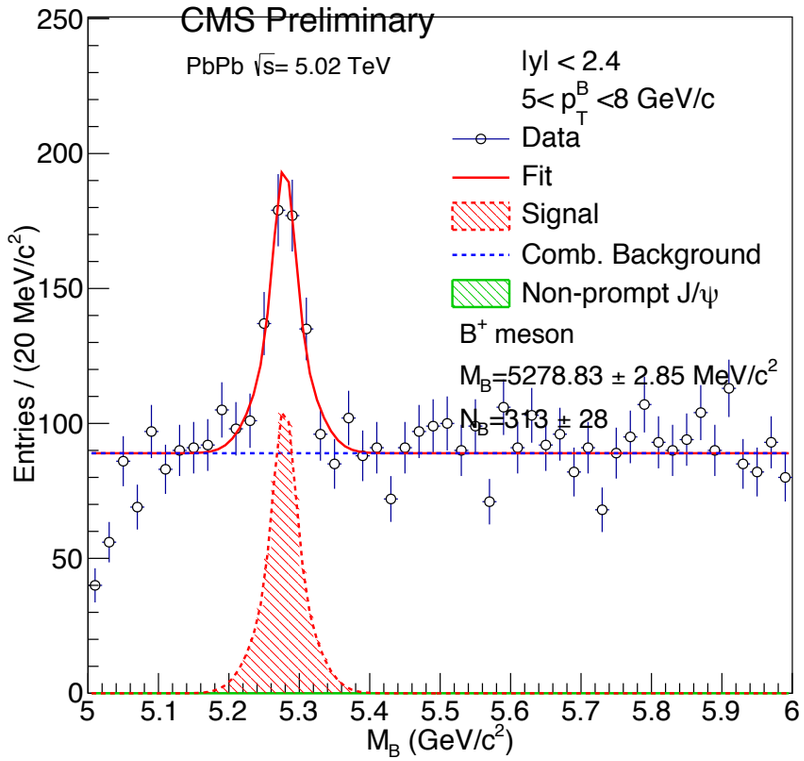

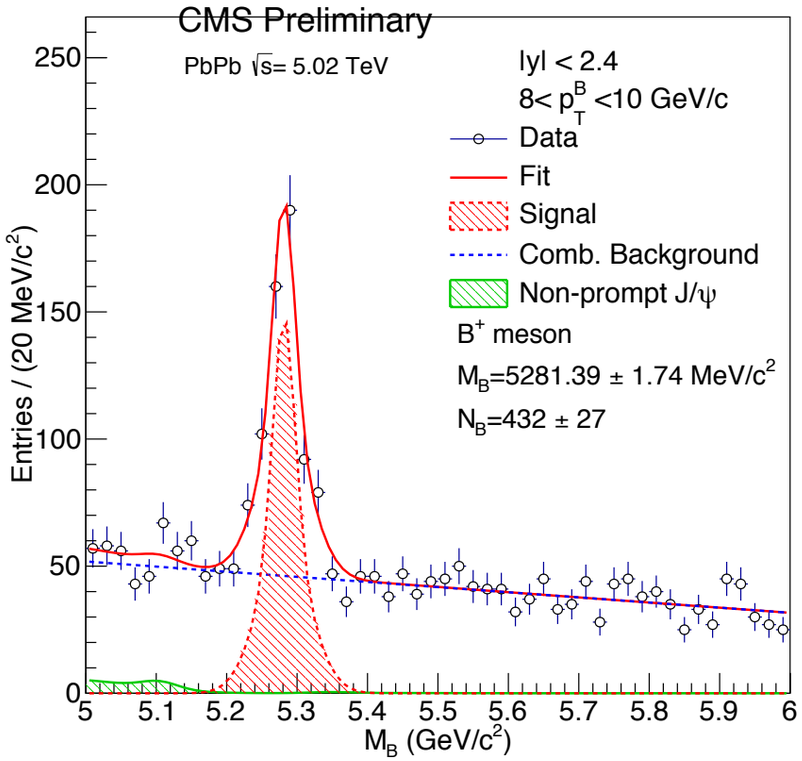

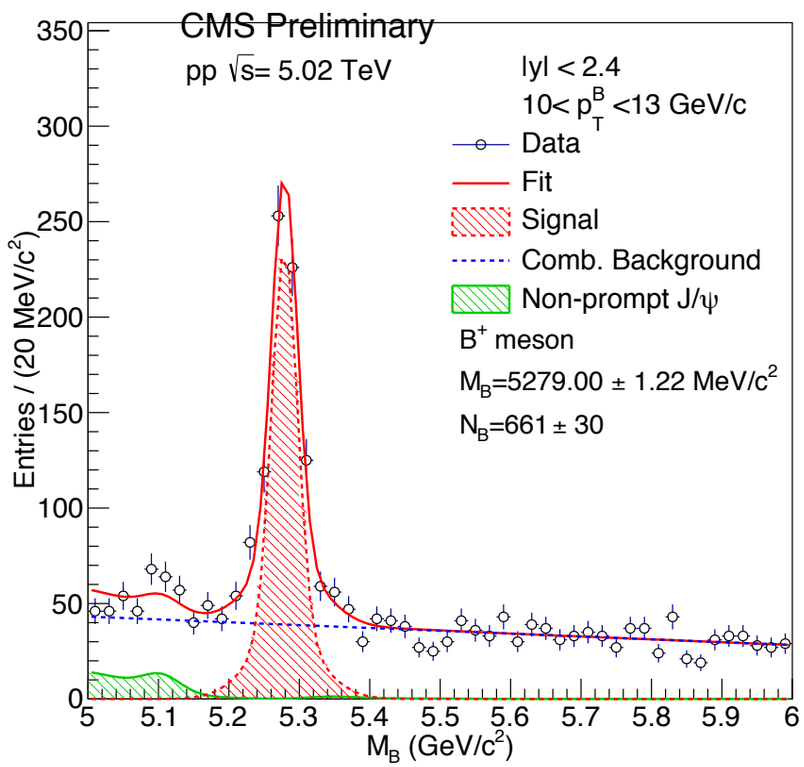

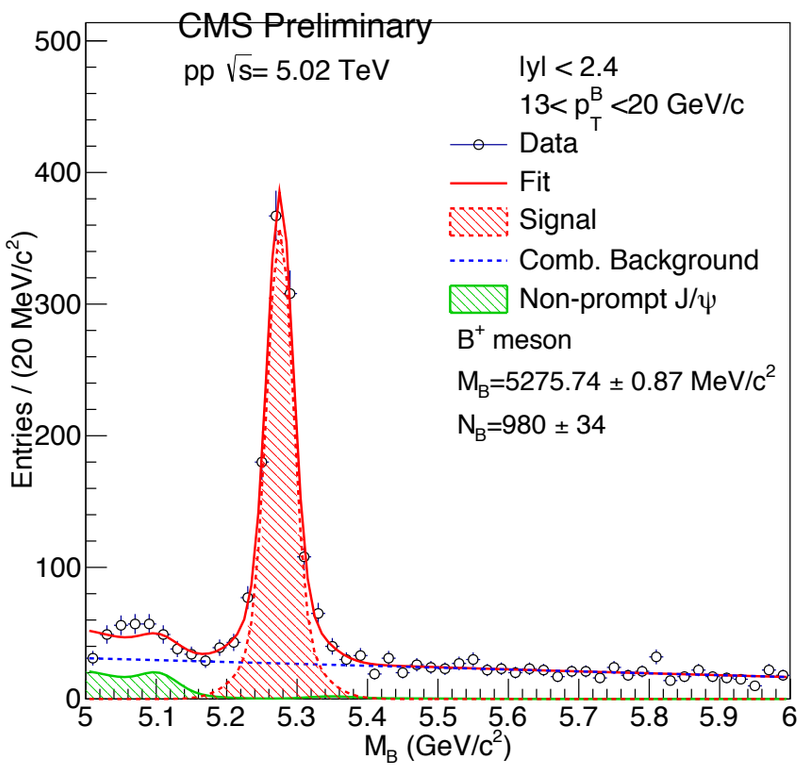

