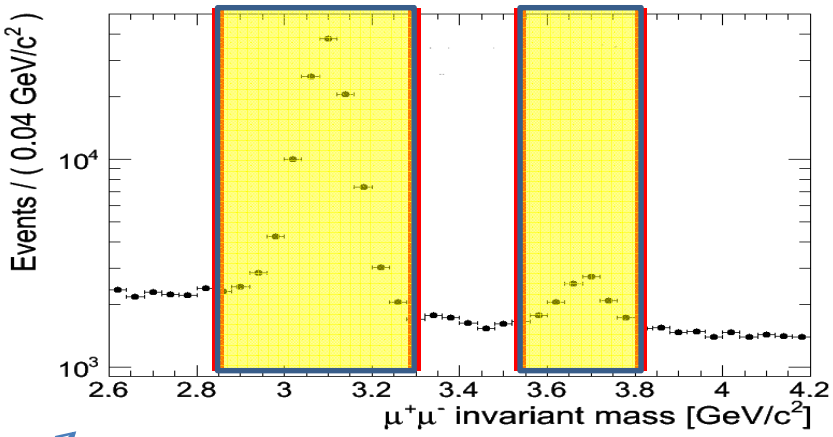
Mass fits for Jpsi/psi' ratio

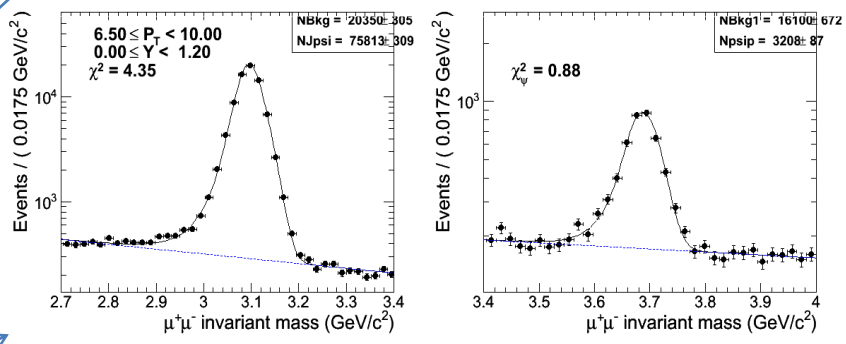
Data and selection

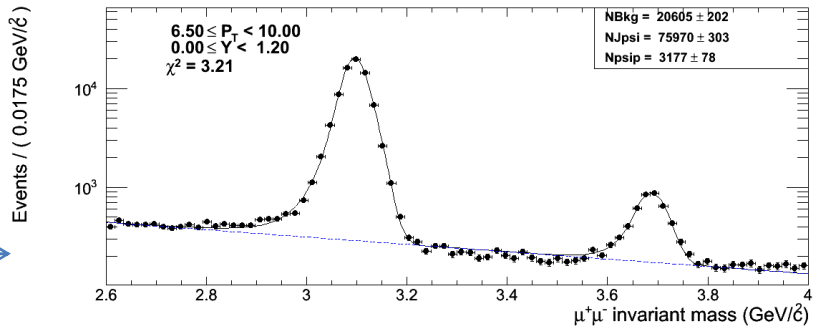
- *Aim to measure the Jpsi/psi(2S) Xsect. ratio separately for the prompt and non prompt components.*
- *Ingredients: efficiencies, yields and lifetime fit.*
- *Full 2010 stat. (MuOnia PD)*
- *HLT: DoubleMu0_Quarkonium_v1 OR DoubleMu0*
- *Almost same cuts of J/psi paper:*
  - ✓ *J/psi vtx prob. > 1% (was 0.1%)*
  - ✓ *Chi2/ndof inner tracks < 1.8 (was 4)*
  - ✓ *Muon ID "TMOneStationThight" (was "TMLastStationAngThight"*
- *pT scale correction (mode 4):*
  - *pT'=pT(1.002-0.002|η|+0.001 η^2-0.0001pT)*

The fit procedure

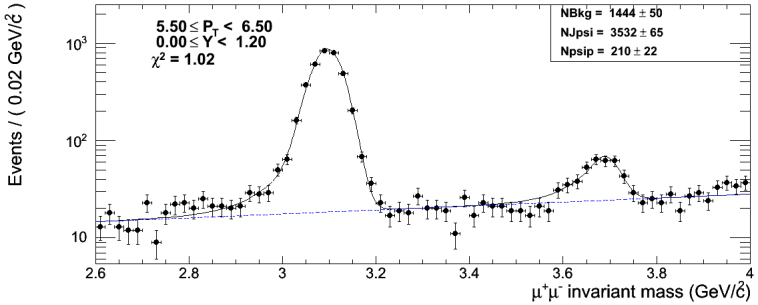
- *MLL fit (RooFit):*
  - *CB+Gauss for the J/psi*
  - *CB psi'*
  - *Exp for the Bkg*
- *11 pT bins and 3 Y bins*
  - *pT {2, 2.75, 3.5, 4.5, 5.5, 6.5, 8, 9, 10, 12, 15, 30}*
  - *Y {0, 1.2, 1.6, 2.4}*
- *3 steps:*
  1. *prefit of the sidebands*
  2. *Fit separately the J/psi and psi' (Signal+Bkg)*
  3. *Fix some shape params (alpha,n, σ), and fit the full interval all together*

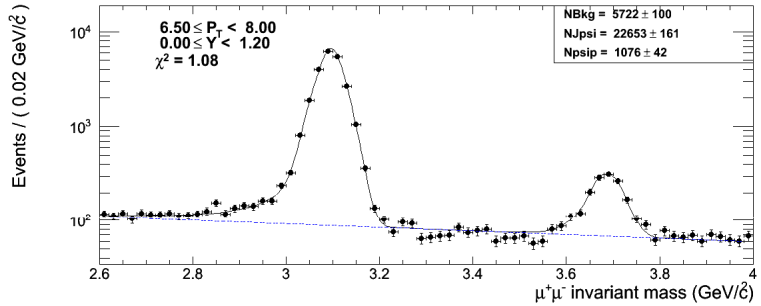


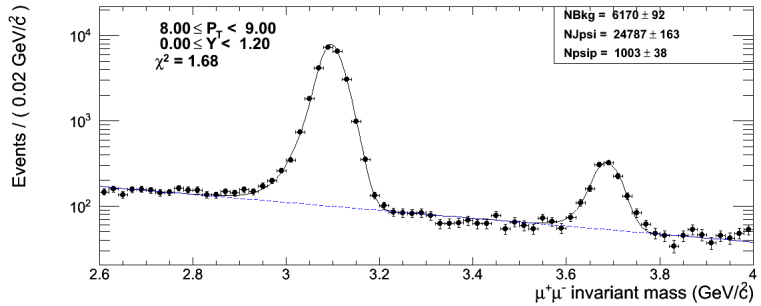


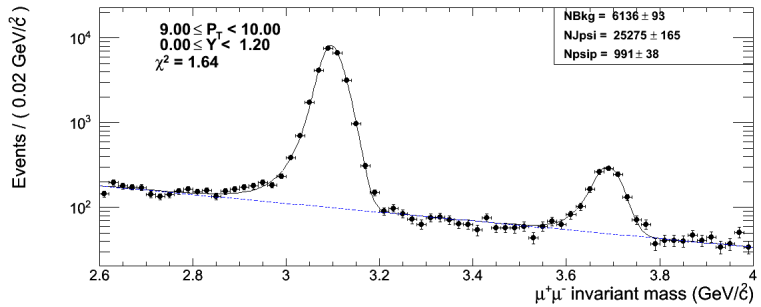


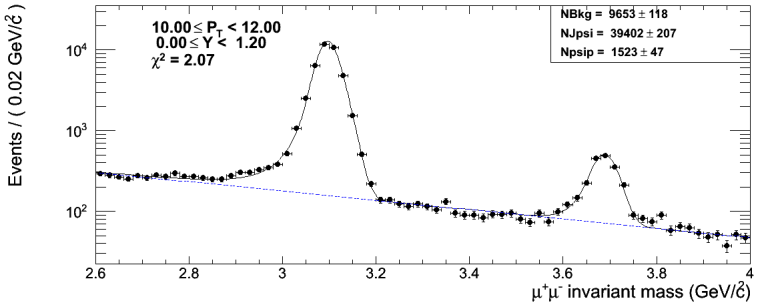
The fits: Barrel (|Y|<1.2)

