Exclusive B->JPsiK Analysis in CMSSW_3_1_2

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OutLine

- Mont Carlo data sample
- HL Trigger efficiency
  - ✓ CMSSW_2_1_7 vs CMSSW_3_1_2
- Event Reconstruction
  - ✓ B candidate selection
  - ✓ Kinematic fit
  - ✓ Final fitted B selection
- 1-D Maximum LH fit Kμμ Inv. Mass
- To do list

Mont Carlo Data Sample

- b->JPsiX, Jpsi->MuMu
  (σ=0.036mb)
- CMSSW_3_1_2(EvtGen)
- ECM: 10TeV
- Filter Eff: 0.00304
  1μ pt>2.5 2μ η<2.5
- No. of evts: (10M≈90pb^{-1})

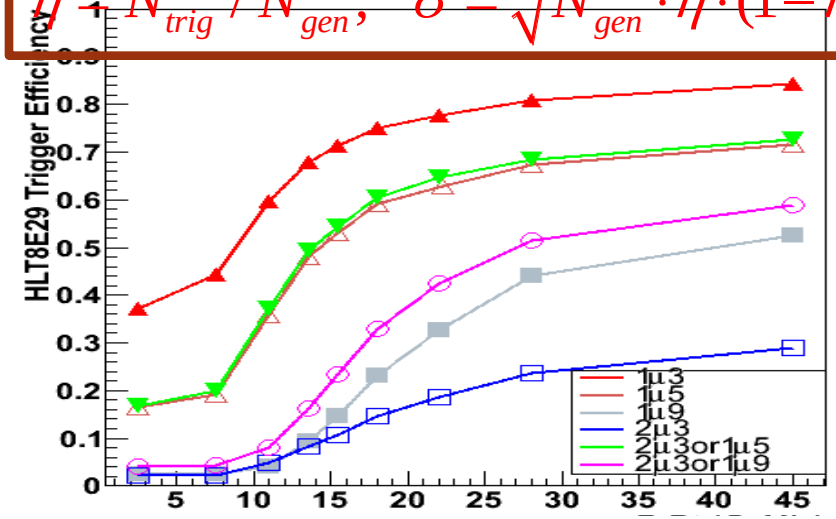
1.7M(≈ 15pb^{-1}) evts analyzed

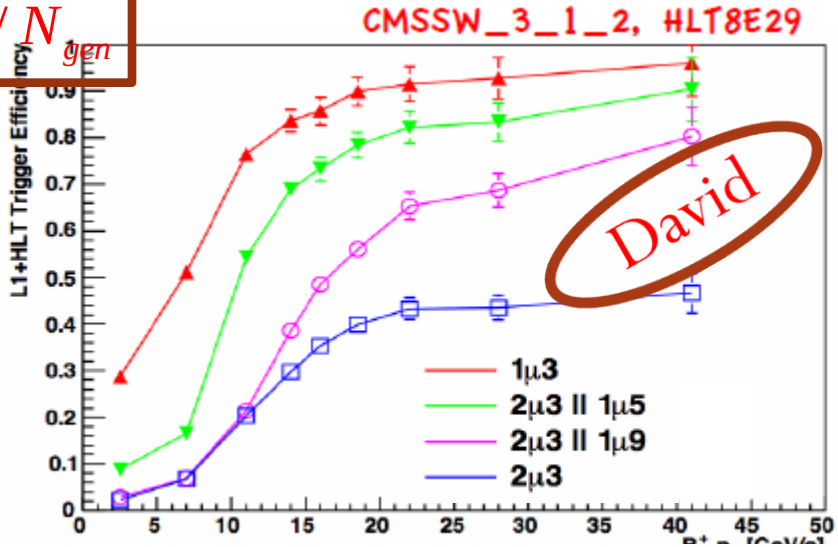
- b->JPsiX,Jpsi->MuMu
  (σ=0.036mb)
- CMSSW_2_1_7(EvtGen)
- ECM: 10TeV
- Filter Eff: 0.000644
  2 μ pt>2.5 η<2.5
- No. of evts: (43pb^{-1})