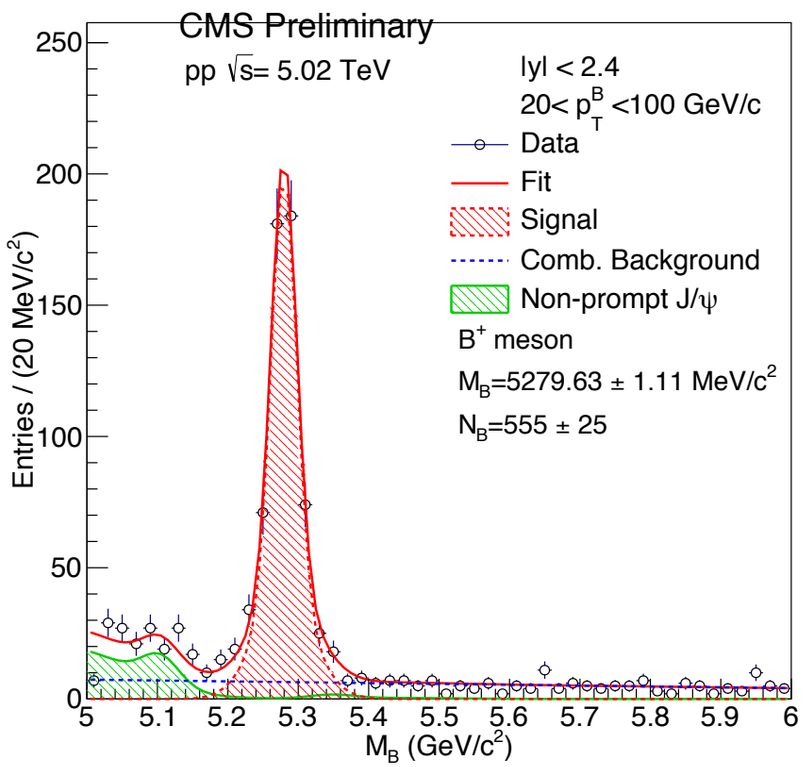

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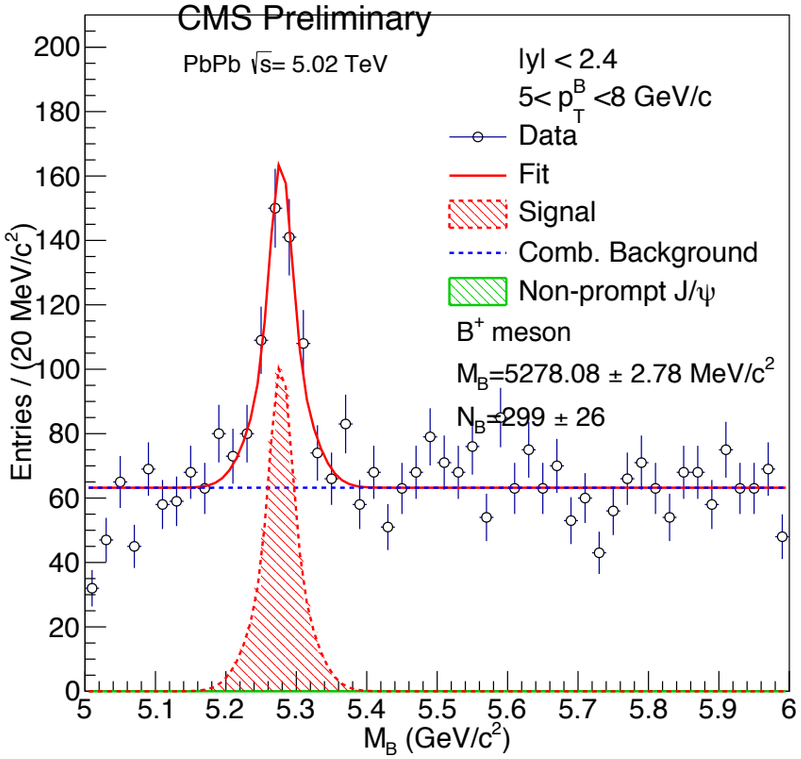