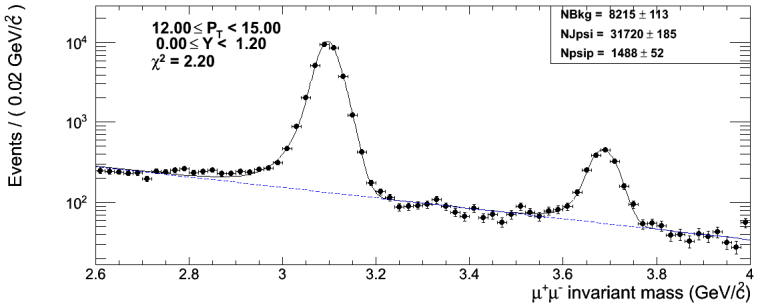


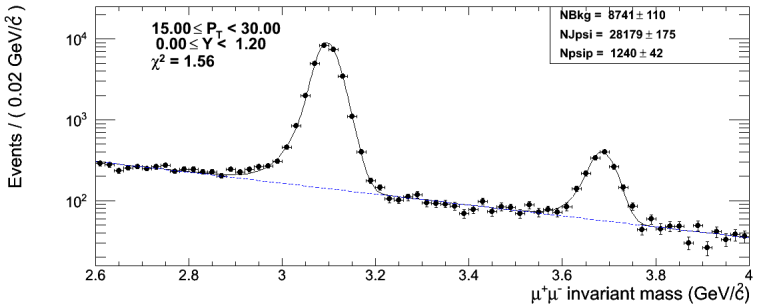




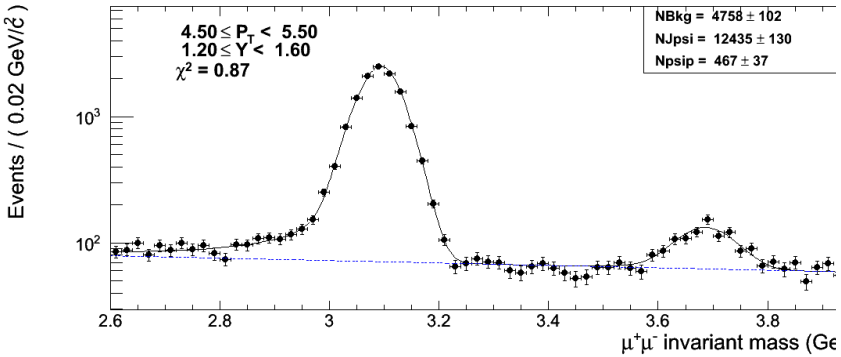


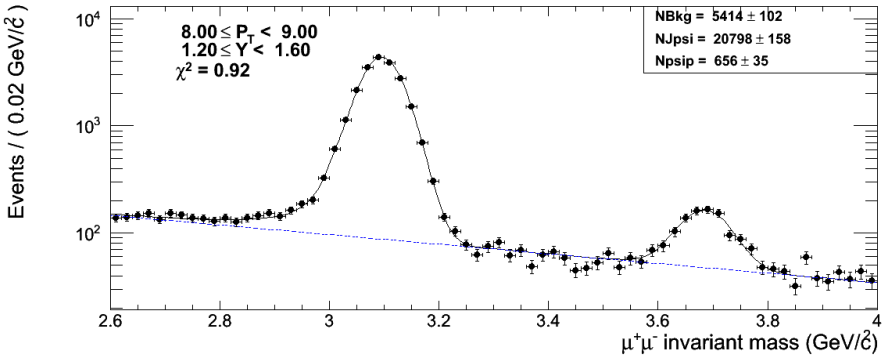


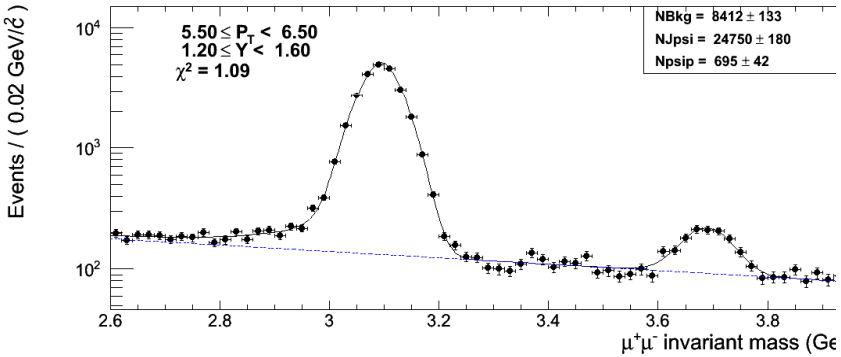


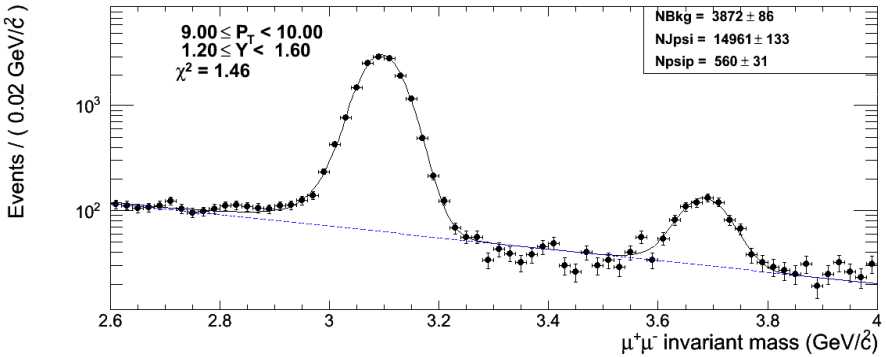


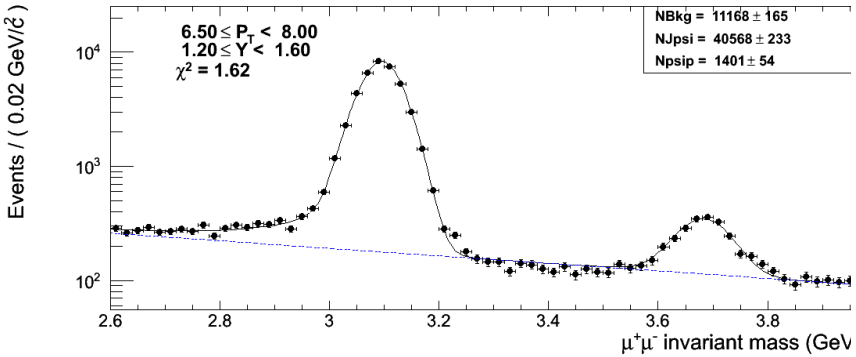
Middle (1.2 <|Y|< 1.6)

