
Non-Prompt J/psi Analysis

PbPb @ 5.02 TeV



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ALICE

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IFJ - ALICE Meetings

- **Fraction of Non-prompt J/psi in PbPb @ 5.02 TeV (LHC18q,r)**
 - **Most Central Collisions (0-10%)**

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- Templates
  - Msig(x) : InvMass-signal from MC reconstructed
              (CrystalBall function)
  - MBkg(x) : InvMass-Bkg from Data
              (2nd order Polynomial)
  - Fbkg(x) : PsProper Decay length distribution (x)
              for Bkg candidates
  - Fsig(x)** :
  - R(x)      : Prompt Jpsi Template from MC-truth reconstructed
  - CsiB(x)   : Non-Prompt Jpsi Template from MC-truth

- Model for UnBinned two dimensional-fitting
  - Signal Part (Msig(m), Fsig(x))
  - Bkg Part (Mbkg(m), Fbkg(x))

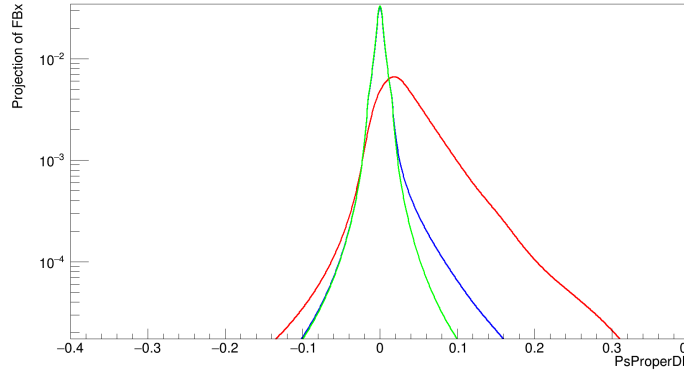
  --> F(m,x) = f.Msig(m).Fsig(x) + (1-f).Mbkg(m).Fbkg(x)

  -> Results - NonPrompt Fraction (from x-dimension)
              - S/(S+B) (from mass-dimension)
```

Variation in Fb :: Green = R(x), Red = Fb(x), Blue = Fsig(x)

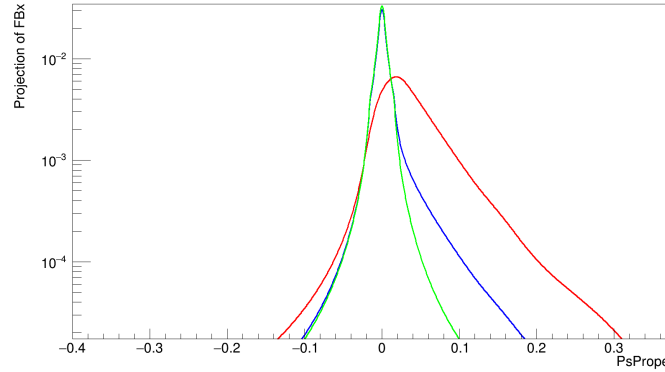


A RooPlot of "PsProperDL"