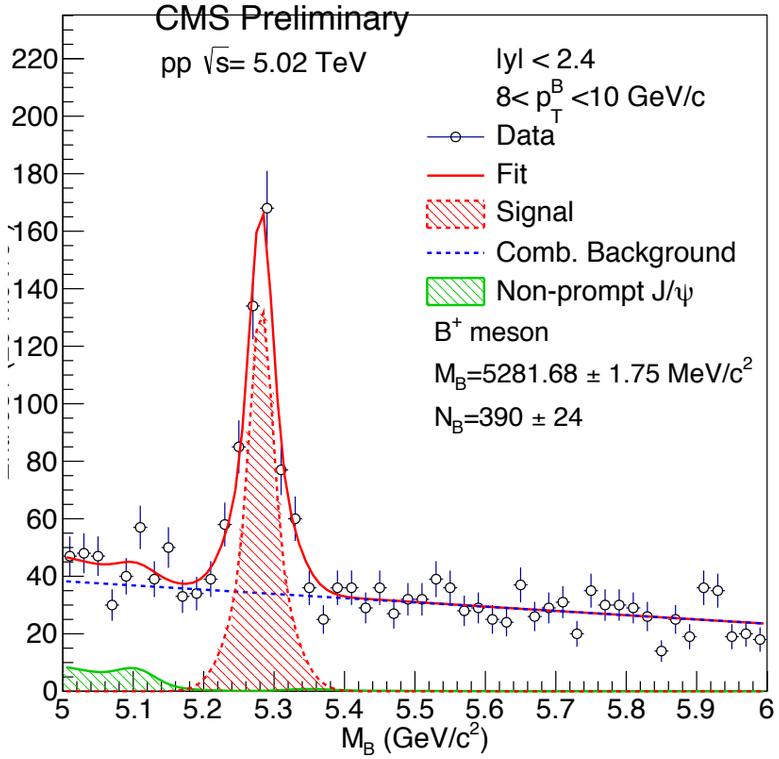

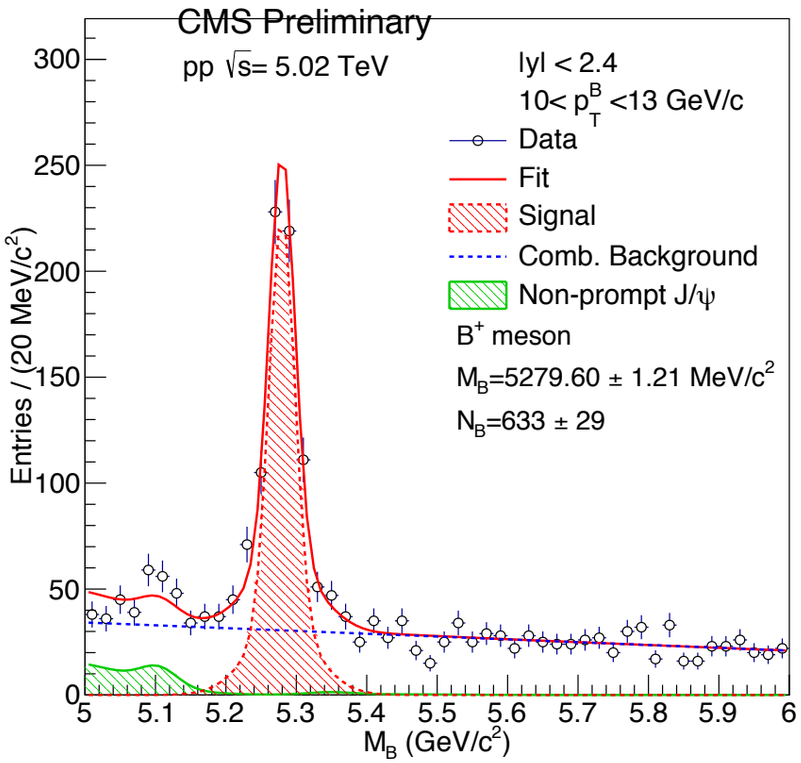

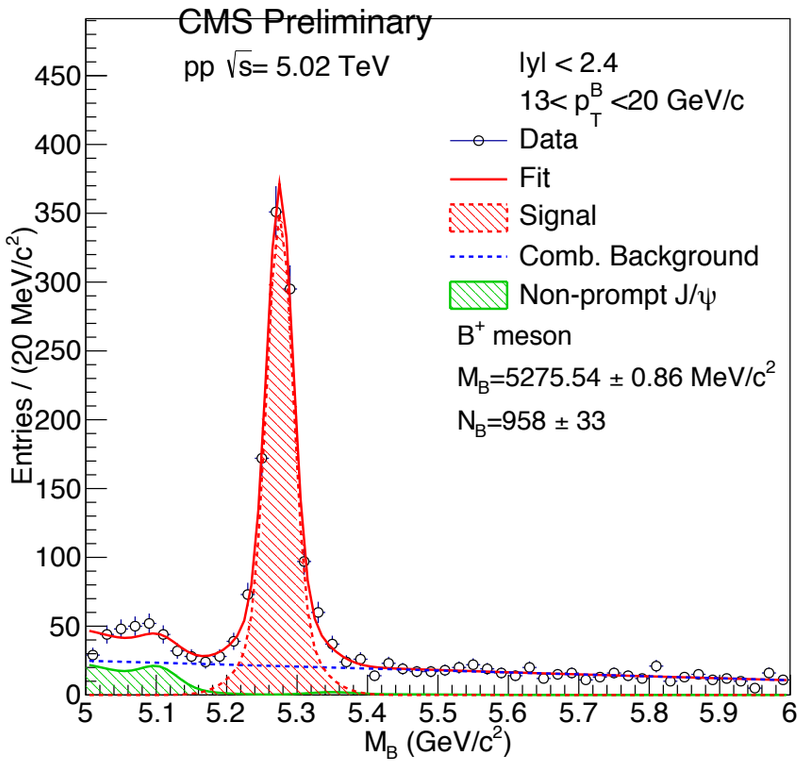

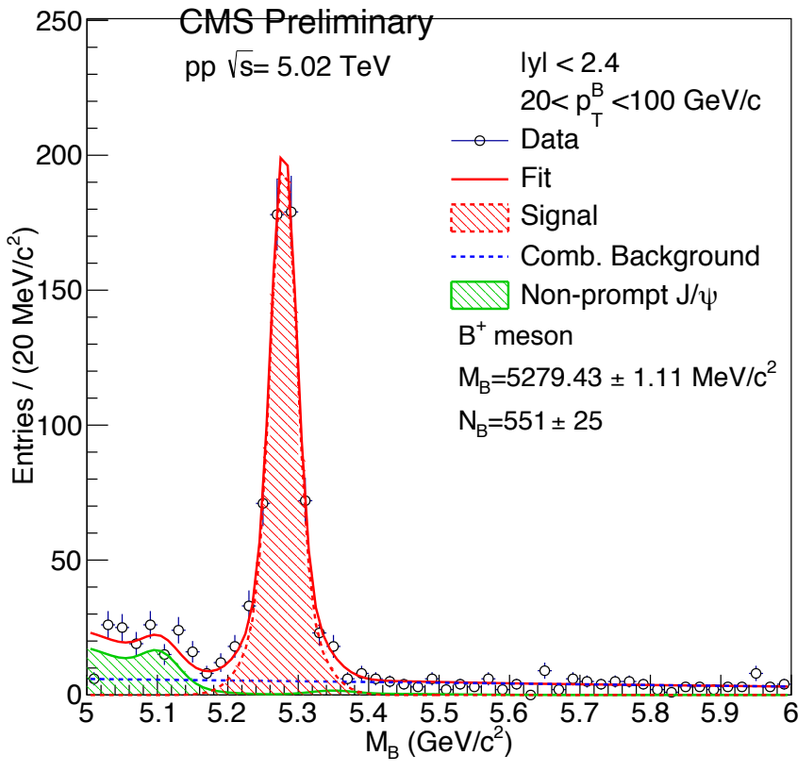

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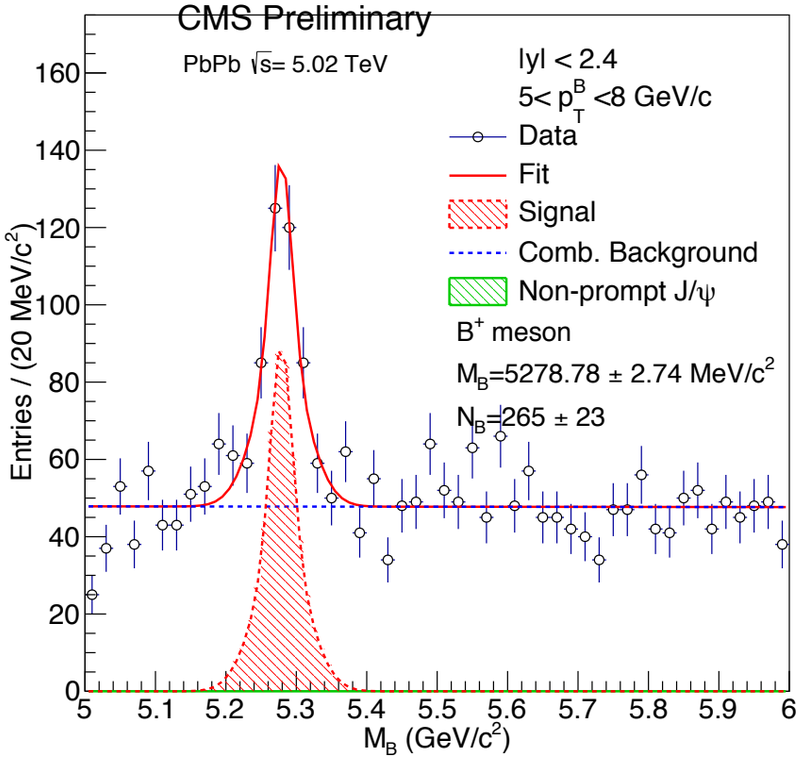