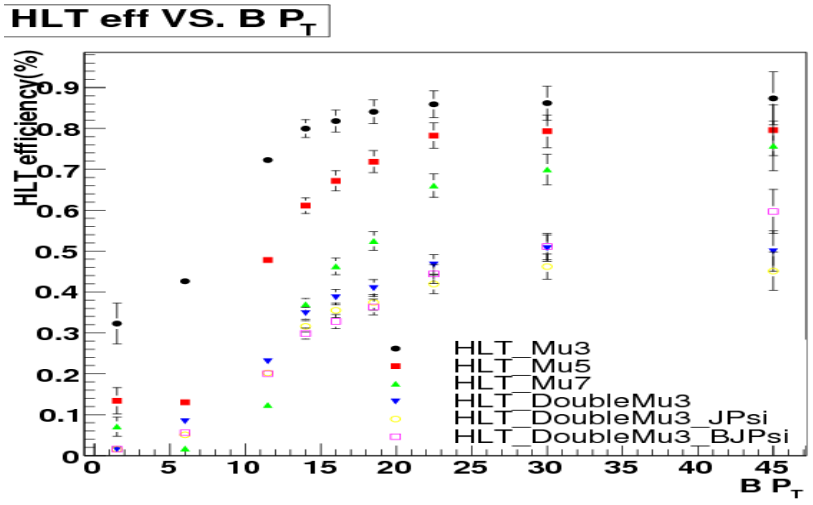
Muon HLT(8E29) Efficiency

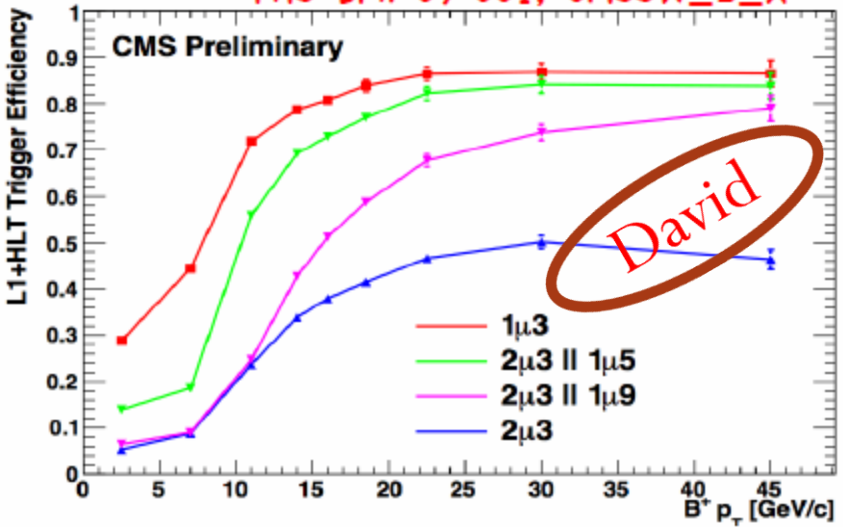
- 9 pt bins[0,5],[5,9],[9,13],[13,14],[14,17],[17,19],[19,25],[25,31],[31,-]
- Statistic error calculated by binomial distribution error function.

$$\eta = N_{trig} / N_{gen}, \quad \sigma = \sqrt{N_{gen} \cdot \eta \cdot (1-\eta)} / N_{gen}$$









Event Preselection (B candidate)

- Mu Selection:

  2 Global Muons with Pt>2.5 &&|η|<2.5 were selected to reco J/ψ

- Jpsi Selection:

  No cuts

- Trk(Kaon) Selection:

  Pt>0.4, |η|<2.5

- B Selection:

  B Mass Window=[3.3,10.0], 9 pt bins

[0,5],[5,9],[9,13],[13,14],[14,17],[17,19],[19,25],[25,31],[31,-]

- Tracker Muon will be considered in the immediate next analysis to compare with Glo Muon.

Kinematic Fit

- After preselection, KalmanVertexFitter was used on μμ-$Trk_{(K\ candidate)}$ pair to fit B meson.

- Next step, we will also try to fit μμ pairs to select best J/ψ and to check whether we can gain higher efficiency and higher significance.

Event Selection (Final but No Optimized)

- Mu Selection:

  2 Global Muons (from Jpsi) with Pt>3.0 &&|η|<2.4

- Jpsi Selection:

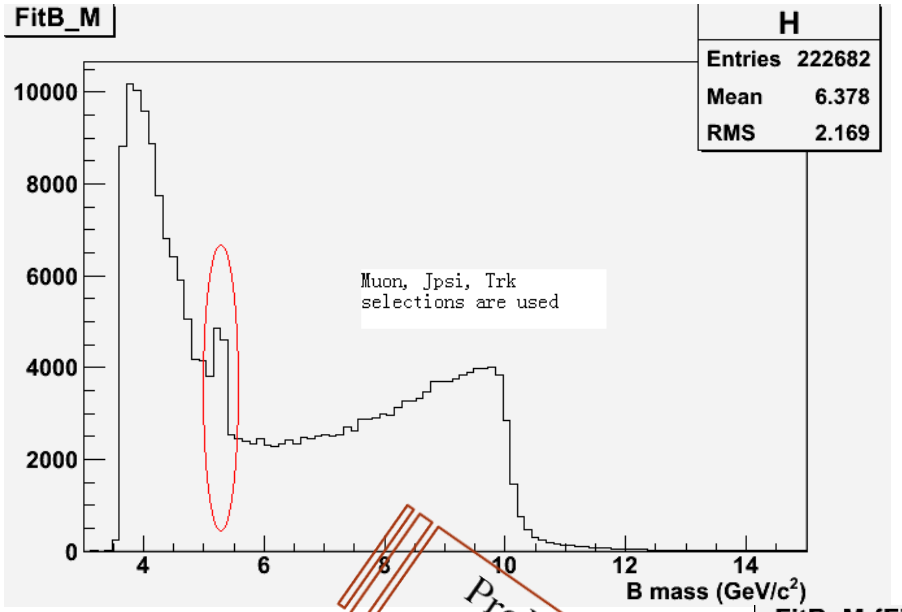
  J/ψ(from B decay) Pt>5, Mass Window = [2.95,3.25]

- Trk(Kaon) Selection:

  Pt>2.0

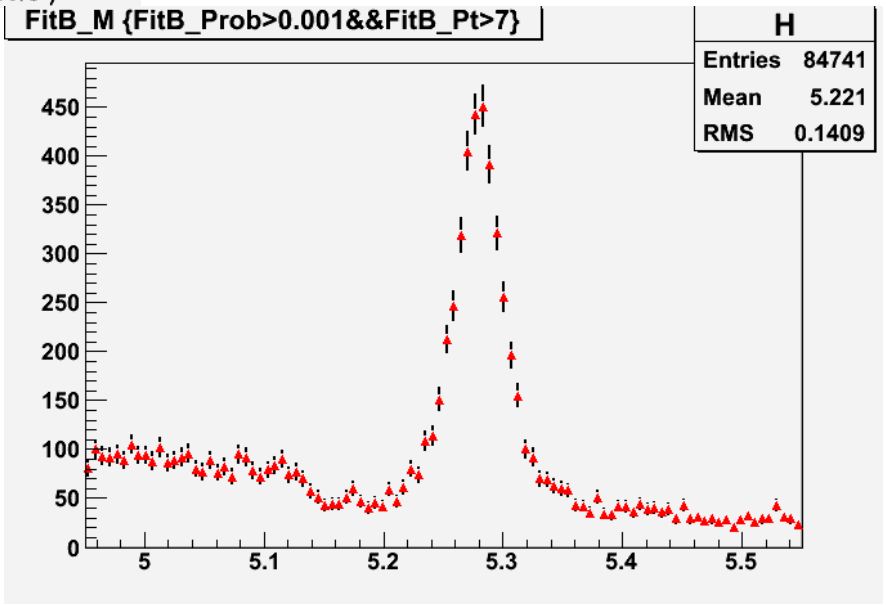
- B Selection:

  Kinematic fit B Pt>7.0, Prob>1‰



Prob>0.001

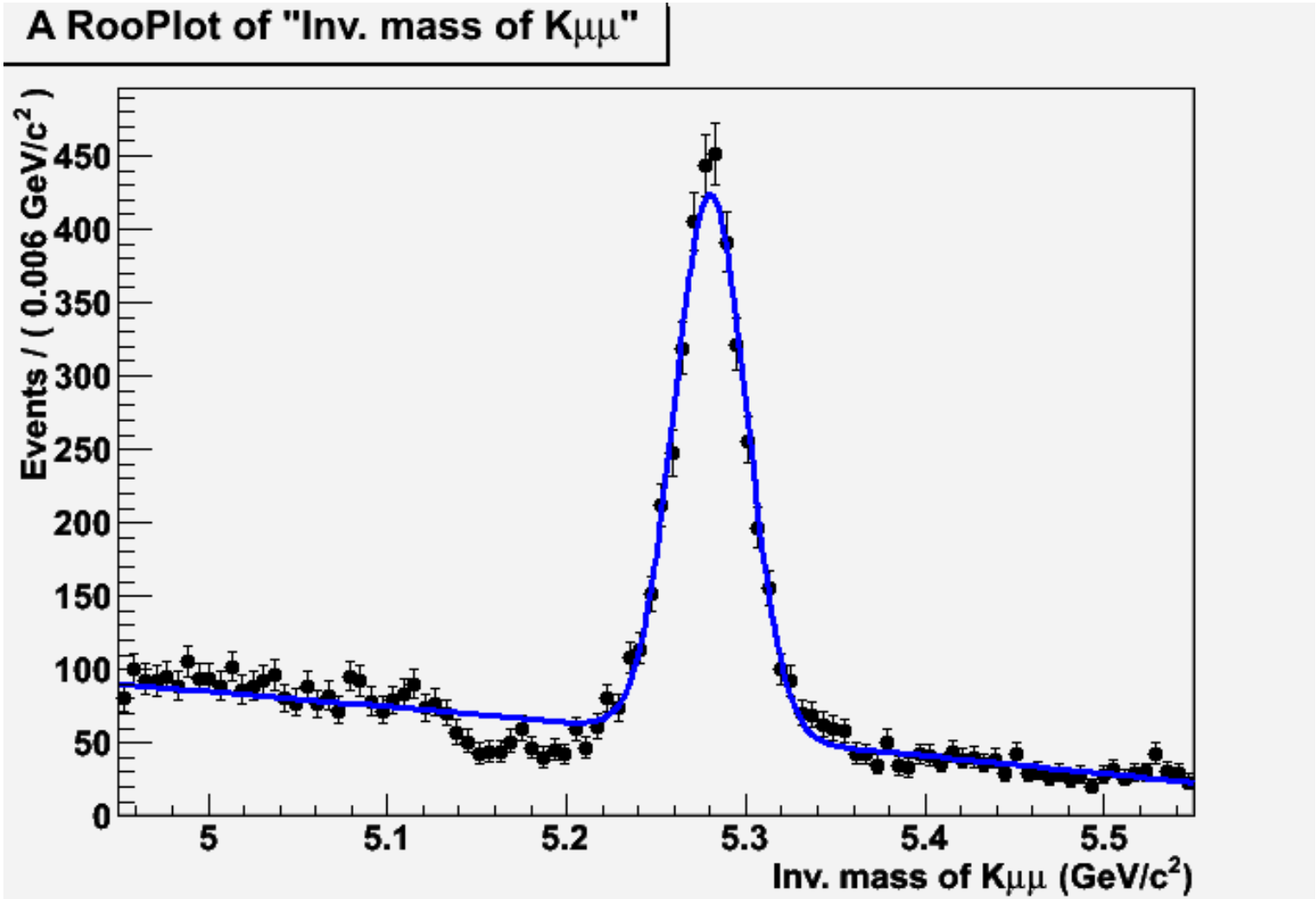
Pt>7



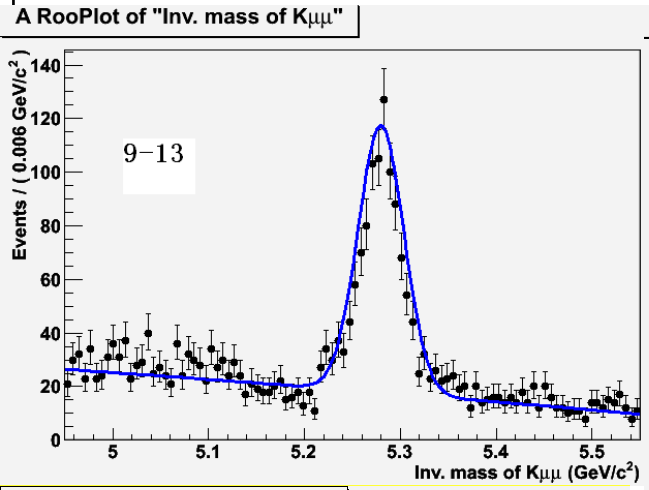
Fit on B->J/ψμμ Analysis

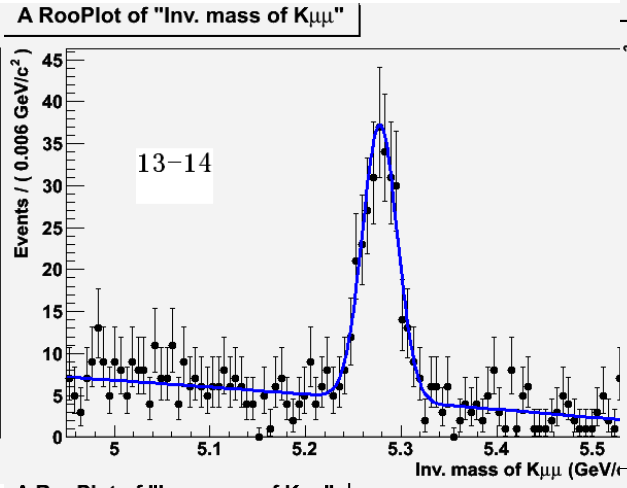
- Only b->J/ψX data sample with ~15 pb^{-1}
- All selection criteria mentioned above were used.
- 1-D simple maximum LH Fit
- PDF: one gaus for signal, one-polynomial for BKG
- Fit over range [4.95,5.55]