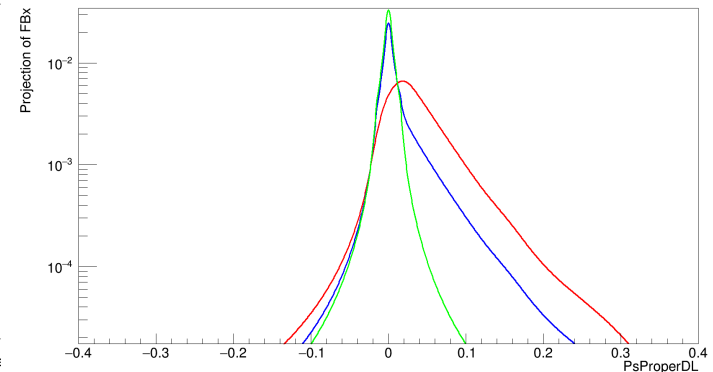


Fb = 0.05

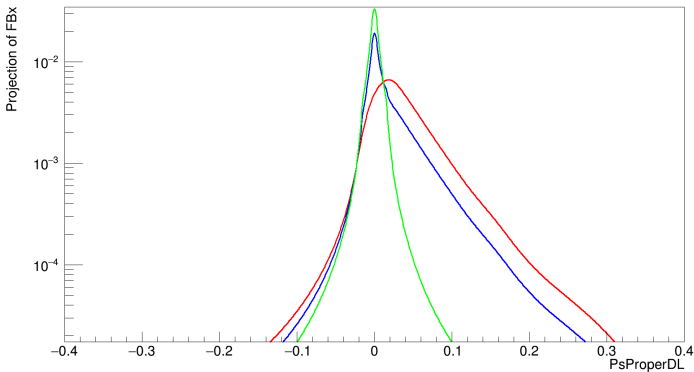
A RooPlot of "PsProperDL"



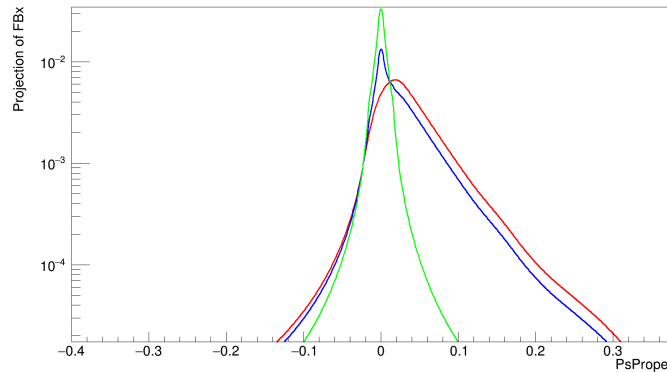
Fb = 0.1



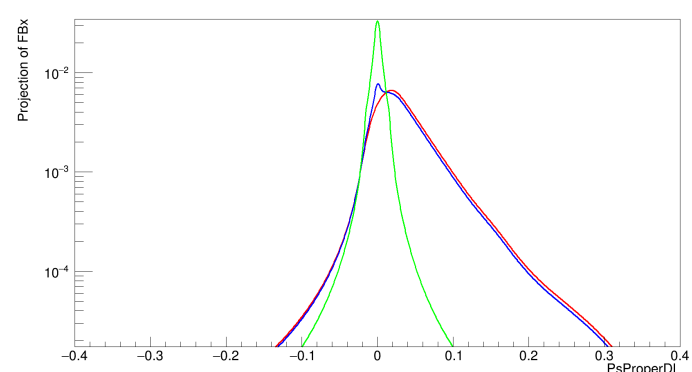
Fb = 0.3



Fb = 0.5



Fb = 0.7



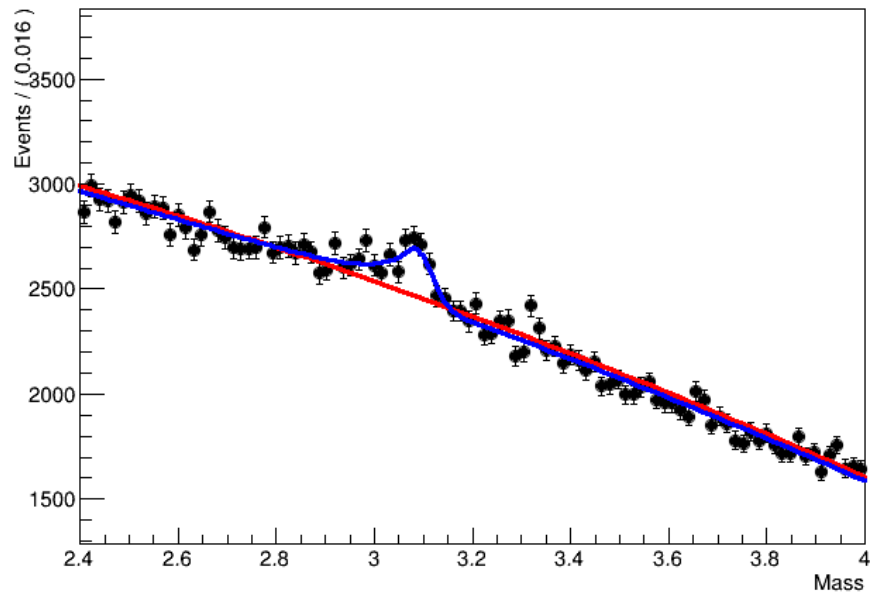
Fb = 0.9



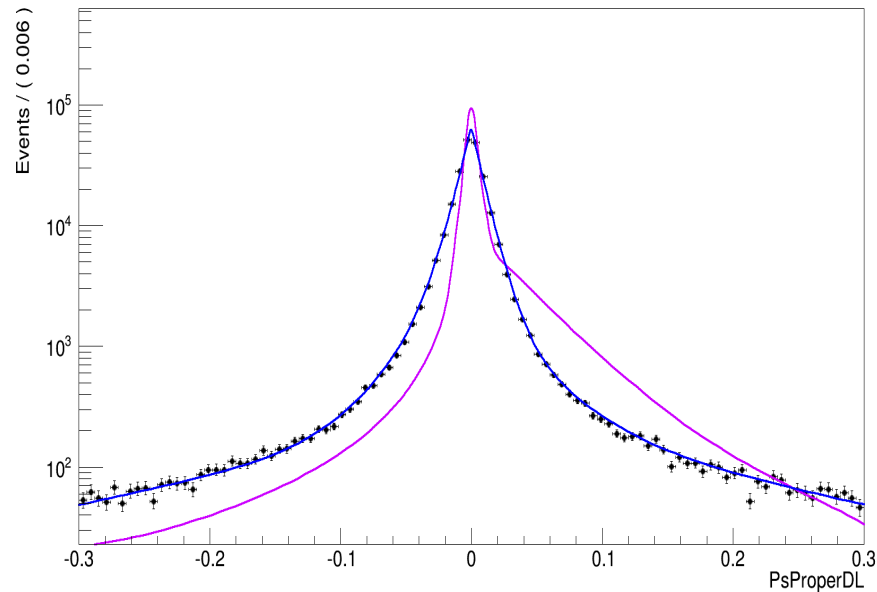
Results of UnBinned Fit ($5.0 < p_t < 7.0 \text{ GeV}/c$)



A RooPlot of "Mass"



- **Red** = Bkg-template
- **Blue** = Fit



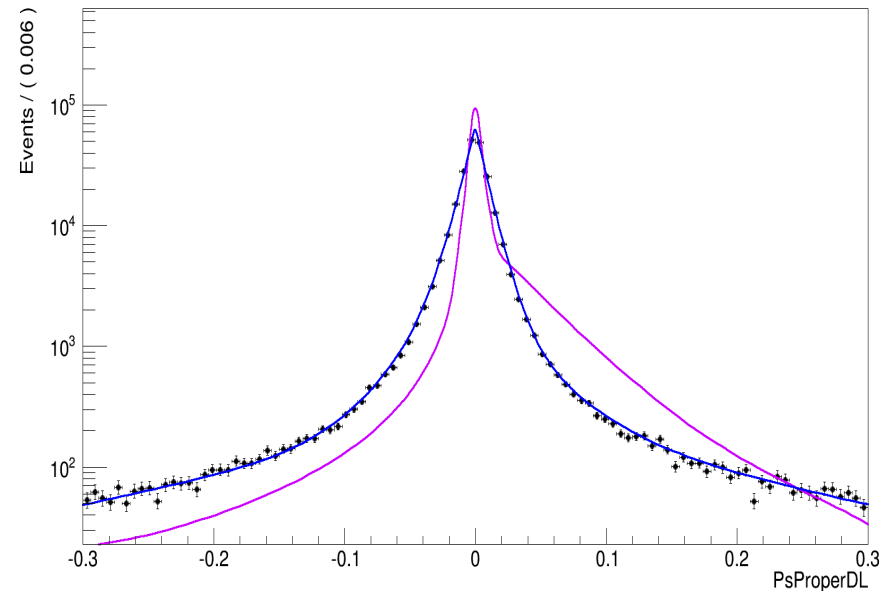
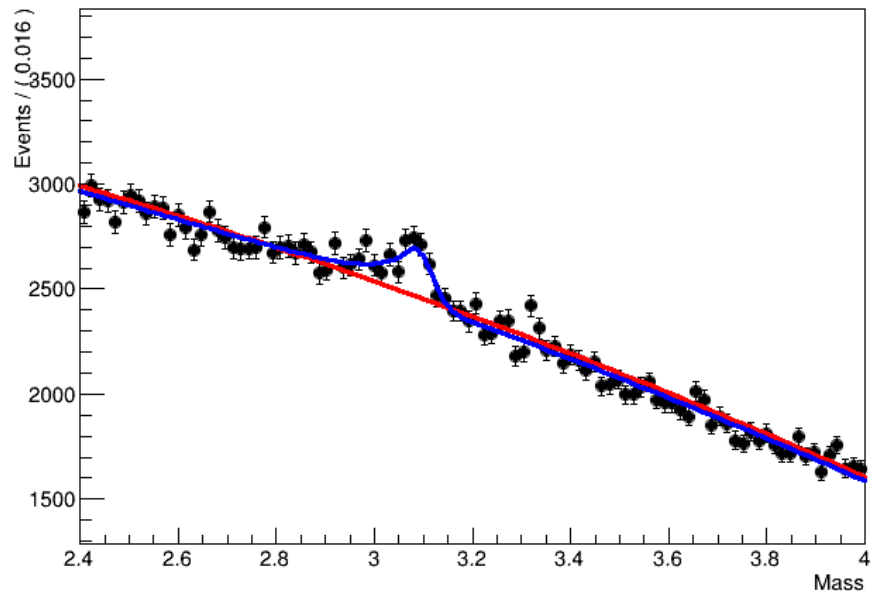
- **Violet** = $F_{sig}(x)$
- **Blue** = Fit