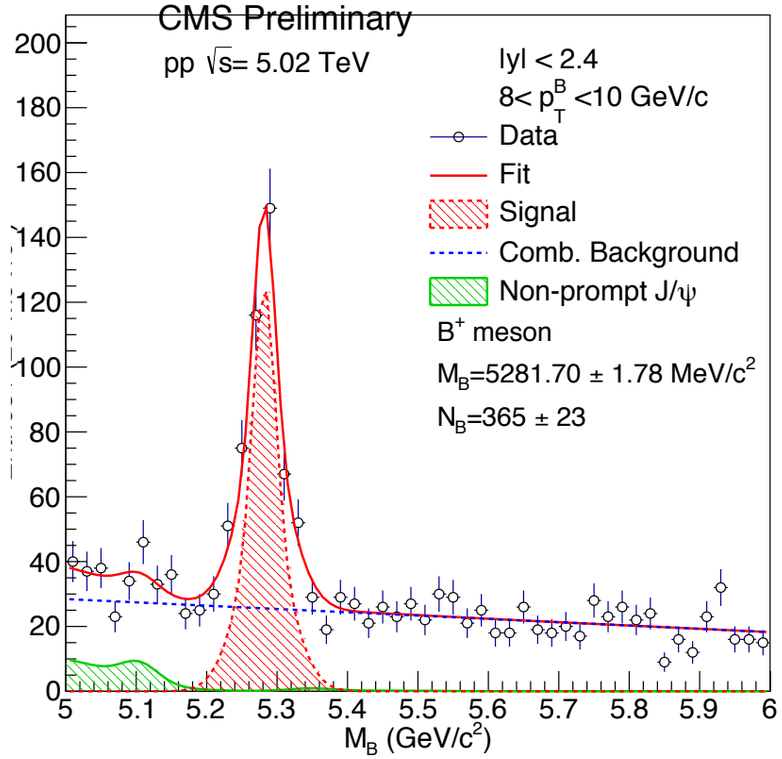

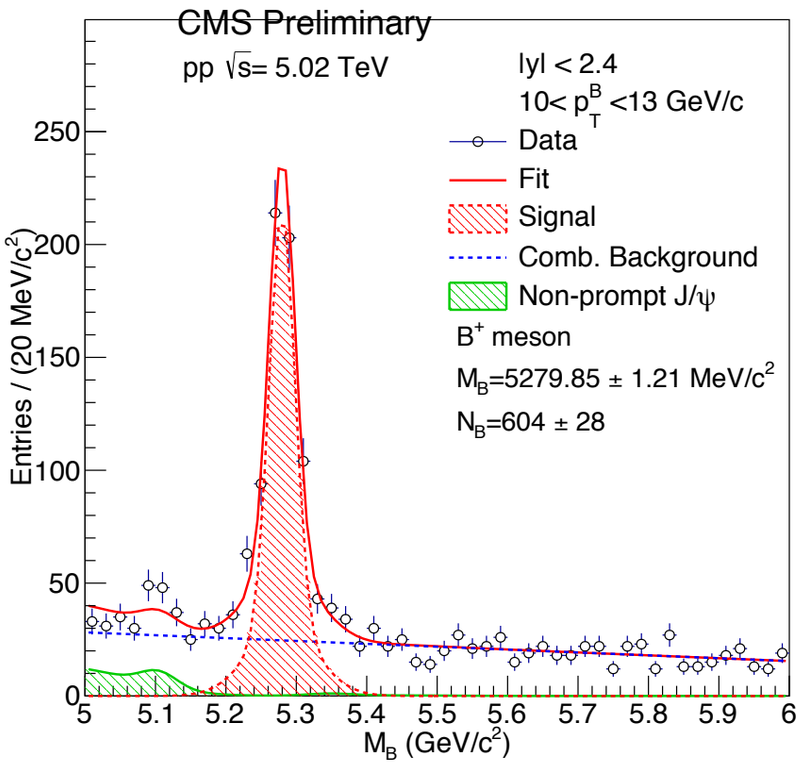

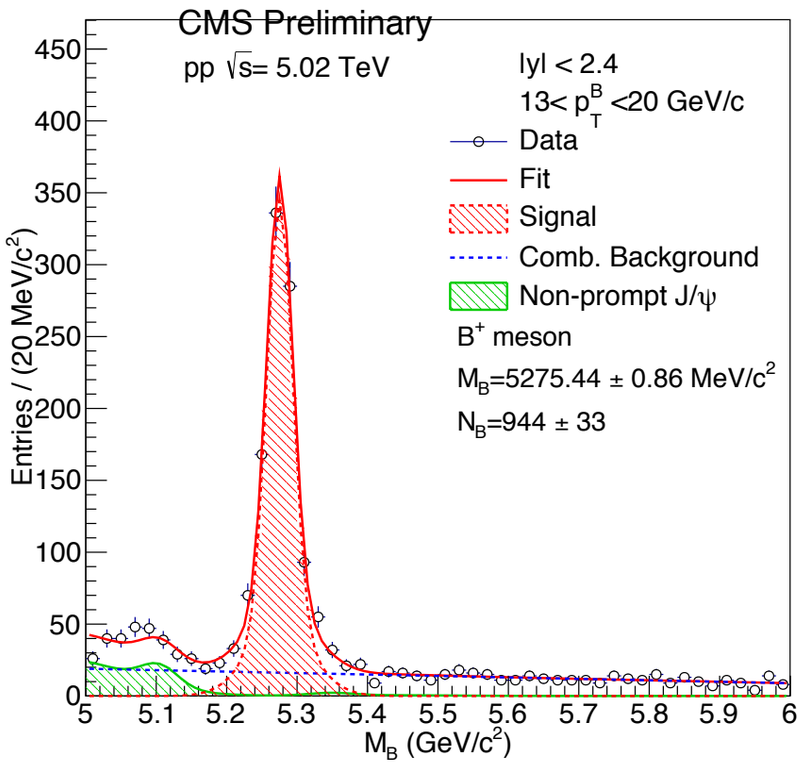

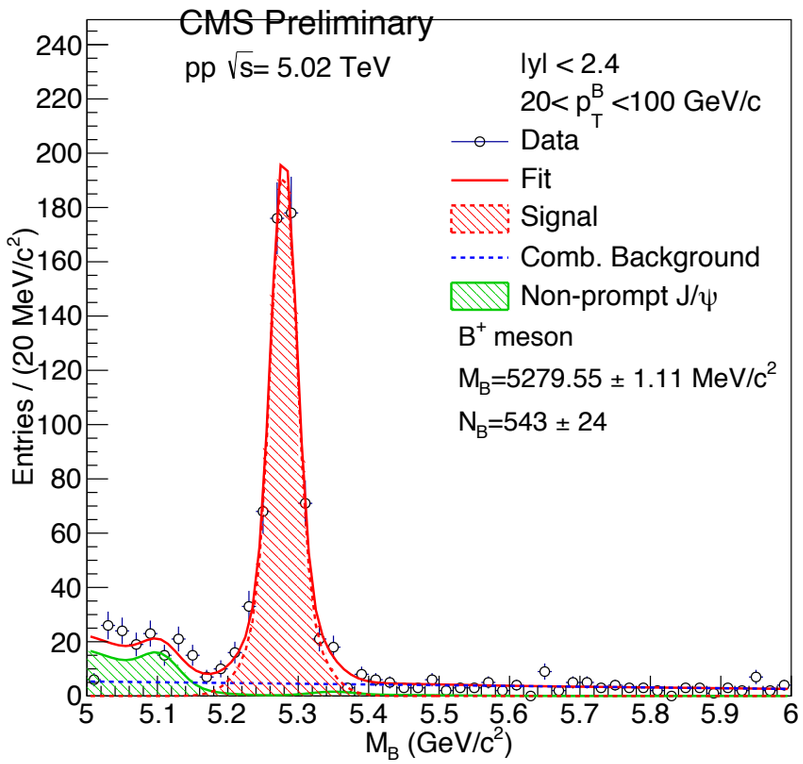

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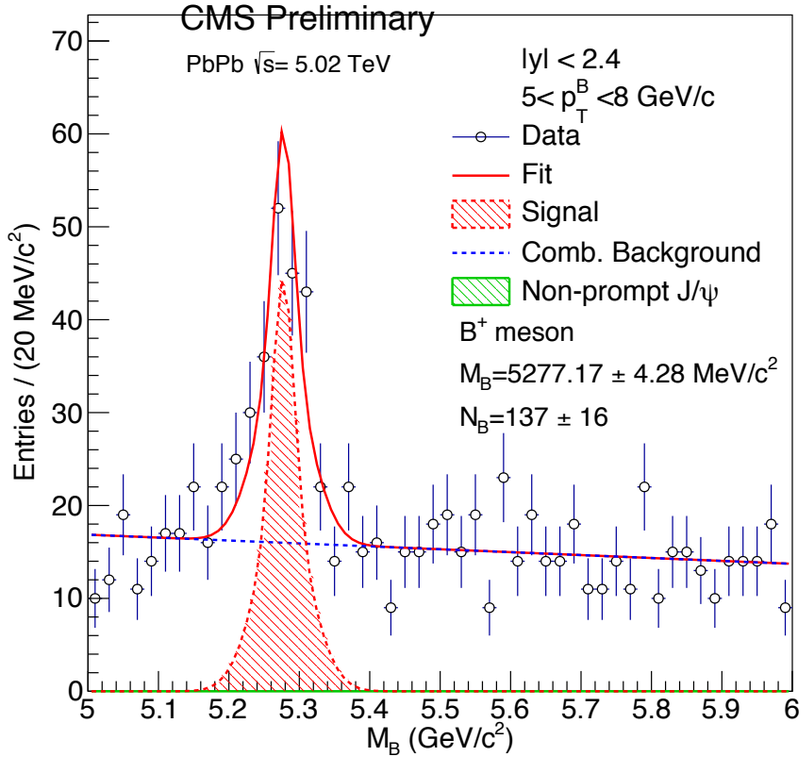

