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# Non-Prompt J/psi Analysis

## PbPb @ 5.02 TeV



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**ALICE**

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IFJ - ALICE Meetings

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- **Fraction of Non-prompt J/psi in PbPb @ 5.02 TeV (LHC18q,r) & MC-data**

- **Most Central Collisions (0-10%)**

- Pseudoproper decay length Bkg data for Fbkg(x) PDF is taken outside the Inv-mass region of Jpsi-meson

(2.4-2.8) U (3.2-3.6)

- Fb extracted in MC is verified using the PDG-codes of previous generations (Mother and so on ).






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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))

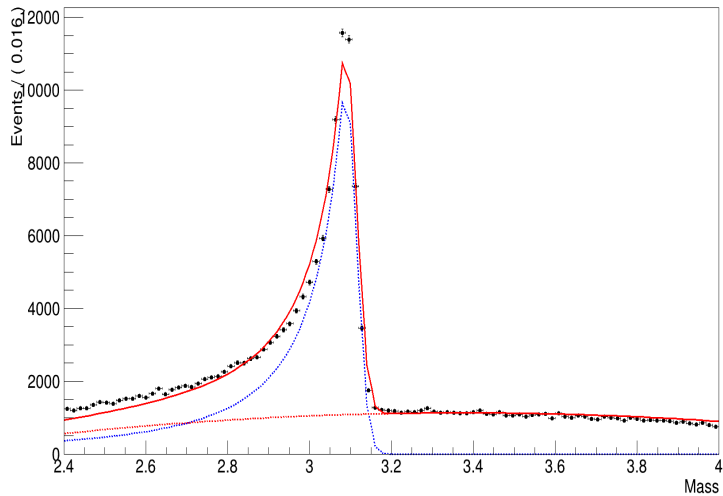
--> F(m,x) = f.Msig(m).Fsig(x) + (1-f).Mbkg(m).Fbkg(x)

-> Results - NonPrompt Fraction (from x-dimension)
            - S/(S+B) (from mass-dimension)
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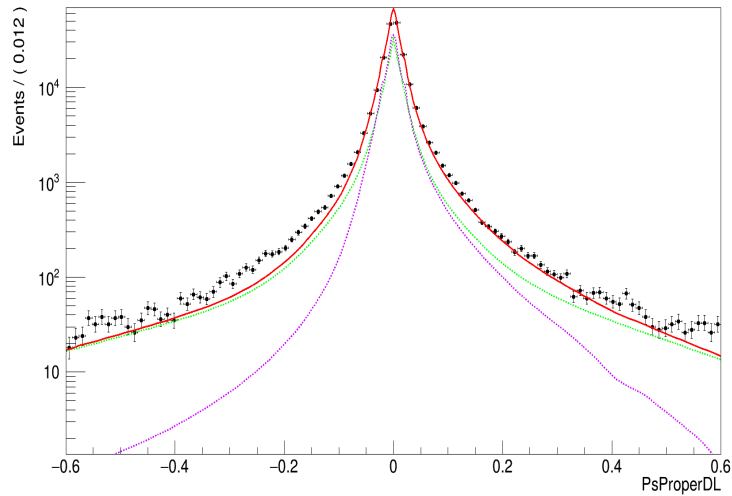
## Description of Fitting Lines :

Fit	
NonPrompt Jpsi (x)	
Bkg for X (x)	
Jpsi-Signal (m)	
Jpsi-Bkg (m)	

A RooPlot of "Mass"

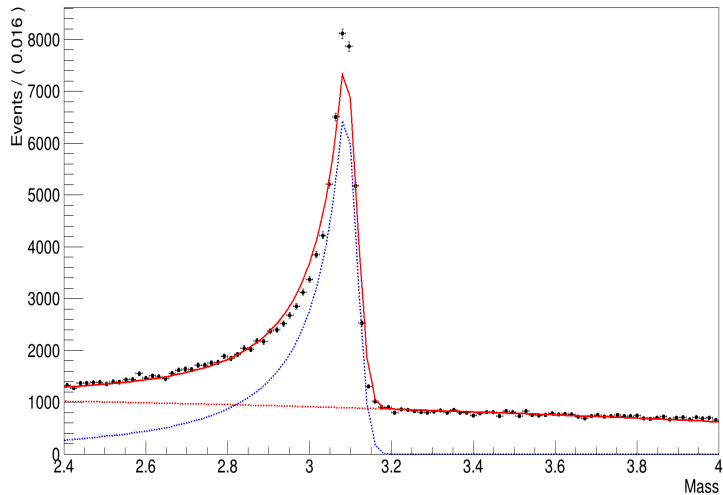


A RooPlot of "PsProperDL"