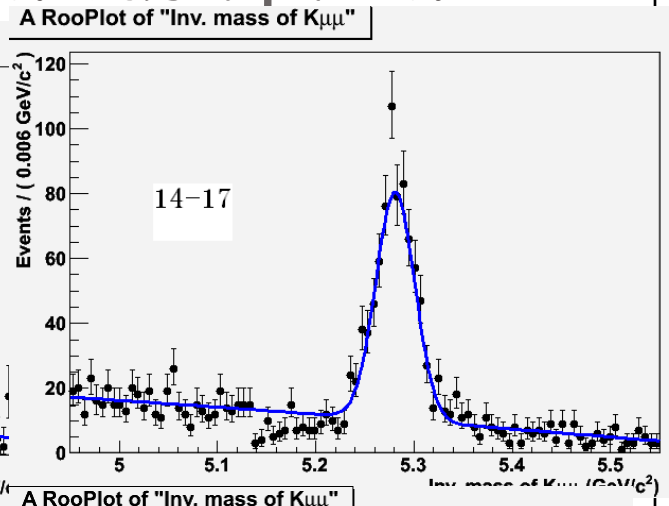
B Mass

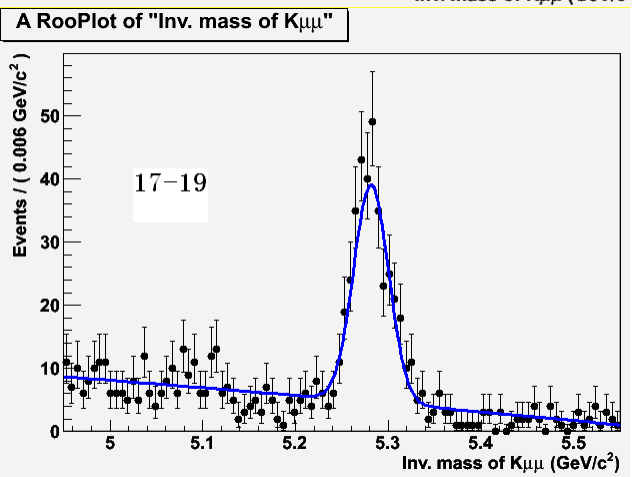

A RooPlot of "Inv. mass of Kμμ"
Events / (0.006 GeV/c^2)
0
50
100
150
200
250
300
350
400
450
5
5.1
5.2
5.3
5.4
5.5
Inv. mass of Kμμ (GeV/c^2)