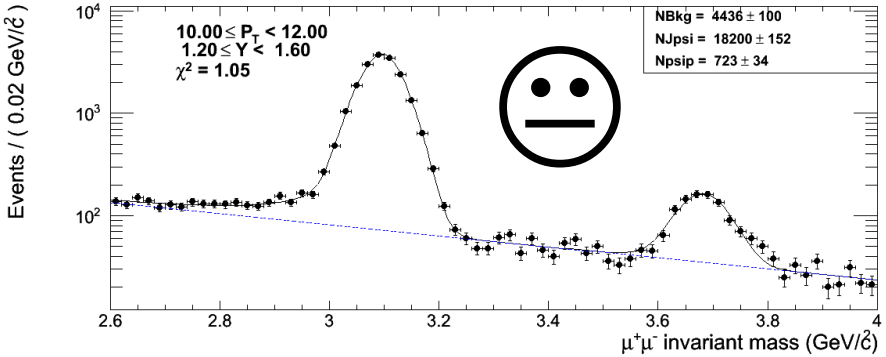




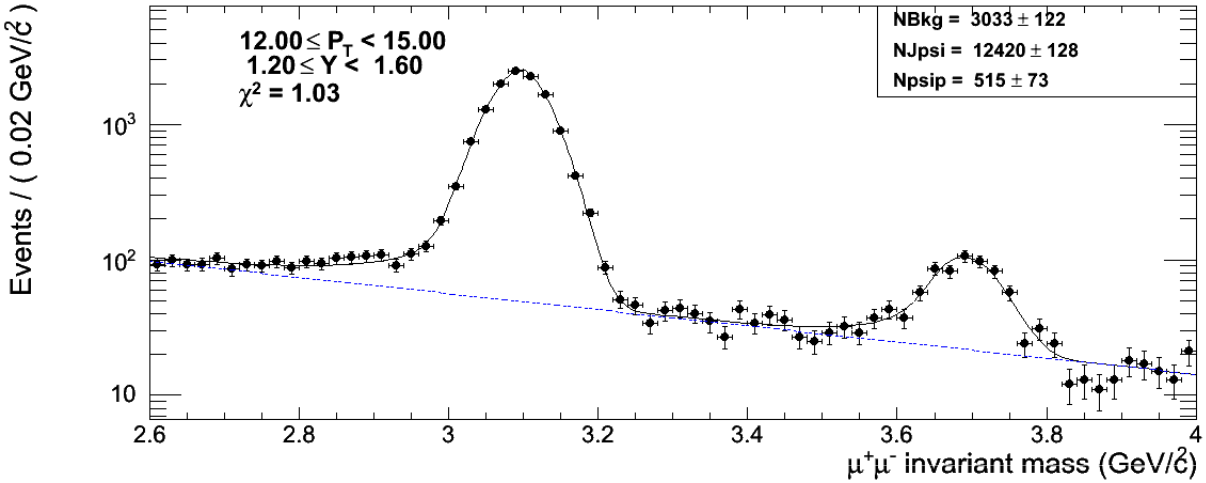


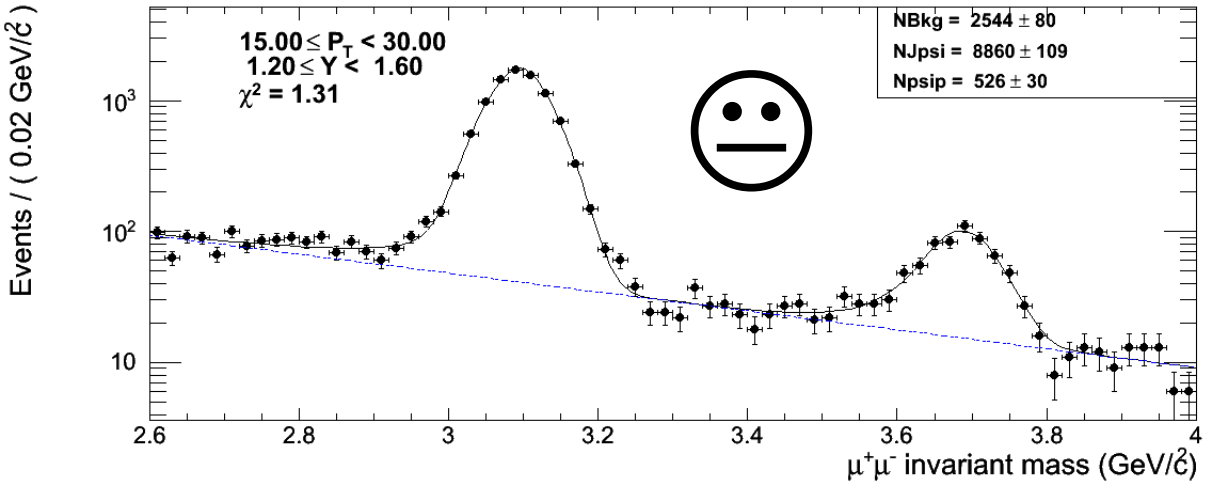




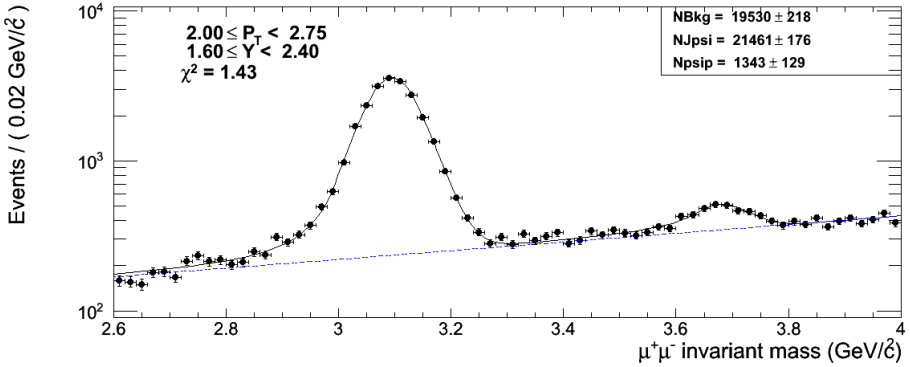


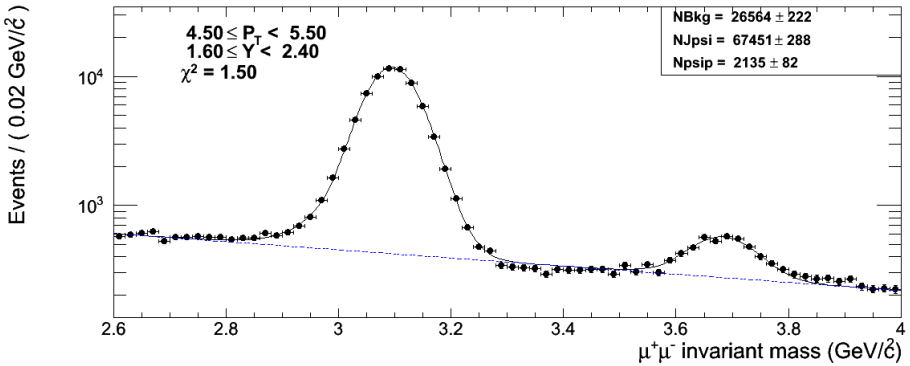
Middle (1.2 <|Y|< 1.6) (II)

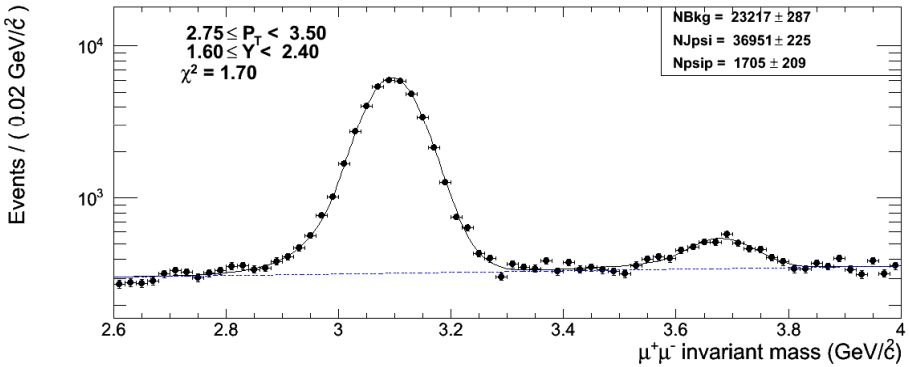


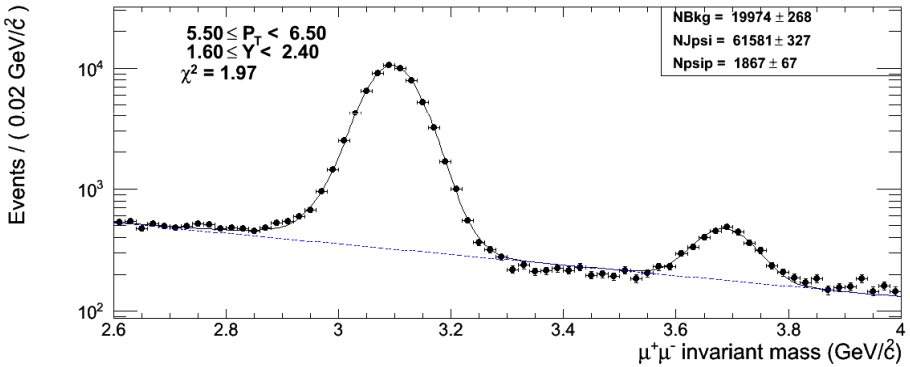


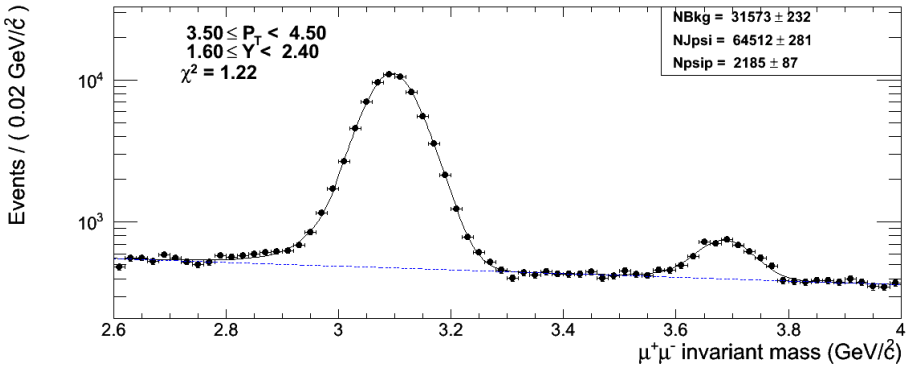
Forward (1.6 <|Y|< 2.4)