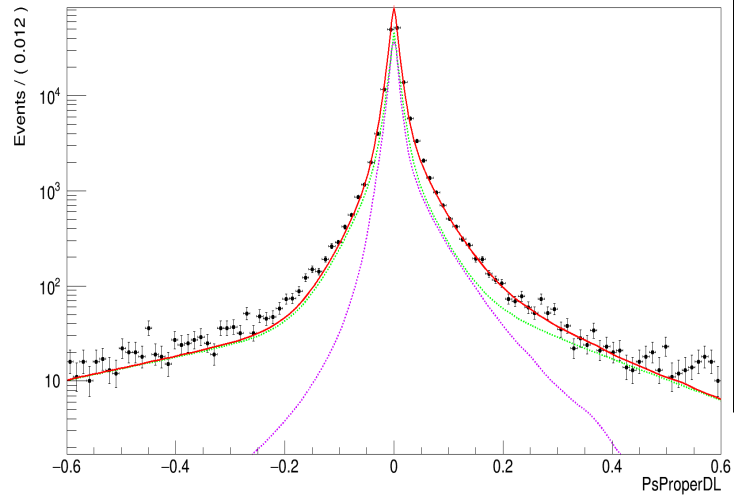


- $1 < Pt < 2 \text{ GeV}/c$
- $F_b = 0.24$
- $F_b (\text{true}) = 0.25$
- $M_{\chi^2/Ndf} = 21$
- $X_{\chi^2/Ndf} = 15$

A RooPlot of "Mass"

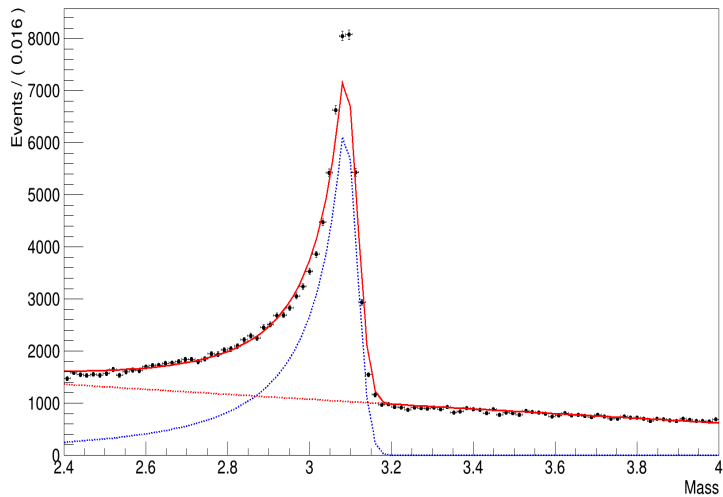


A RooPlot of "PsProperDL"

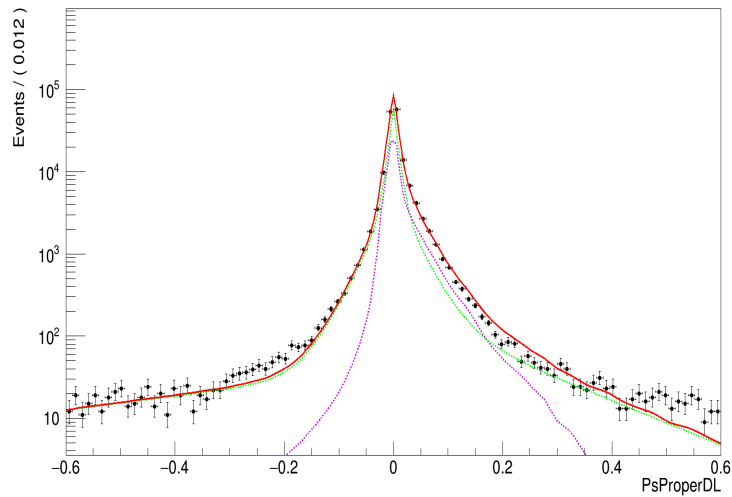


- $2 < Pt < 3 \text{ GeV}/c$
- $F_b = 0.23$
- $F_b (\text{true}) = 0.3$
- $M_{\chi^2/Ndf} = 9$
- $X_{\chi^2/Ndf} = 10$