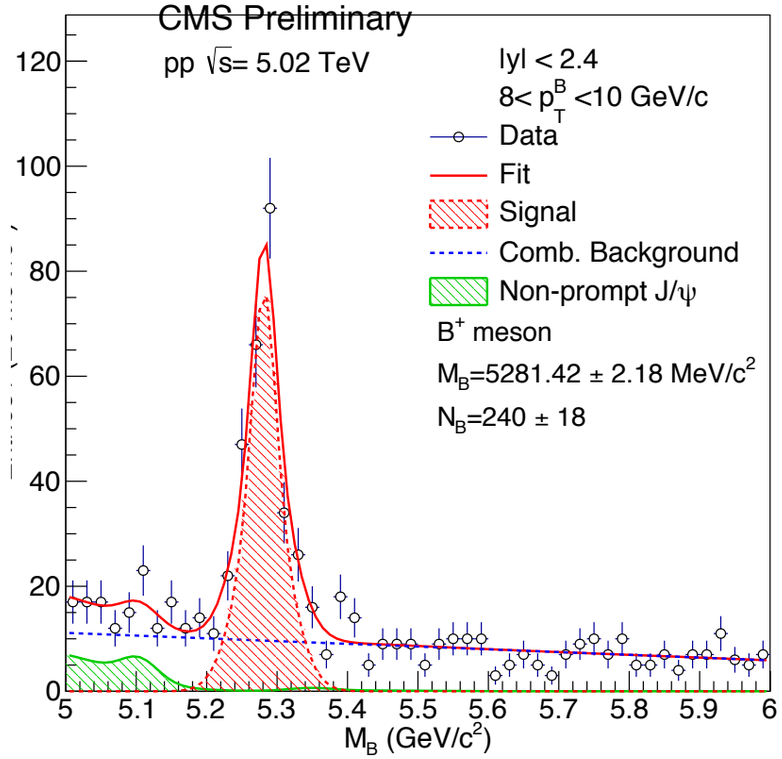

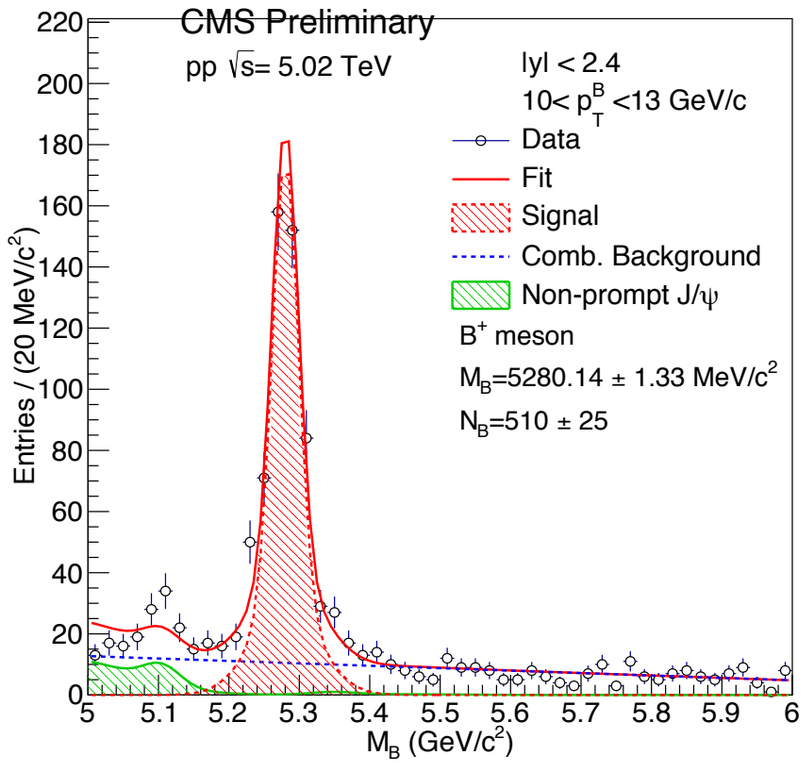

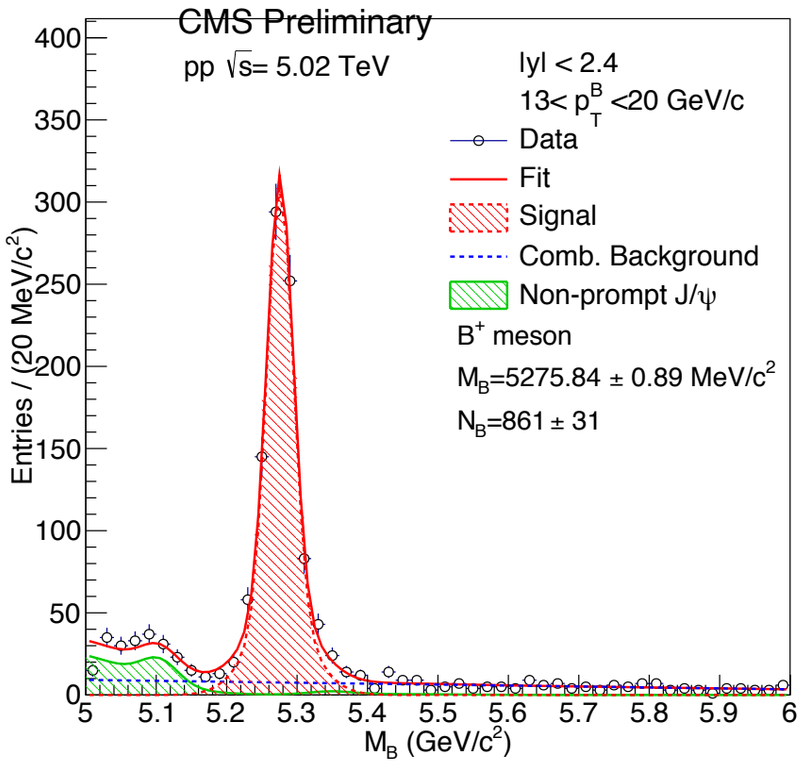

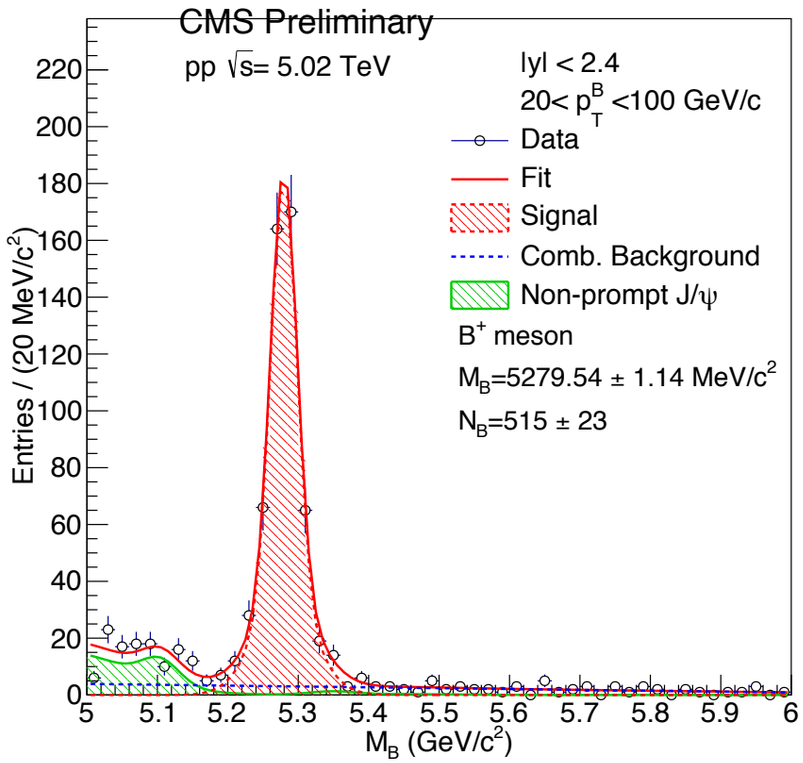

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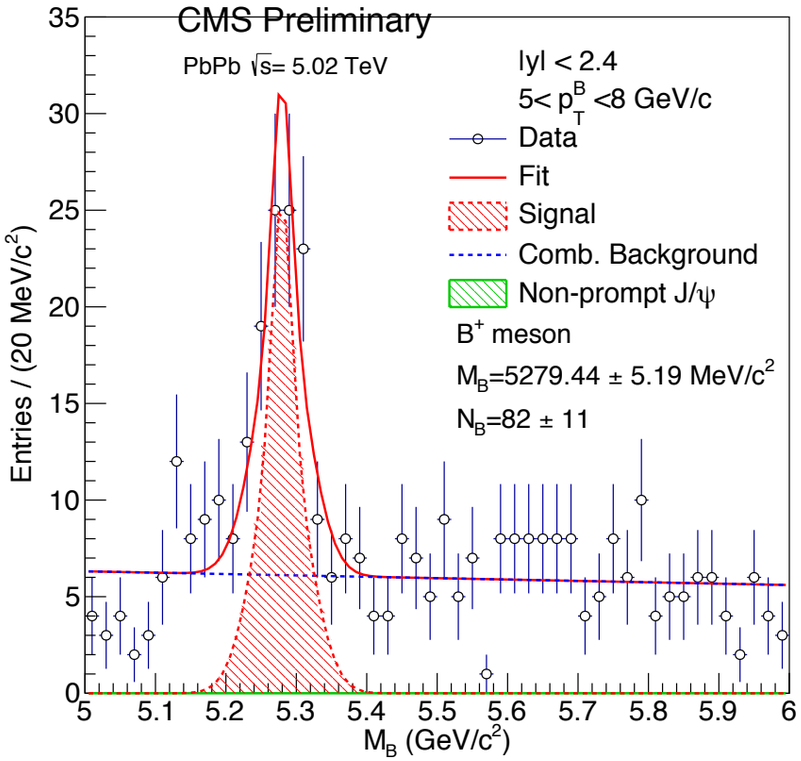