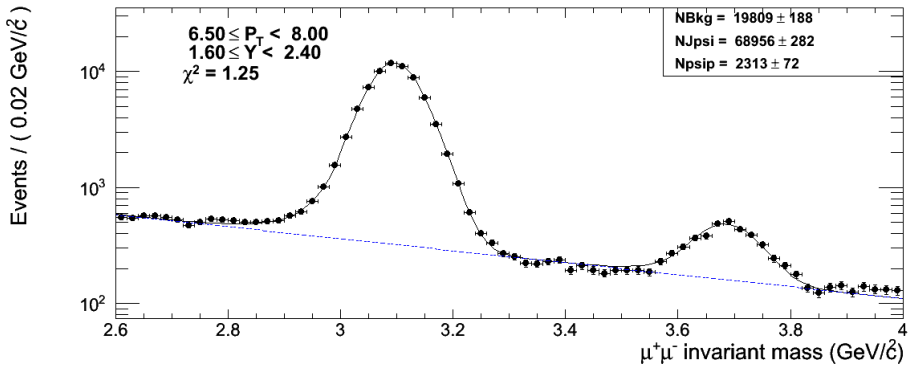




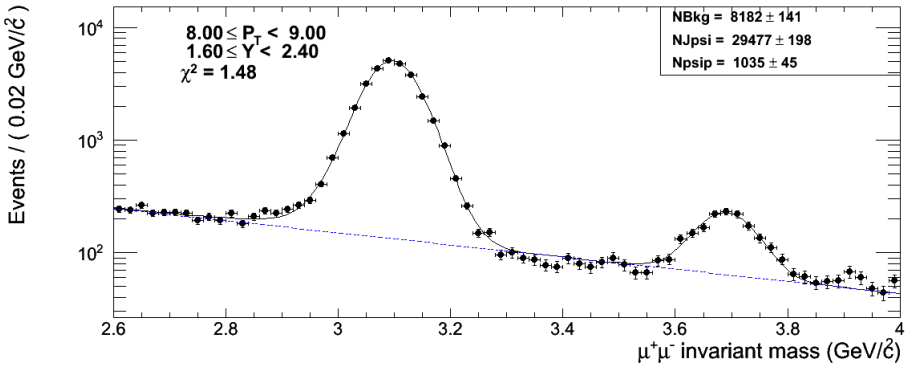


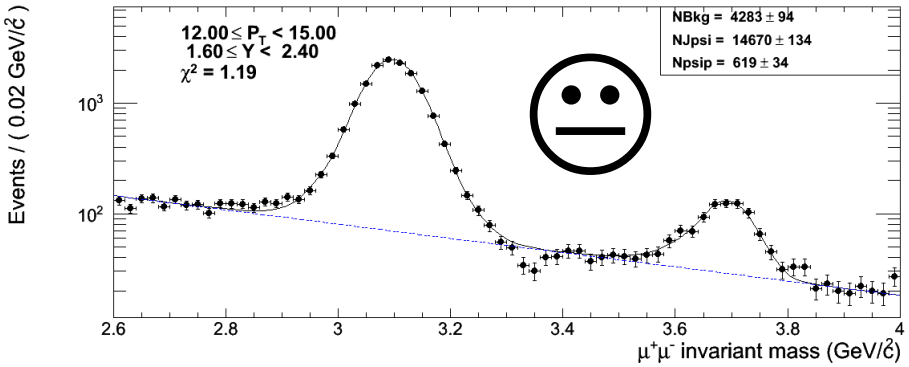


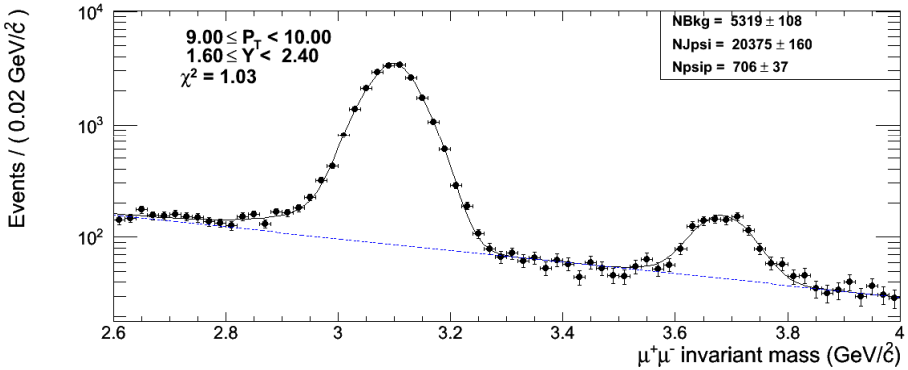


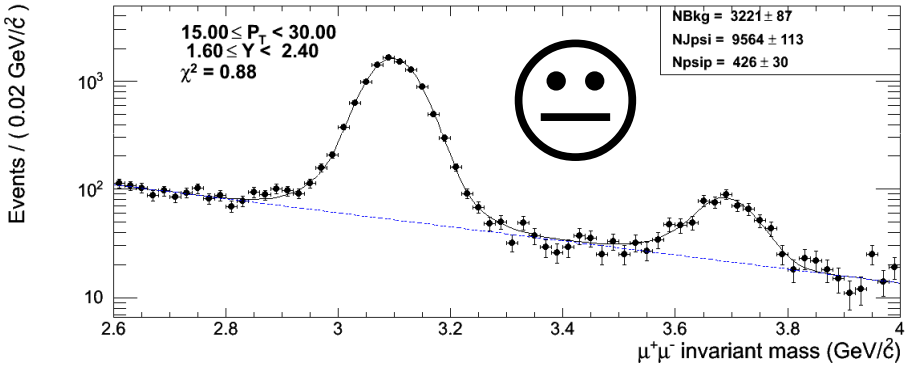


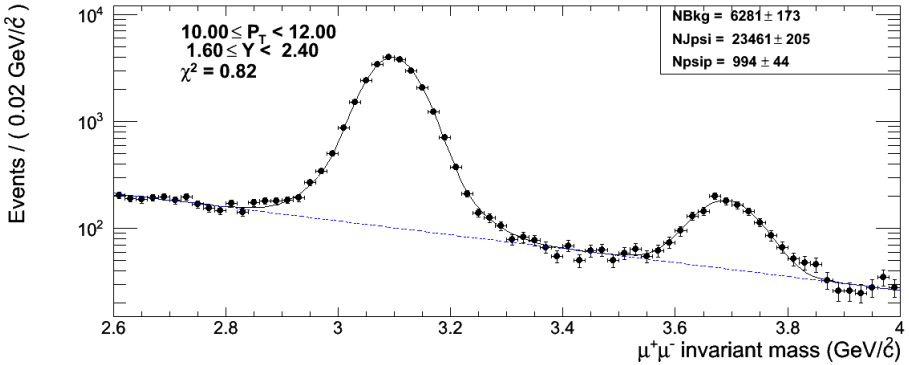
Forward (1.6 <|Y|< 2.4) (II)