A RooPlot of "Mass"

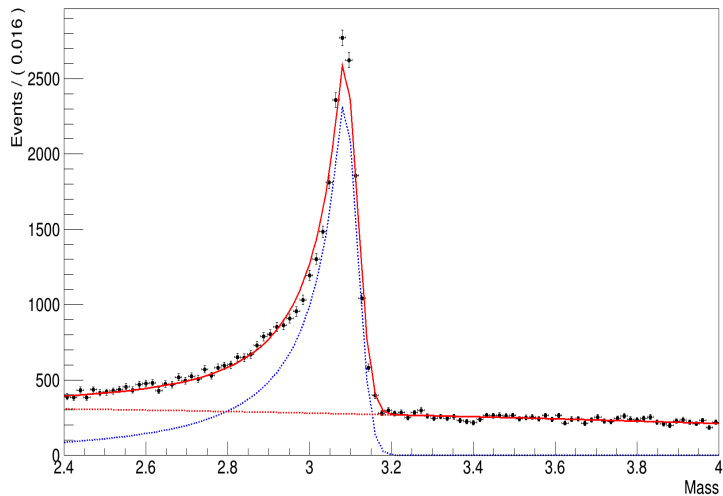


A RooPlot of "PsProperDL"

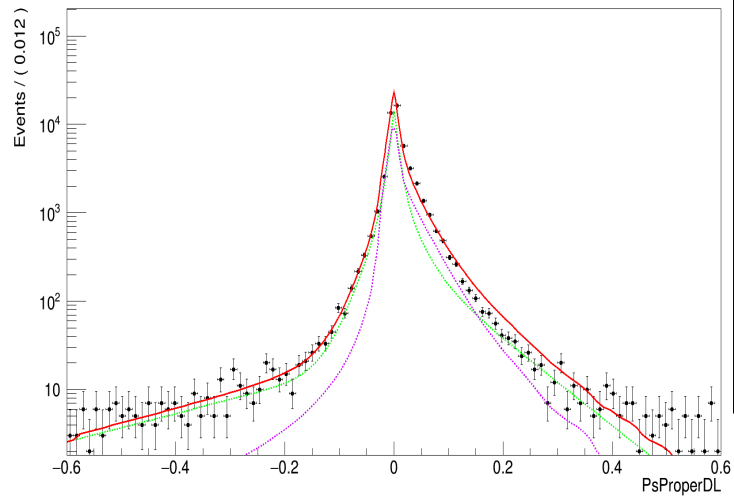


- $3 < Pt < 5 \text{ GeV}/c$
- $F_b = 0.49$
- $F_b (\text{true}) = 0.41$
- $M_{\chi^2/\text{Ndf}} = 8$
- $X_{\chi^2/\text{Ndf}} = 34$

A RooPlot of "Mass"

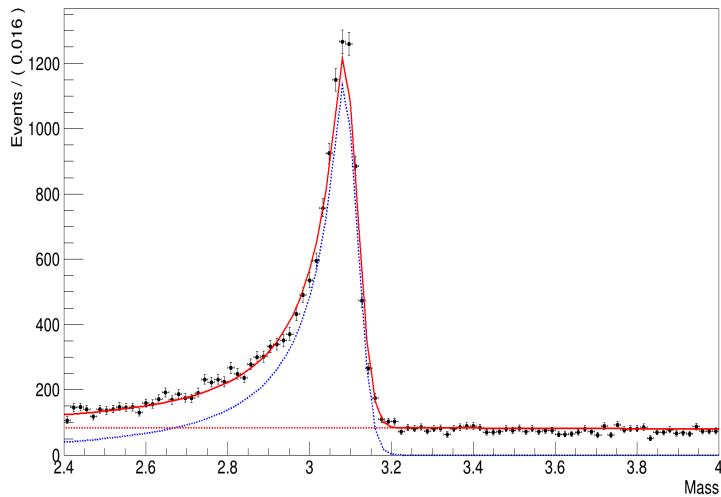


A RooPlot of "PsProperDL"