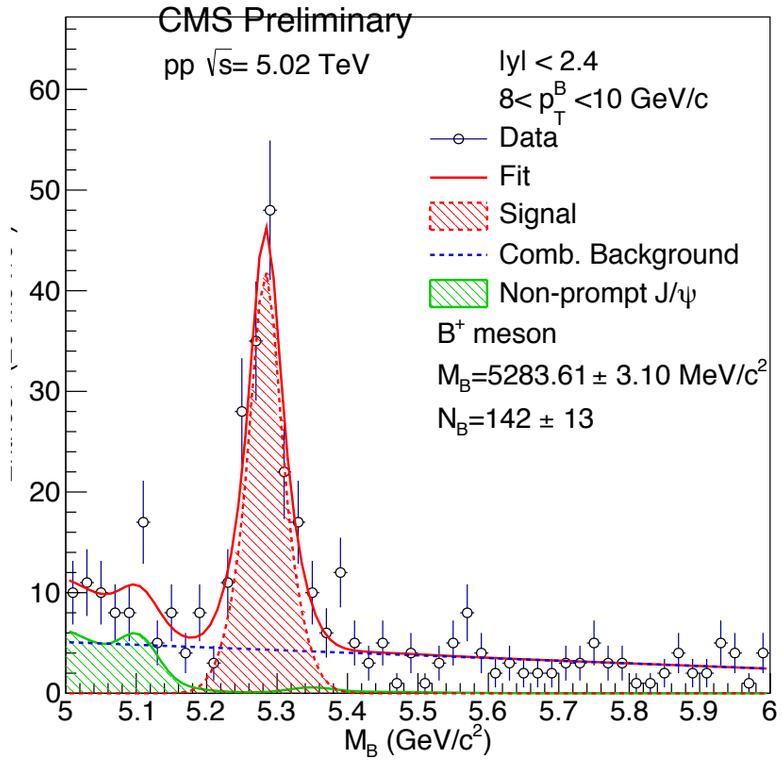

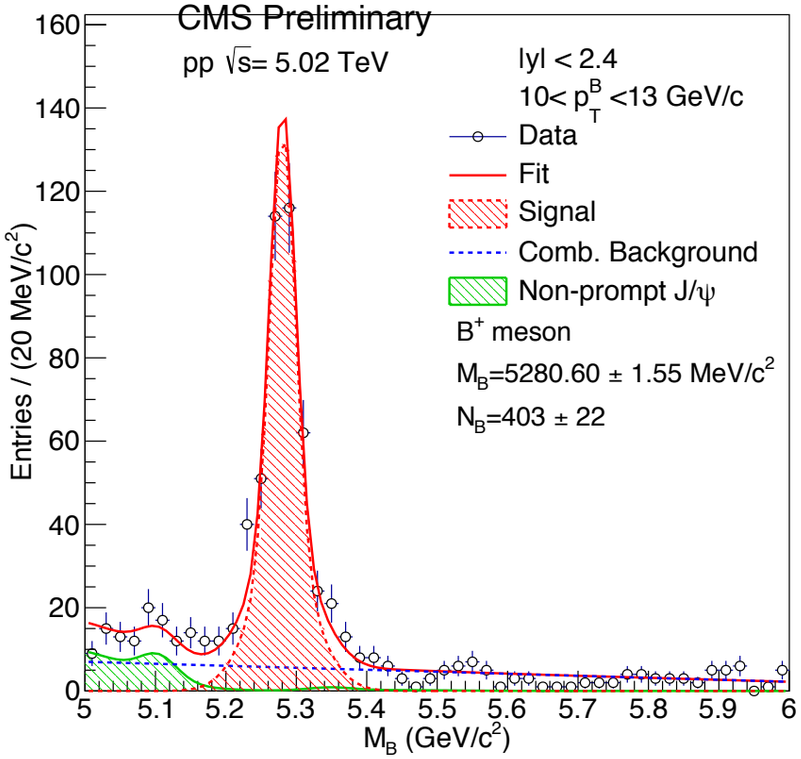

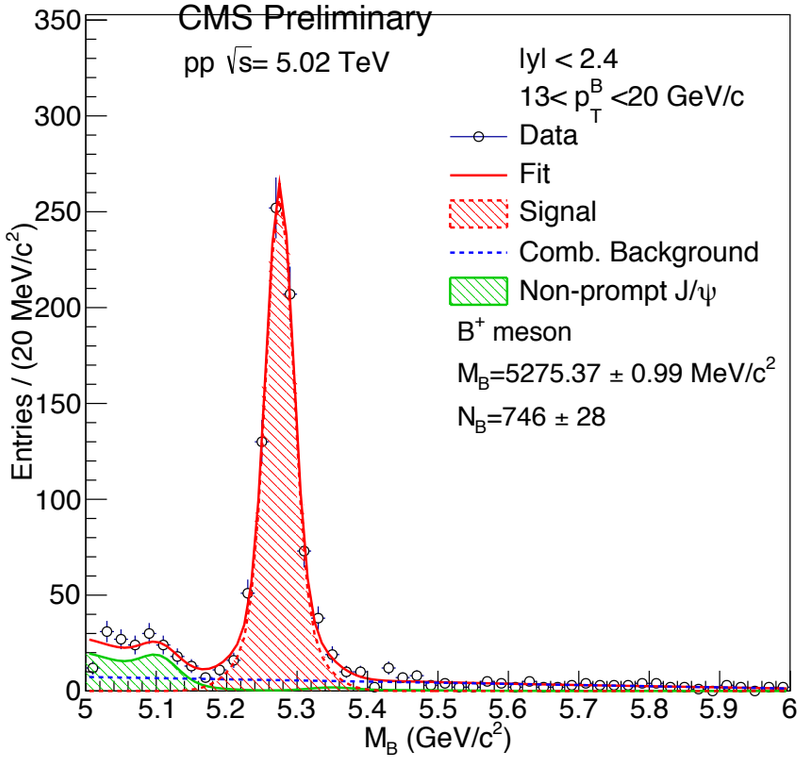