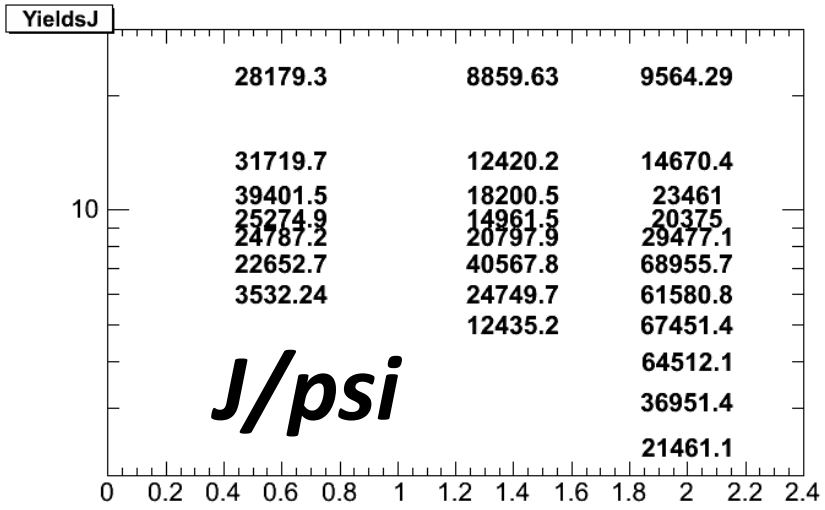


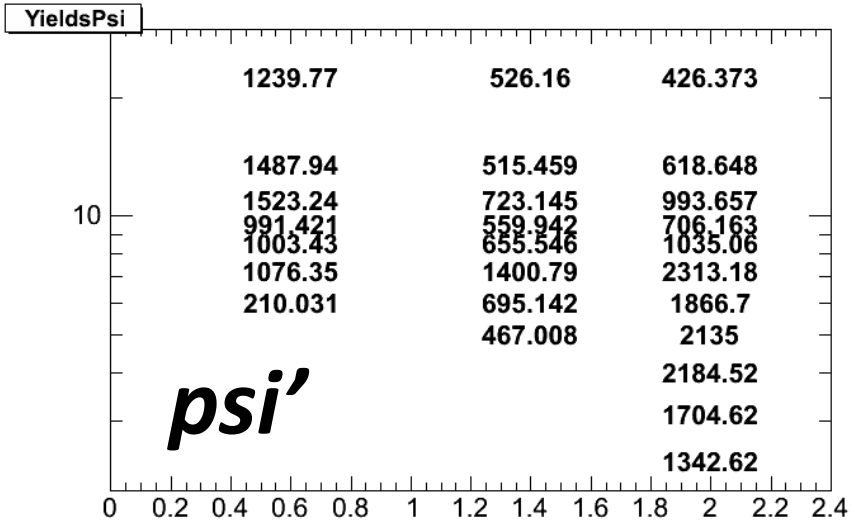




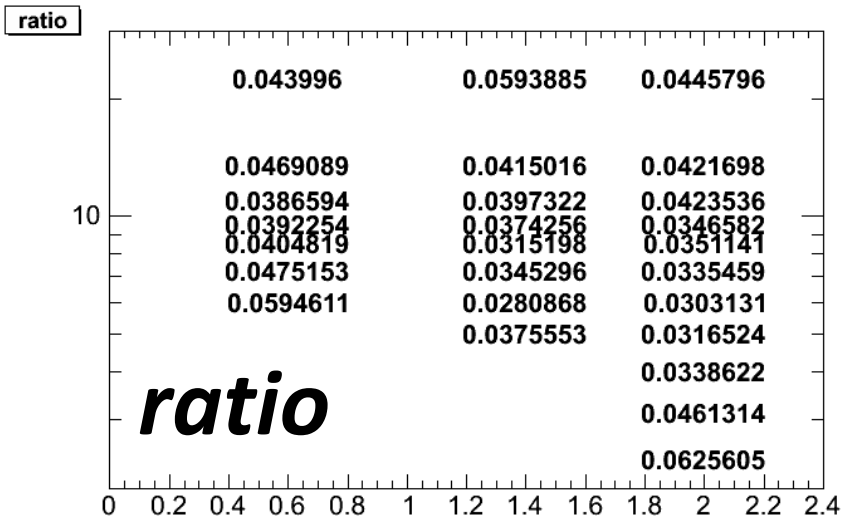


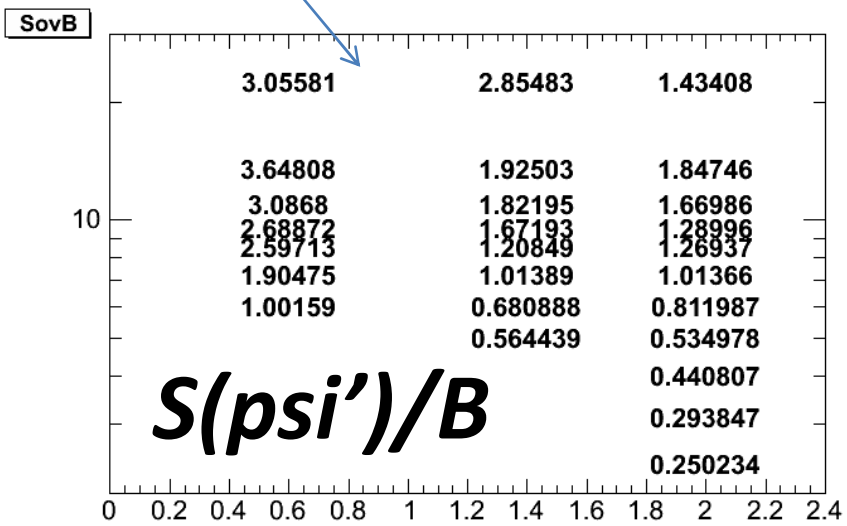
Results





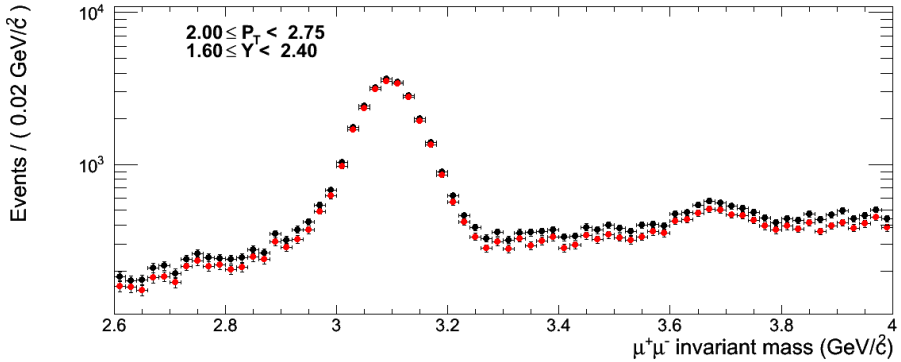
in +/- 2.5 sigma around the psi' peak





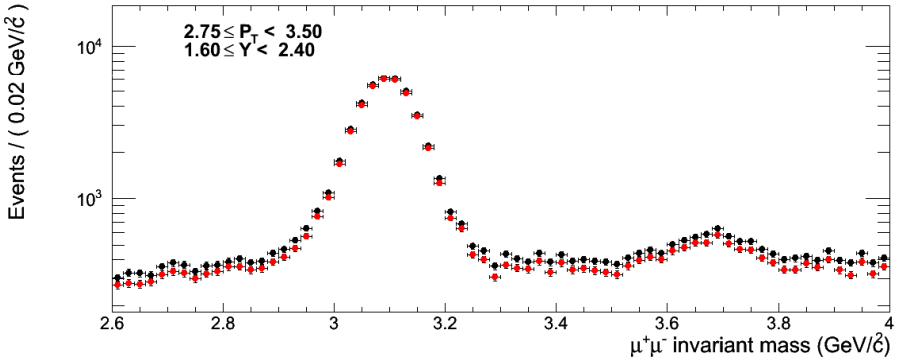
New vs Old cuts

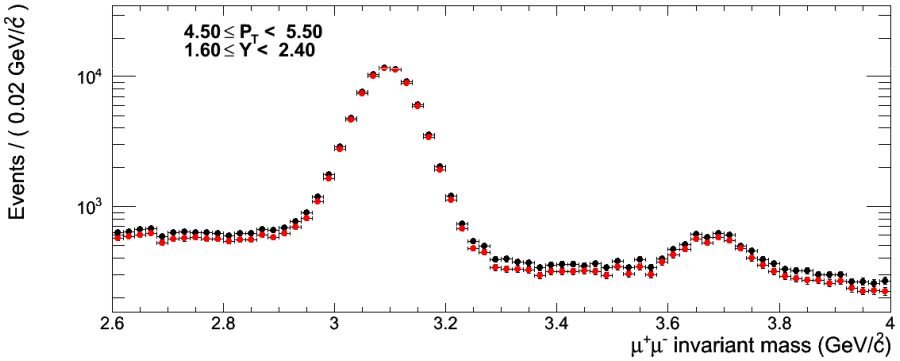
What is the effect of the new cuts in vprob and tracks chi2?