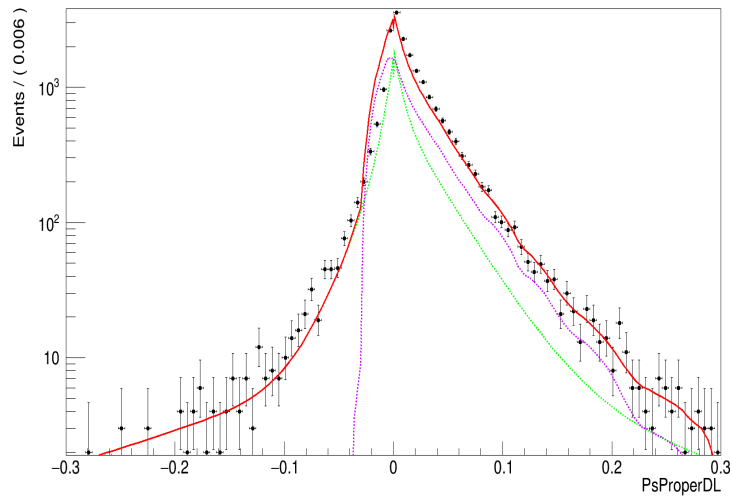


- $5 < Pt < 7 \text{ GeV}/c$
- $F_b = 0.68$
- $F_b (\text{true}) = 0.64$
- $M_{\chi^2/\text{Ndf}} = 2$
- $X_{\chi^2/\text{Ndf}} = 25$

A RooPlot of "Mass"

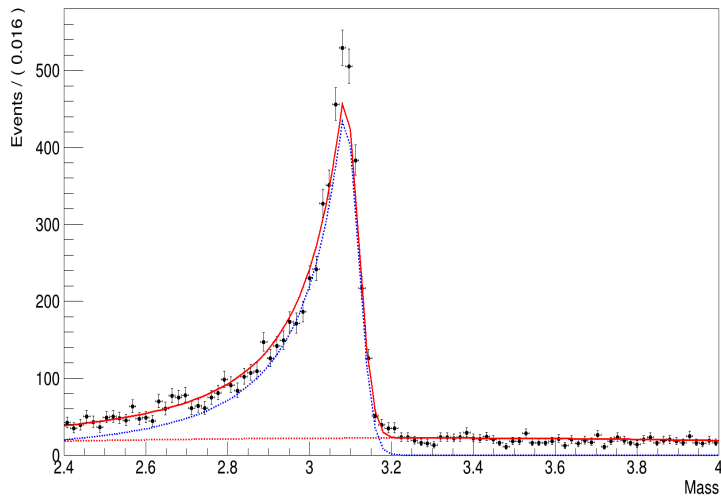


A RooPlot of "PsProperDL"

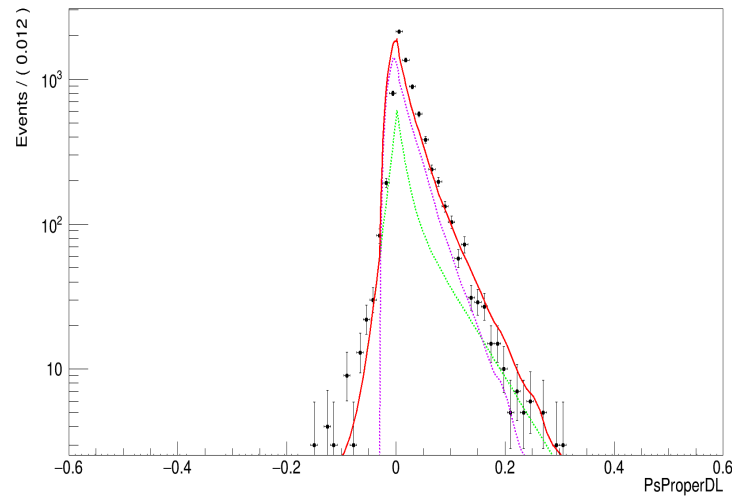


- $7 < Pt < 10 \text{ GeV}/c$
- $F_b = 0.94$
- $F_b (\text{true}) = 0.86$
- $M_{\chi^2/Ndf} = 2$
- $X_{\chi^2/Ndf} = 31$