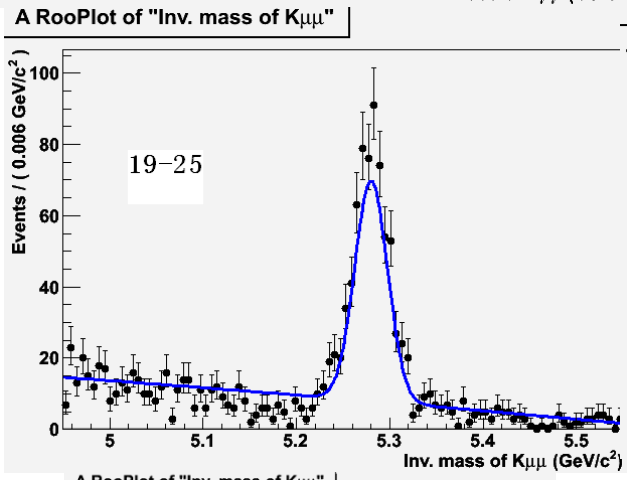
RooPlot of Inv. Mass Kμμ in each ptbin

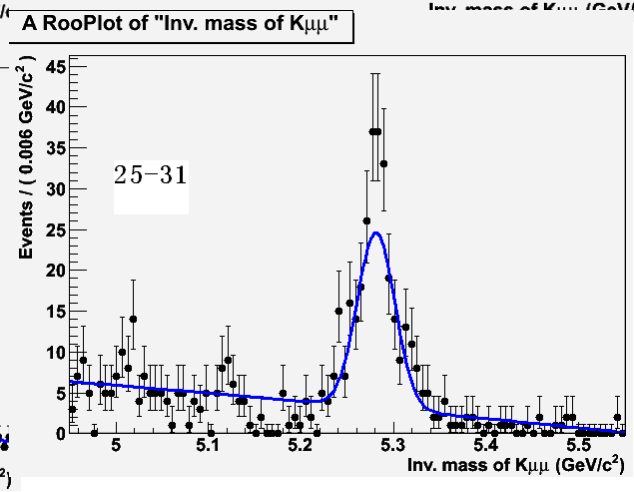


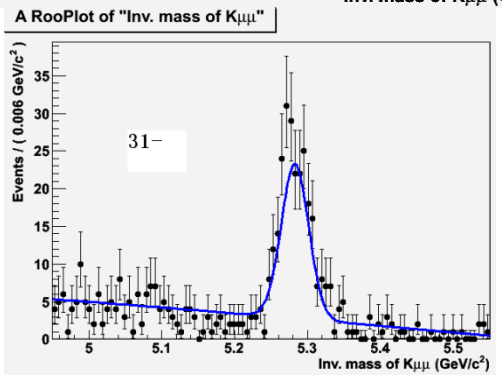




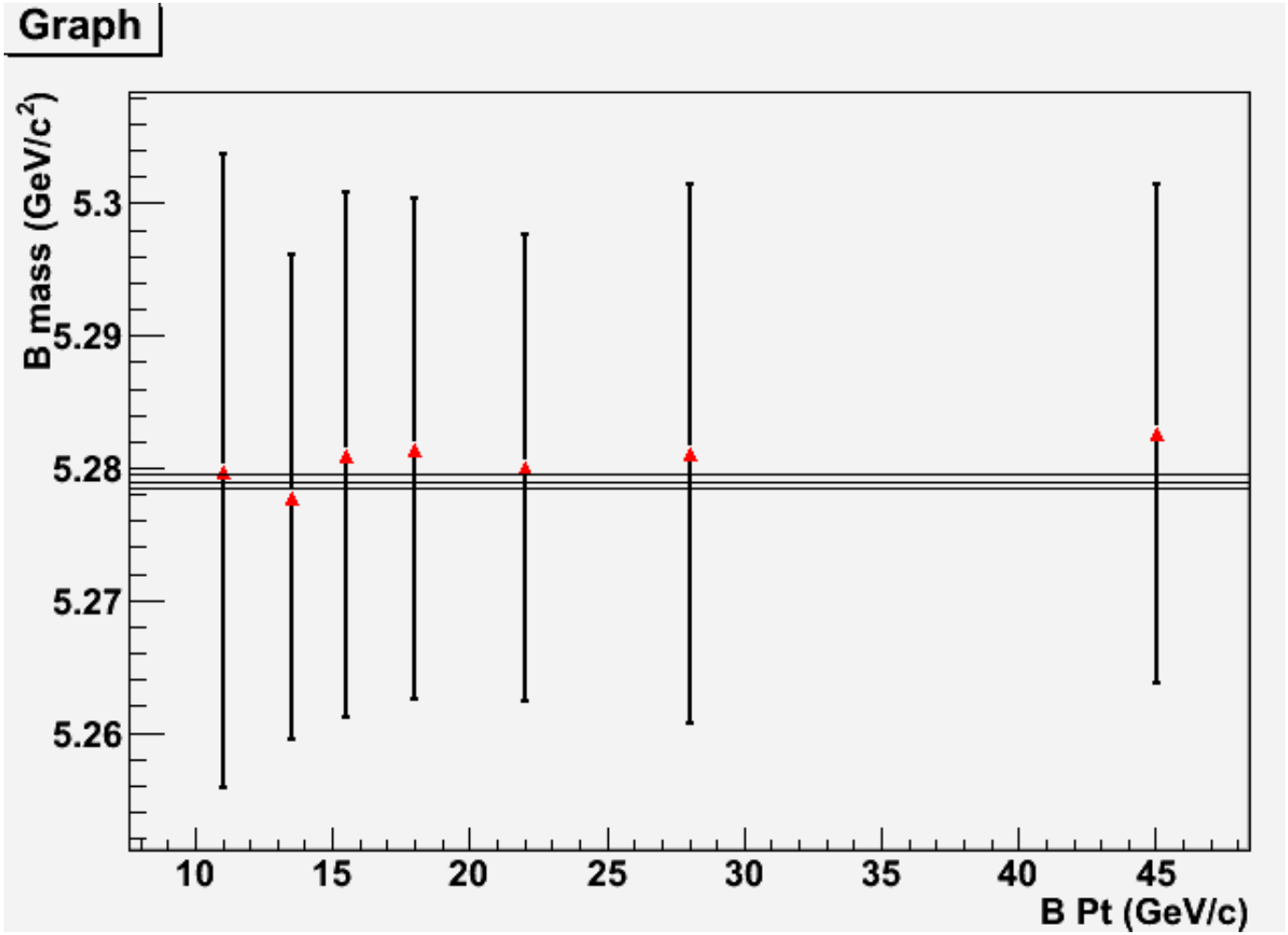








$B^{\pm}$ mass performance

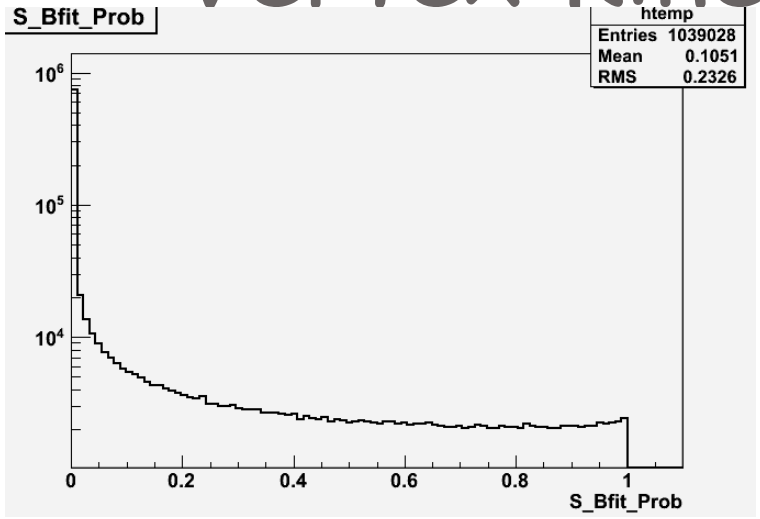


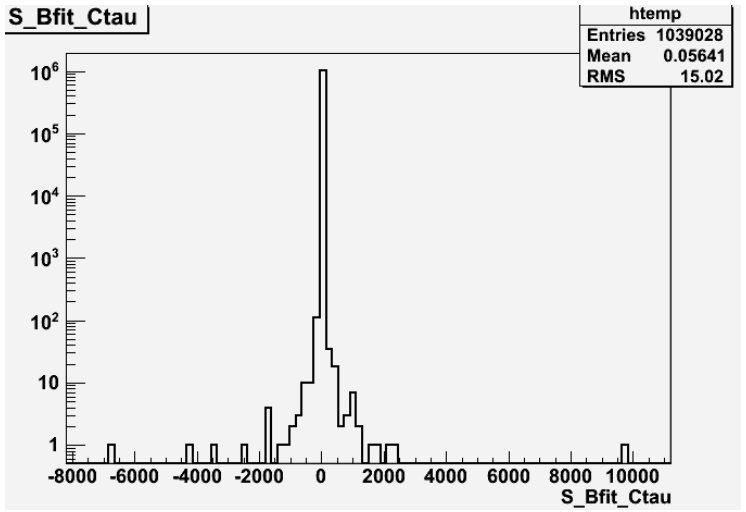
To do list