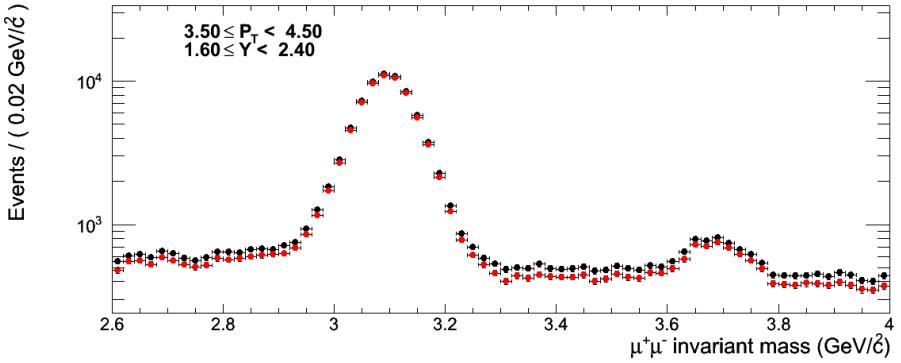


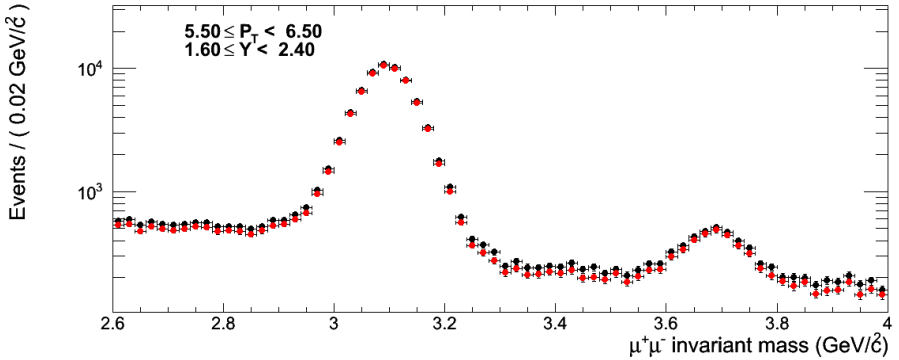
OLD

NEW

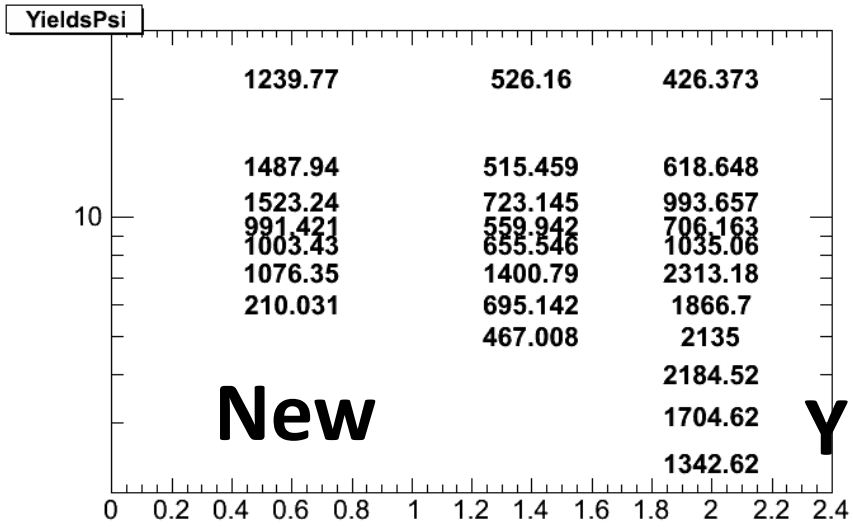




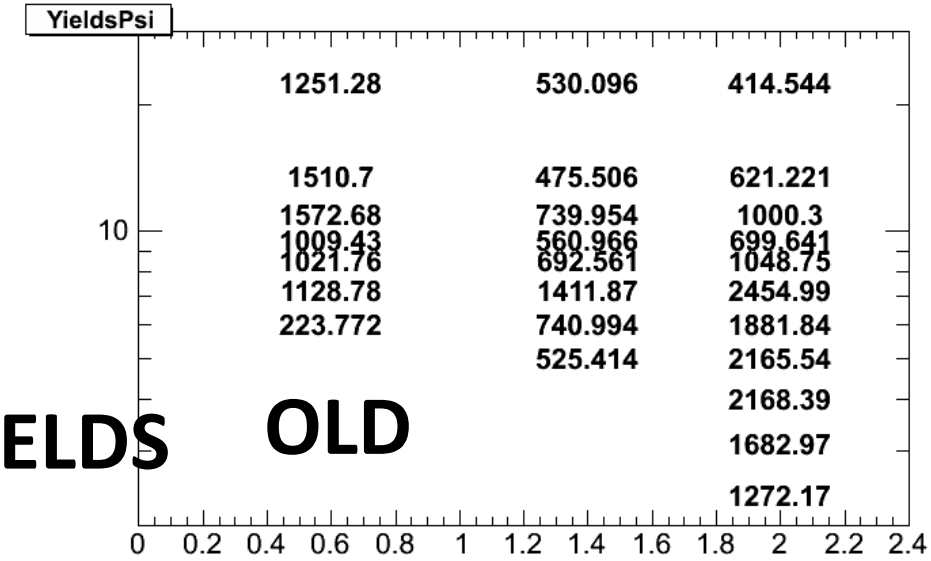


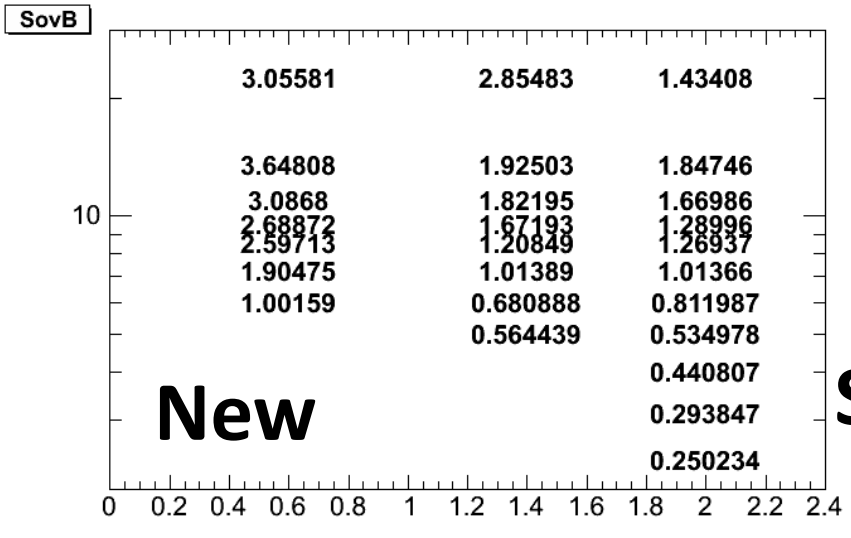


New vs Old cuts (II)

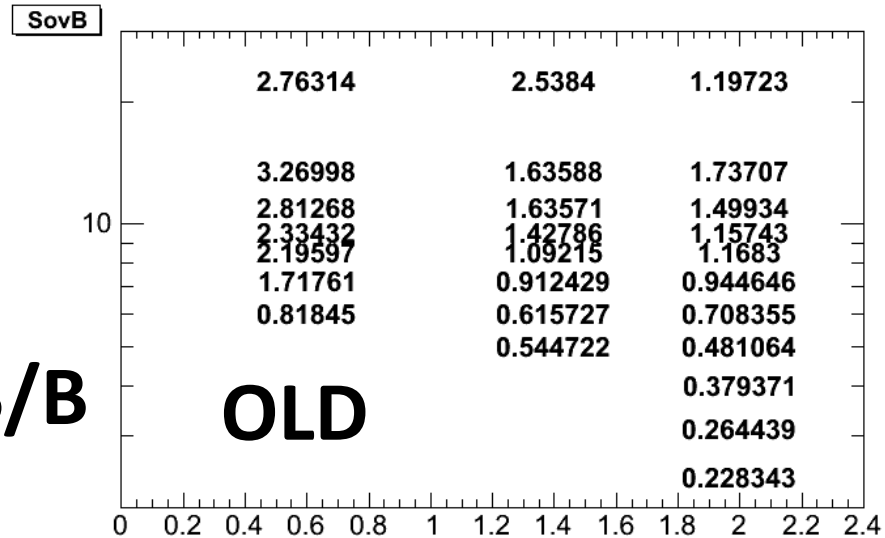


YIELDS





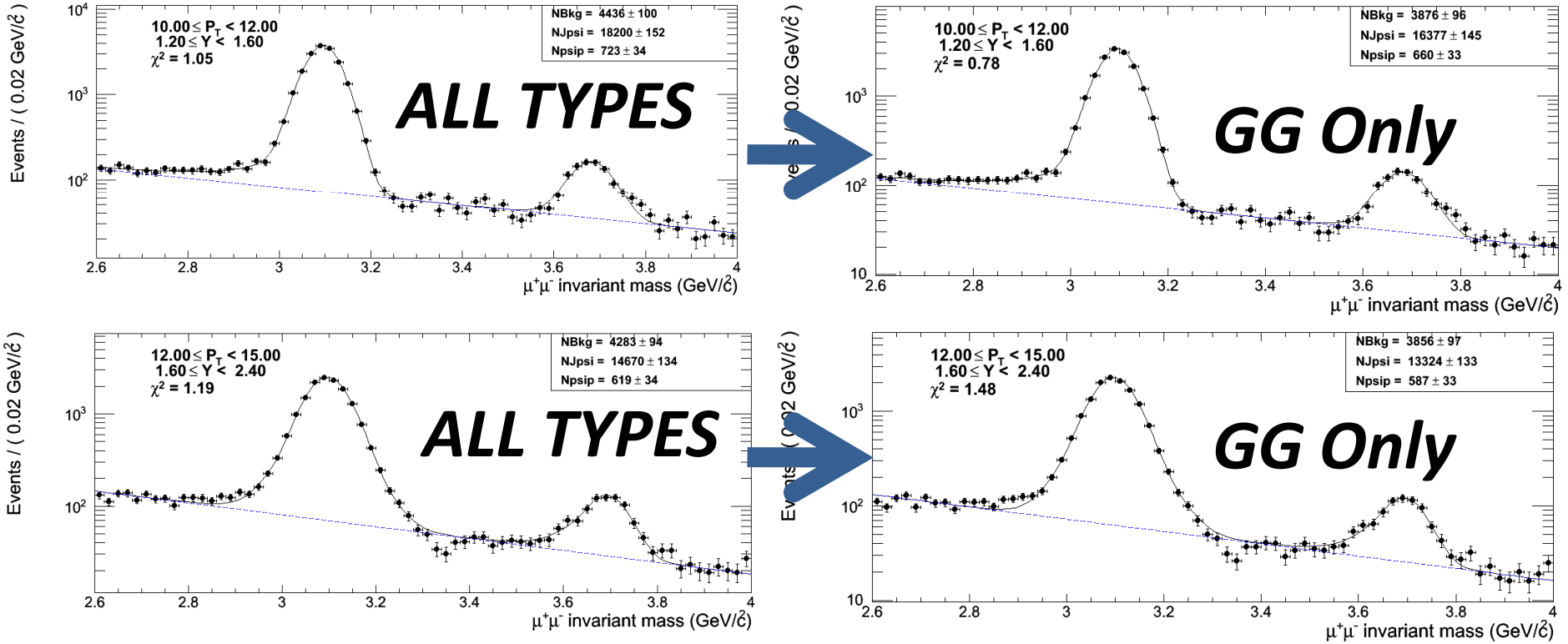
S/B



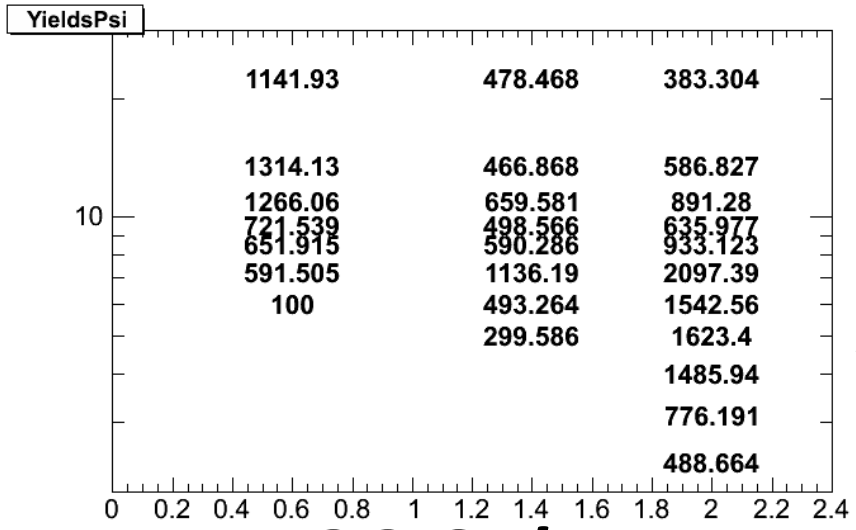
The yields are quite the same, S/B rise by a 10%

Use only GG ?