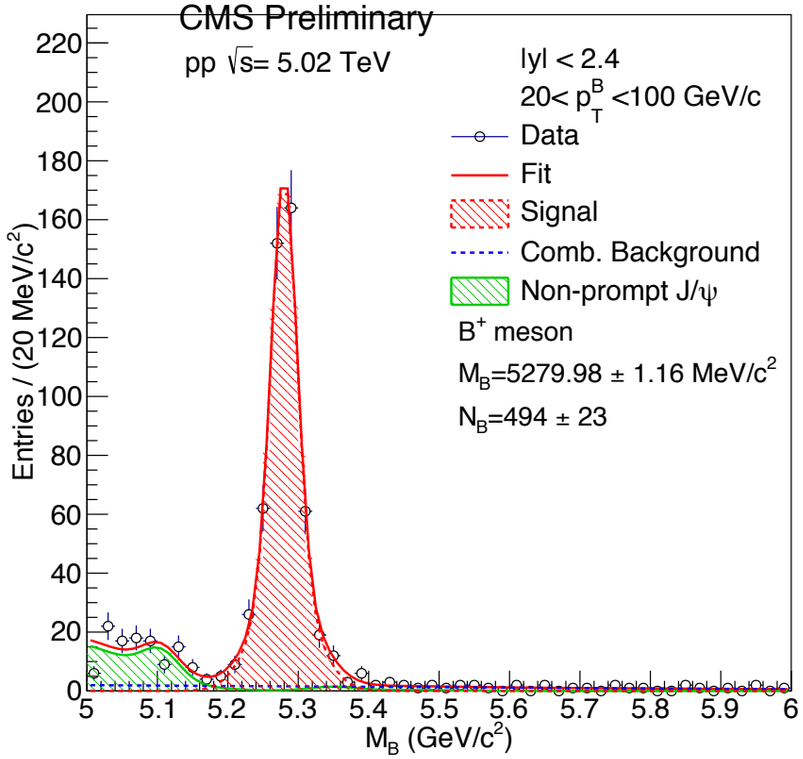

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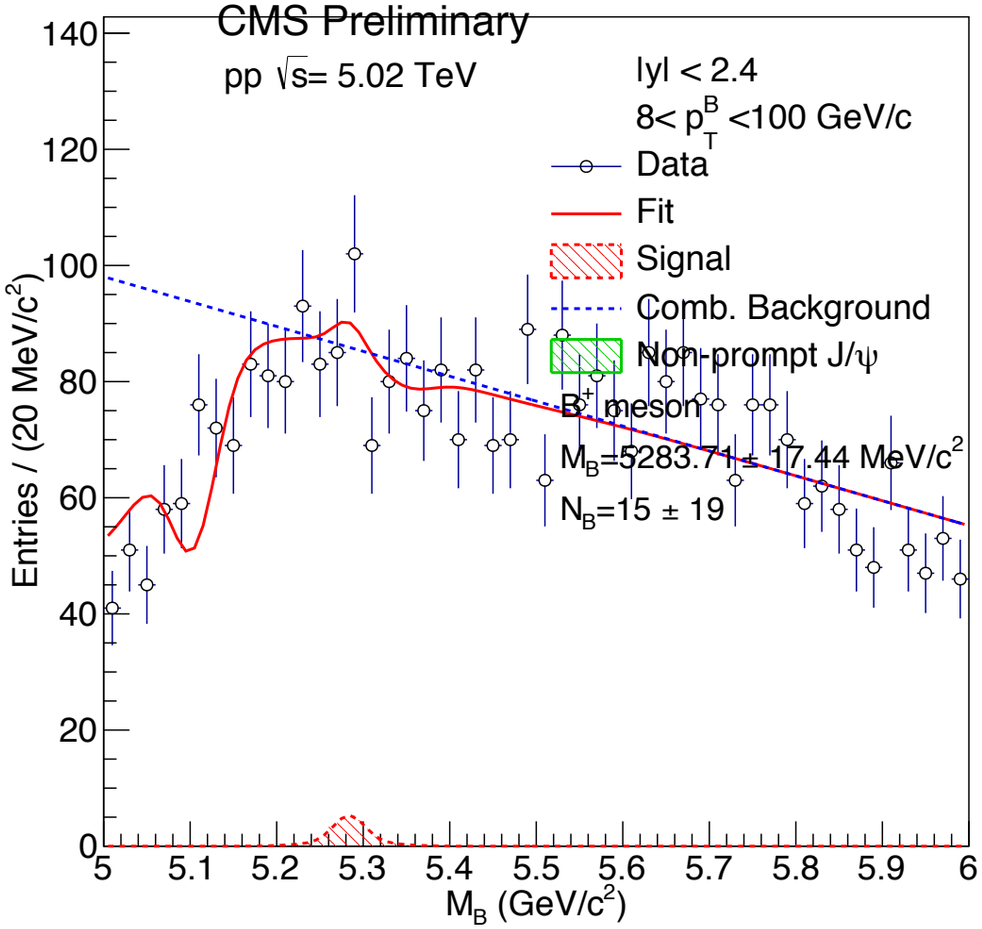
Old