Results of UnBinned Fit ($5.0 < p_t < 7.0 \text{ GeV}/c$)



A RooPlot of "Mass"



- Fraction of Signal = 0.011 ± 0.0009
- Chi2/ndf = 1.2

- NonPrompt Frac = 0.26 ± 0.039
- Chi2/ndf = 5.27

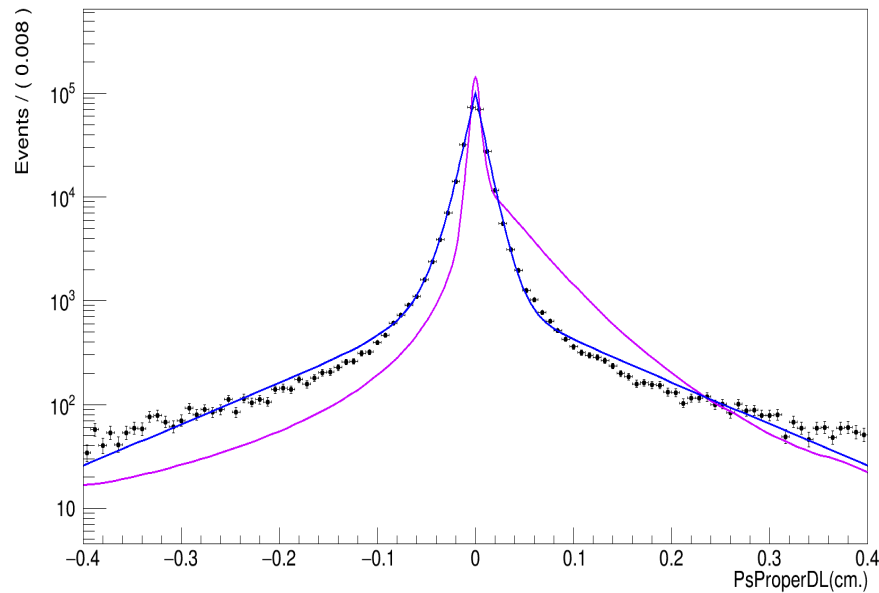
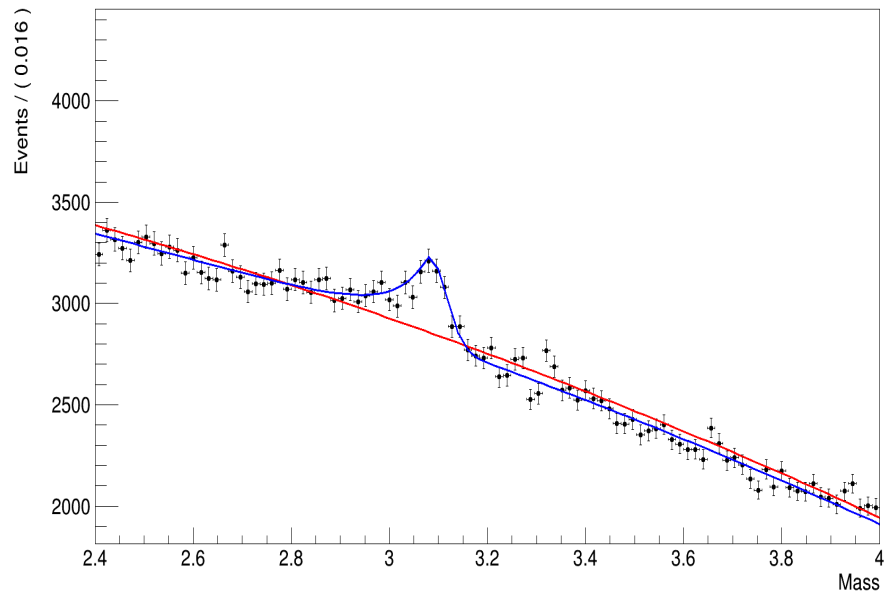
- Total Candidates = 234609
- Time Taken to Fit ~ 25 mins



Results of UnBinned Fit ($5.0 < p_t < 15.0 \text{ GeV}/c$)



A RooPlot of "Mass"



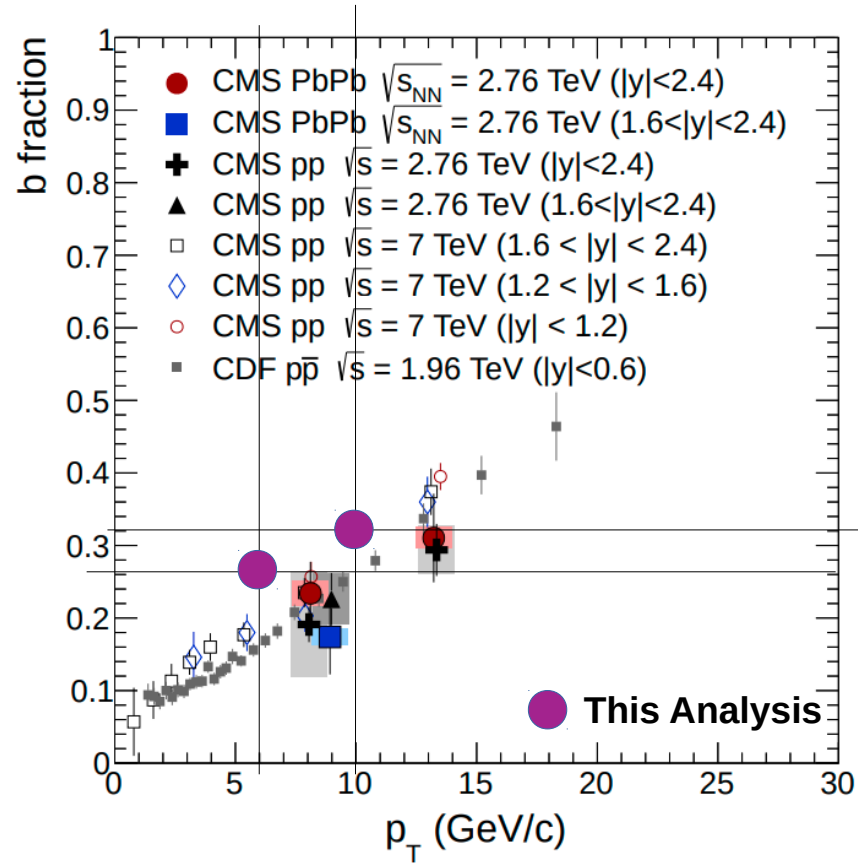
- Fraction of Signal = 0.016 ± 0.0009
- Chi2/ndf = 1.08

- NonPrompt Frac = 0.32 ± 0.026
- Chi2/ndf = 14.04

- Total Candidates = ----
- Time Taken to Fit -----