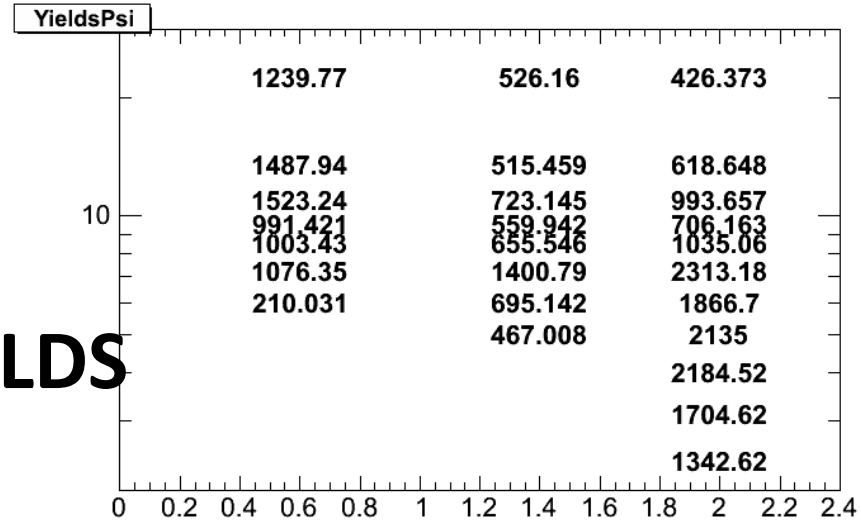
- *Better quality of fits and enhanced S/B*
- *However … same features in the fits*



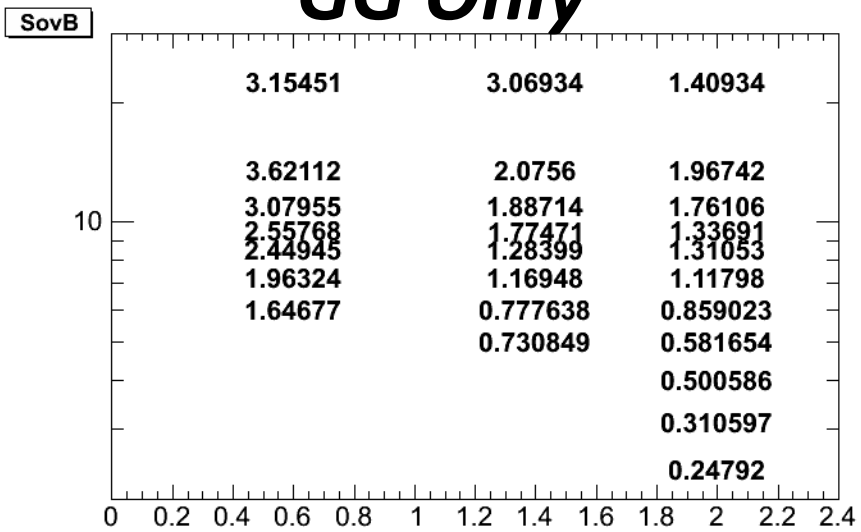
Use only GG ? (II)



YIELDS

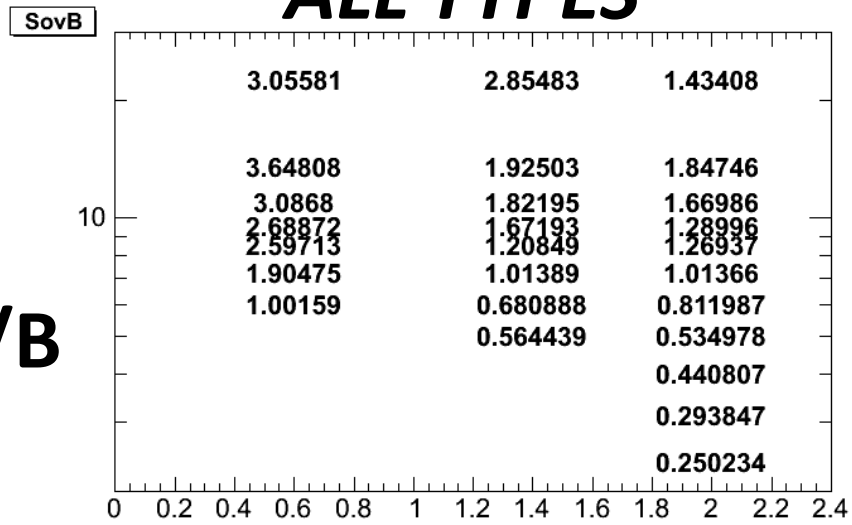


GG Only



S/B

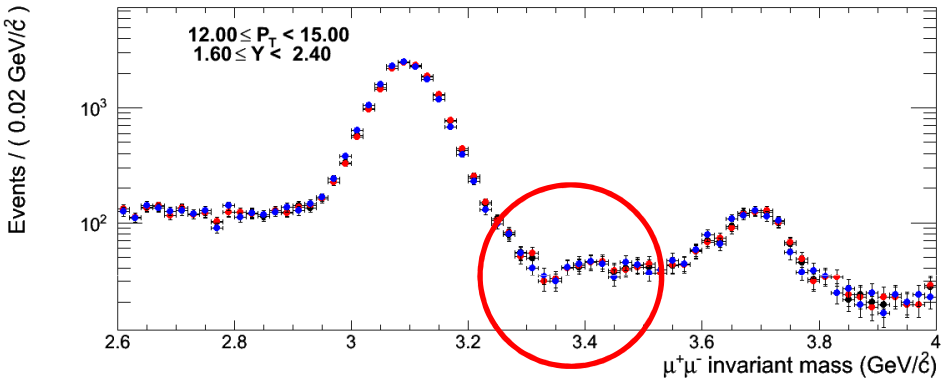
ALL TYPES

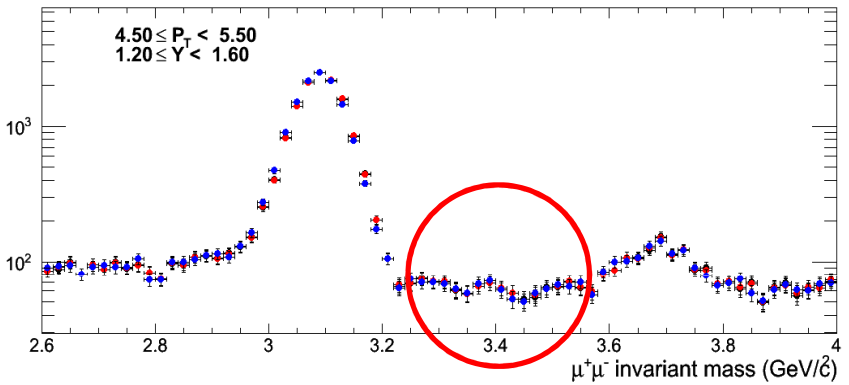


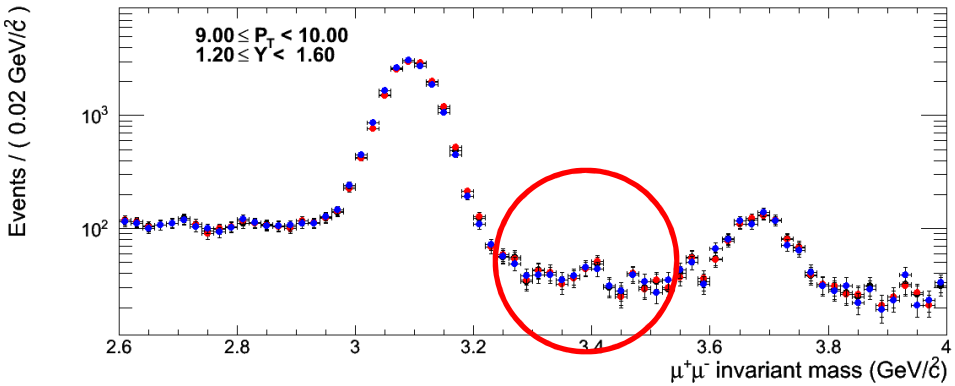
It doesn't seem convenient

Which mass (pT) correction?

- *4 modes available, modes 3 and 4 pT and η dependent*
- *Is it the cause of strange features in the bkg shape?*