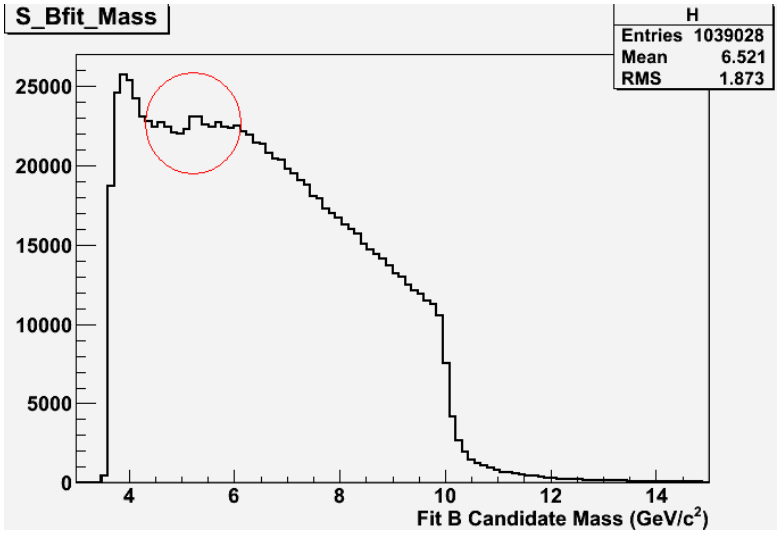
- Prepare for 2-D fit (mass+PDL)
- Study of Tracker vs Global Muon (η of μ ID)
- A few detailed work
  - ✓ Kinematic fit on μμ pairs to select best J/ψ
  - ✓ Selection criteria need to be optimized
  - ✓ Determine binning method
- Bkg estimation
  - ✓ prompt J/ψ
  - ✓ Inclusive pp->μ(μ)X
  - ✓ QCD