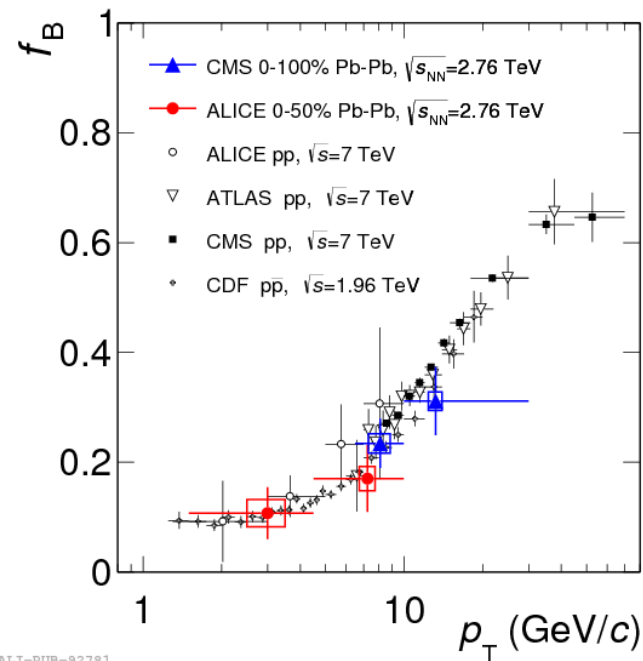


Rough Comparison:



Centrality	p_T (GeV/c)	f_B
0-10% (2011)	1.5-10	0.109 ± 0.046 (stat.) ± 0.037 (syst.)
0-10% (2011)	1.5-4.5	0.072 ± 0.048 (stat.) ± 0.026 (syst.)
0-10% (2011)	4.5-10	0.159 ± 0.106 (stat.) ± 0.038 (syst.)
10-50% (2011)	1.5-10	0.109 ± 0.047 (stat.) ± 0.024 (syst.)
10-50% (2011)	1.5-4.5	0.112 ± 0.057 (stat.) ± 0.027 (syst.)
10-50% (2011)	4.5-10	0.142 ± 0.100 (stat.) ± 0.026 (syst.)
0-50% (2010)	1.5-10	0.101 ± 0.088 (stat.) ± 0.023 (syst.)
0-50% (2010)	4.5-10	0.196 ± 0.088 (stat.) ± 0.024 (syst.)
10-40% (2011)	1.5-10	0.086 ± 0.052 (stat.) ± 0.019 (syst.)
10-40% (2010)	1.5-10	0.091 ± 0.085 (stat.) ± 0.020 (syst.)
40-90% (2010)	1.5-10	0.187 ± 0.127 (stat.) ± 0.025 (syst.)

Table 1: Summary of f_B results with statistic and systematic uncertainty in all centrality and p_T ranges.



ALICE-PUB-92781

- Convolution of x-Bkg function with $R(x)$, which is time consuming.
 - Verification of the method in MC-statistics
 - For data, Low p_T region (< 5 GeV/c)
 - has Large background
 - takes More time to fit (time is proportional to # of candidates)
-
- Studying in different centralities (other than 0-10%)
--- long term plan.