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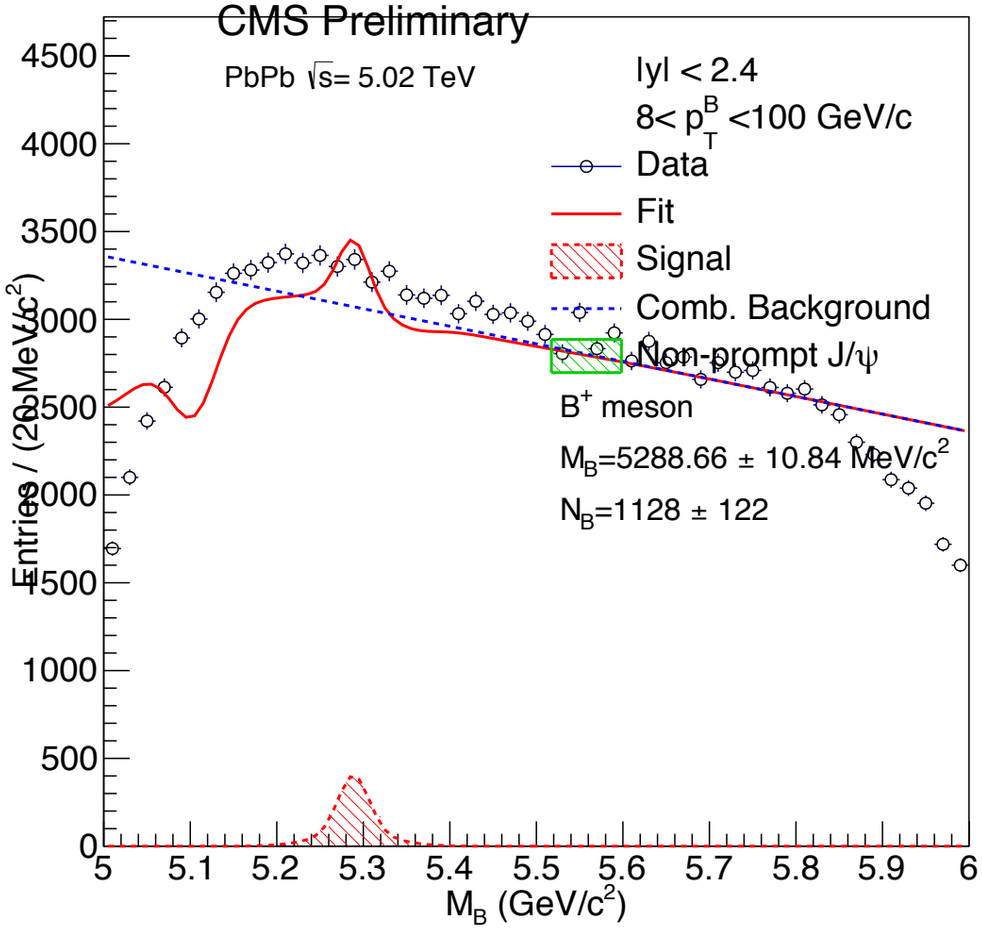

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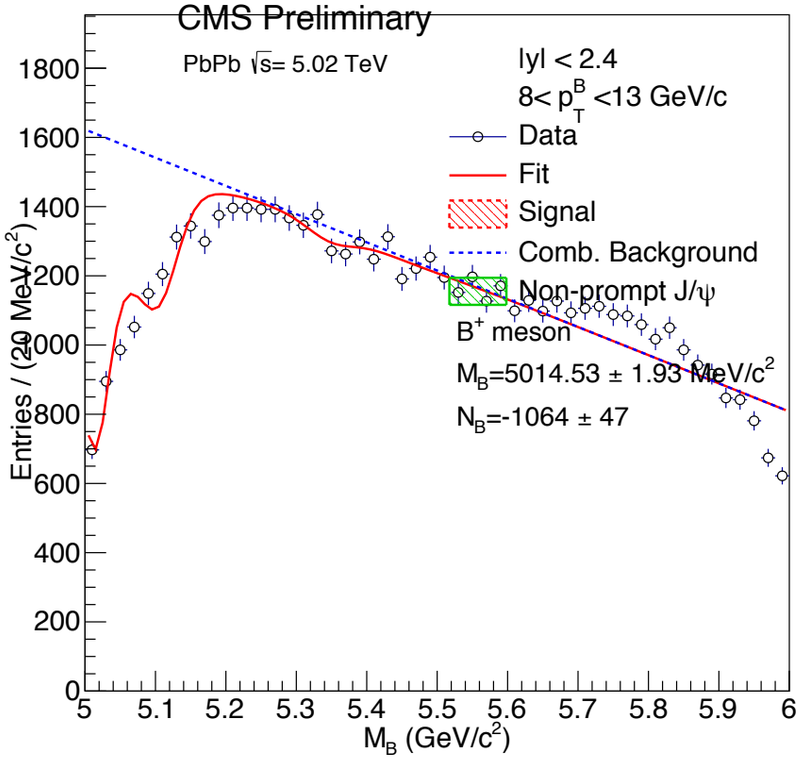

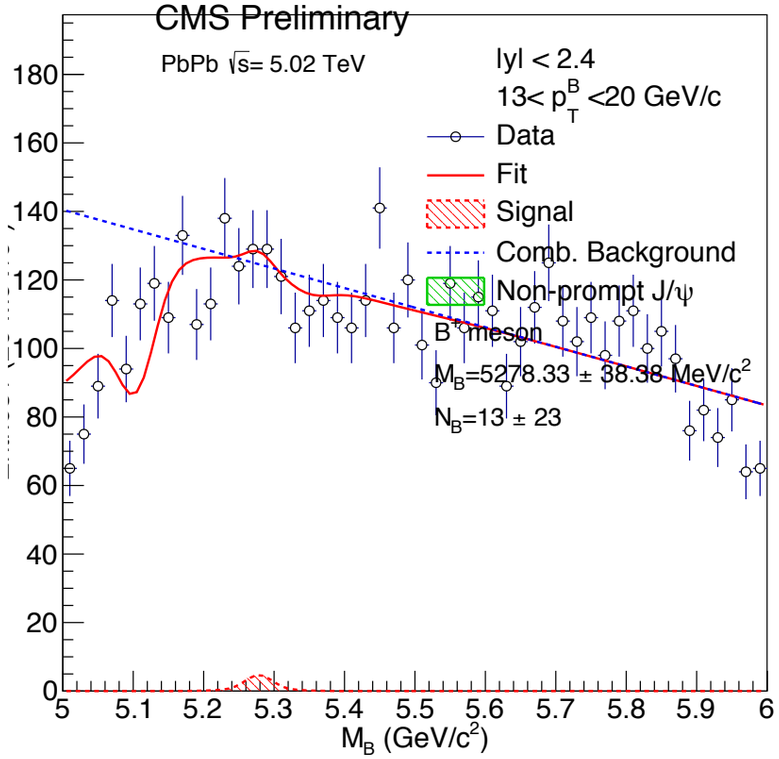

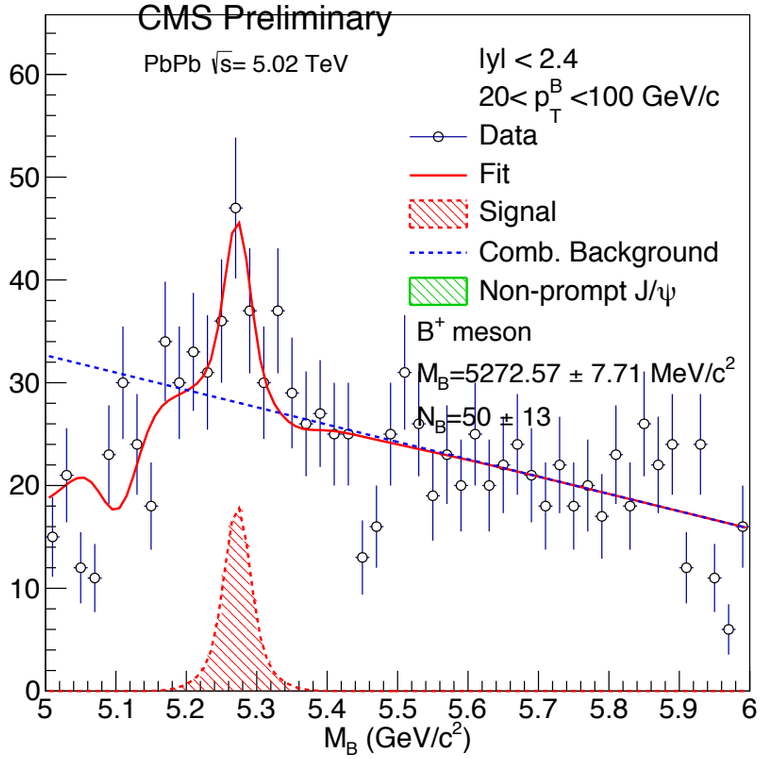

Track pT 3 GeV