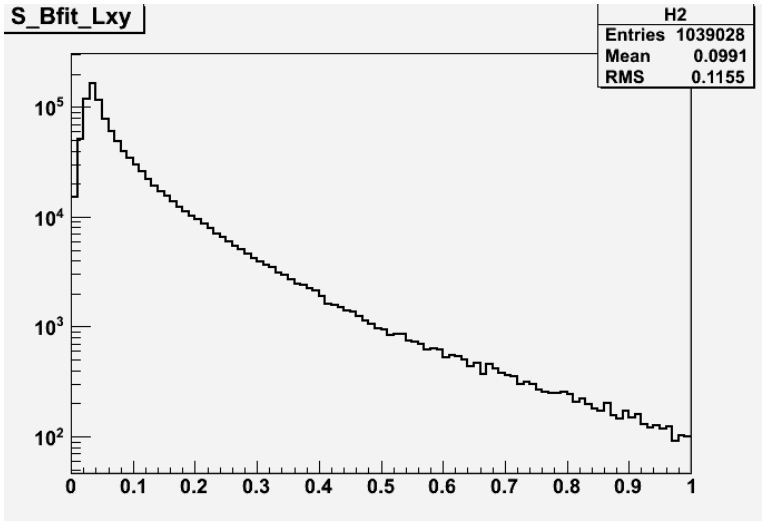
Back Up Slide

Vertex Kinematic Fit Plots

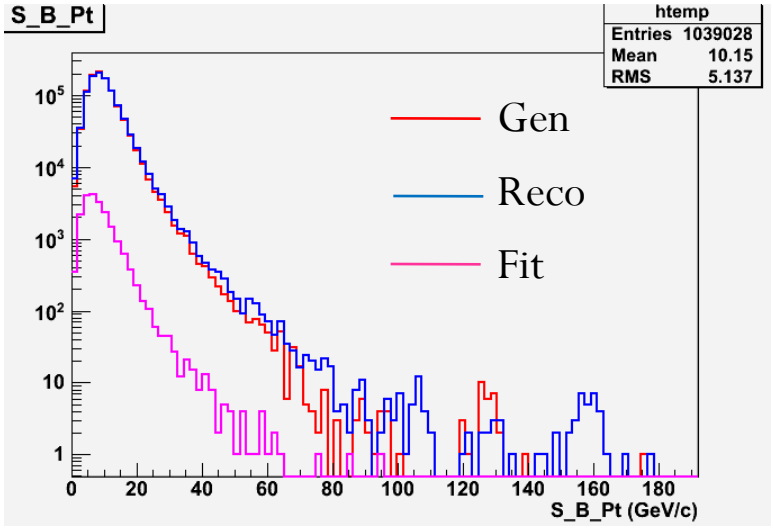


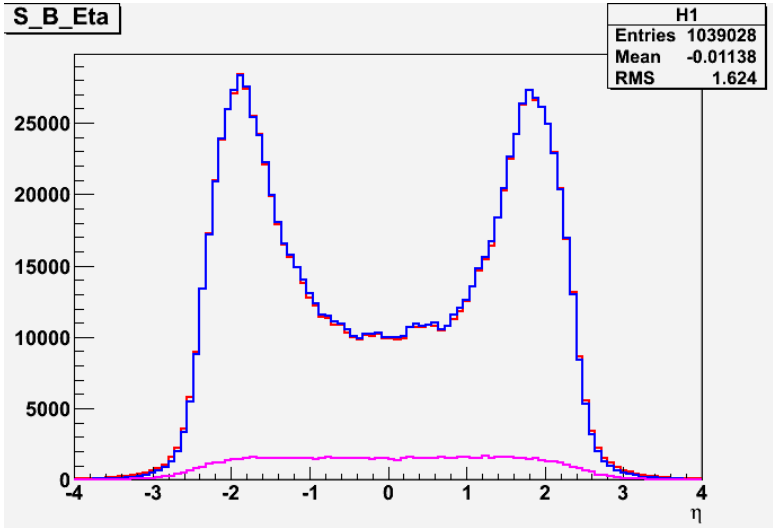






Kinematic Fit





Reco Jpsi mass