Mode 4

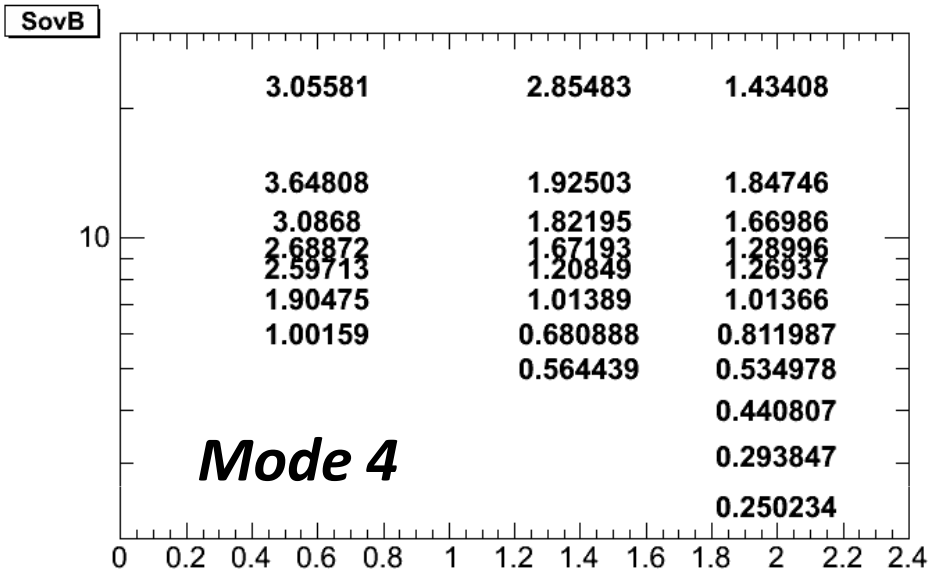
Mode 3

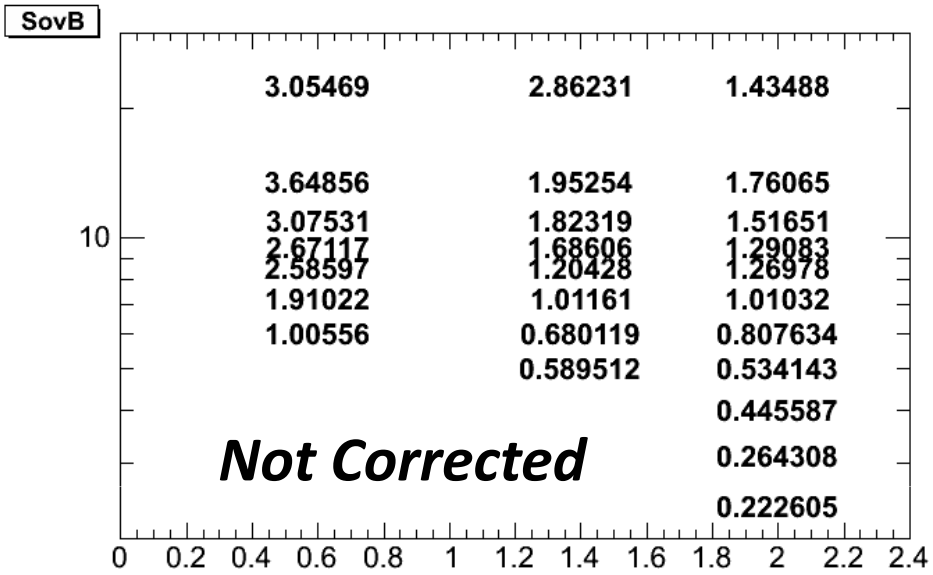
Not Corrected

The features are there independently by the pT correction

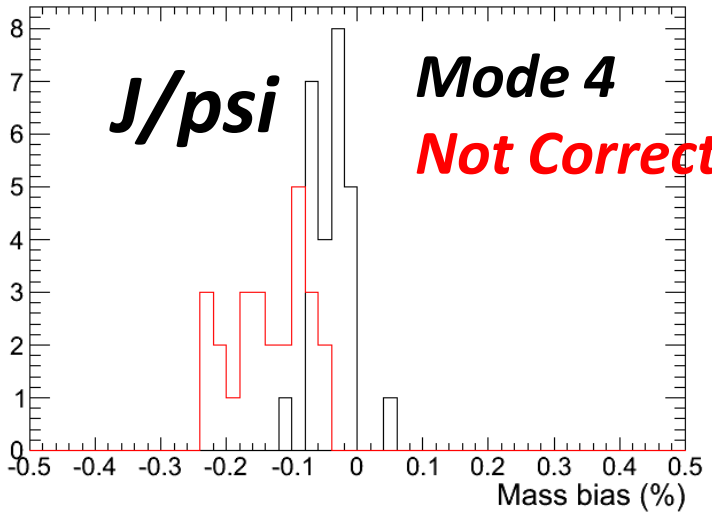
Which mass (pT) correction? (II)

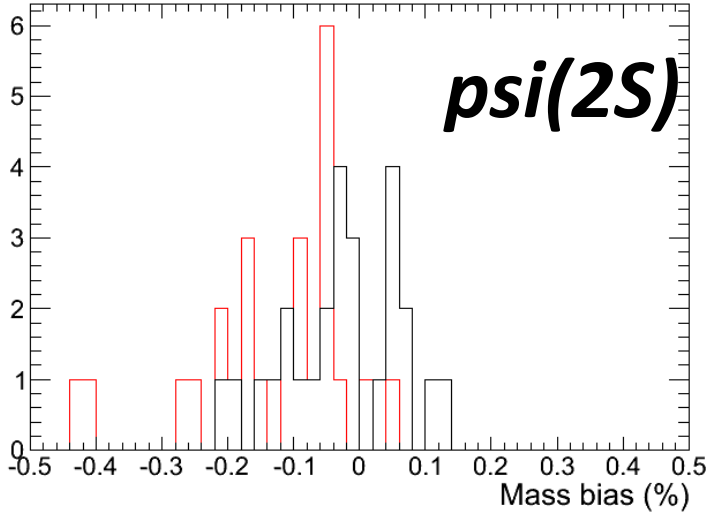
- *The effect on S/B is negligible ....*



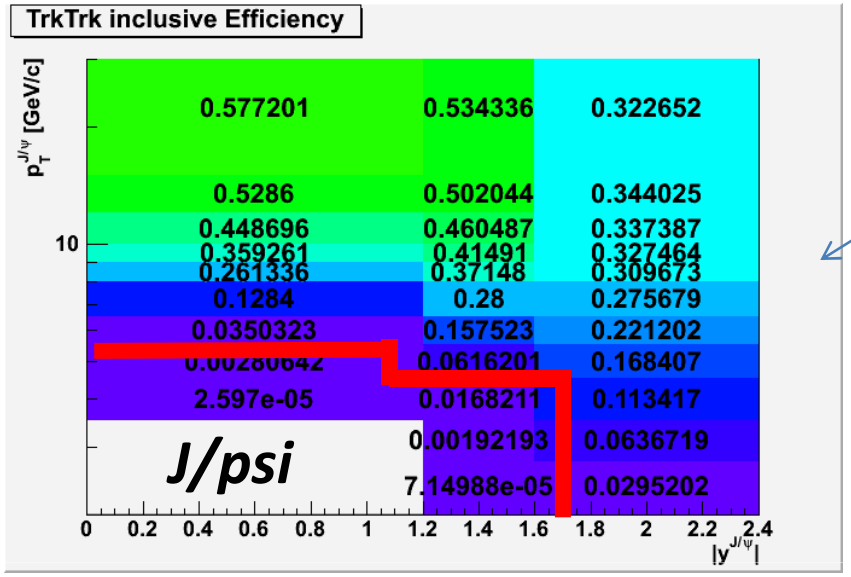


However the mass peak measurement improve, as expected .... stay with mode 4

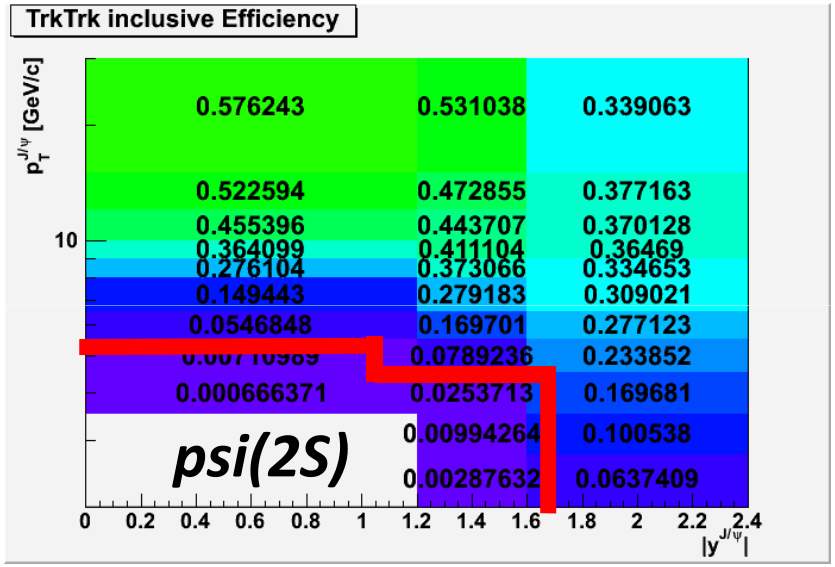


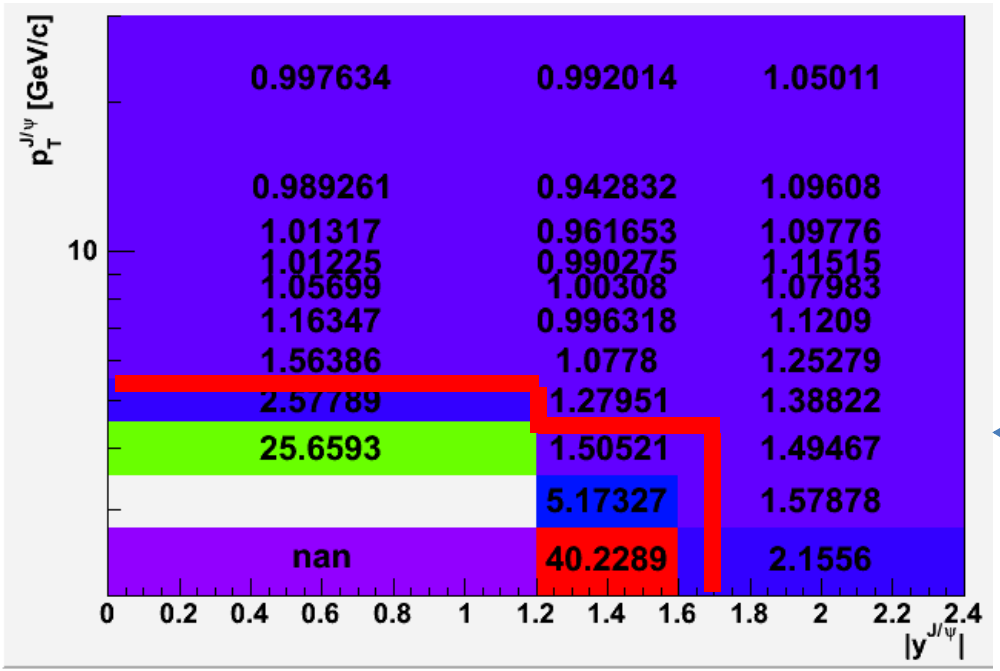


Efficiencies



Total efficiency (Muon ID + Track + Trigger + Analysis cuts)





Ratio of efficiencies

Summary and plans

- *The mass fit to extract the J/psi and psi' yields is in place with a stable behavior (few bins to be tuned)*
- *The effect of new vprob and chi2 cuts have been reported*
- *Possible enhancement of S/B by using only GG or possible biases due to the pT correction have been discussed*
- *The next step will be to put all the pieces together to have a first measurement*