A RooPlot of "Mass"



A RooPlot of "PsProperDL"



- $10 < Pt < 15 \text{ GeV}/c$
- $F_b = --$
- $F_b (\text{true}) = 0.97$
- $M_{\chi^2/Ndf} = 1.5$
- $X_{\chi^2/Ndf} = 56$

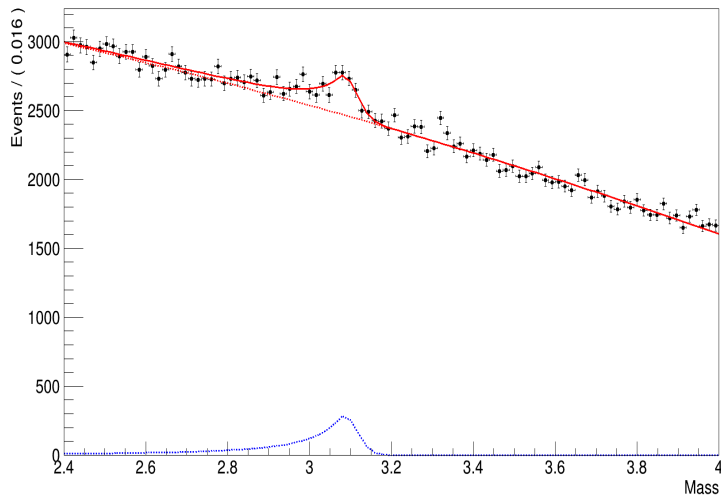
## In some different pT bins

Pt (GeV/c)	Fb from Fit	Fb MC truth
5-10	0.75	0.70
5-15	0.78	0.72
0-15	0.26	0.34

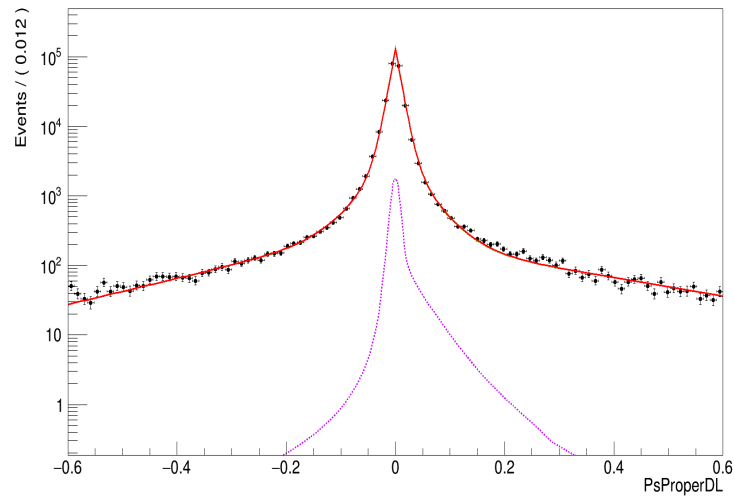




A RooPlot of "Mass"

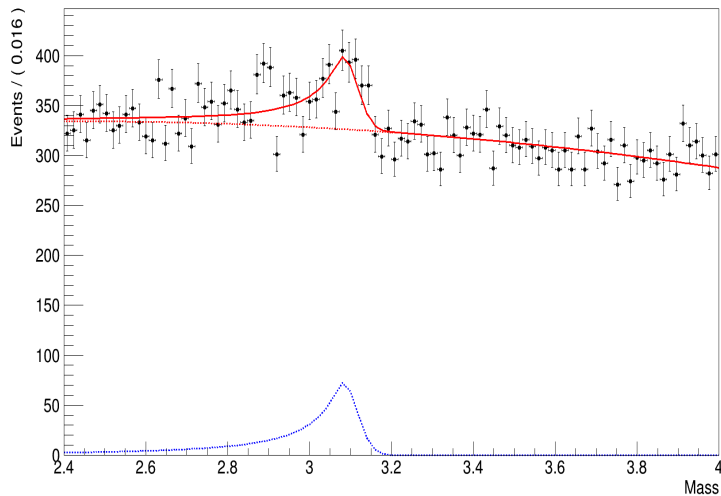


A RooPlot of "PsProperDL"

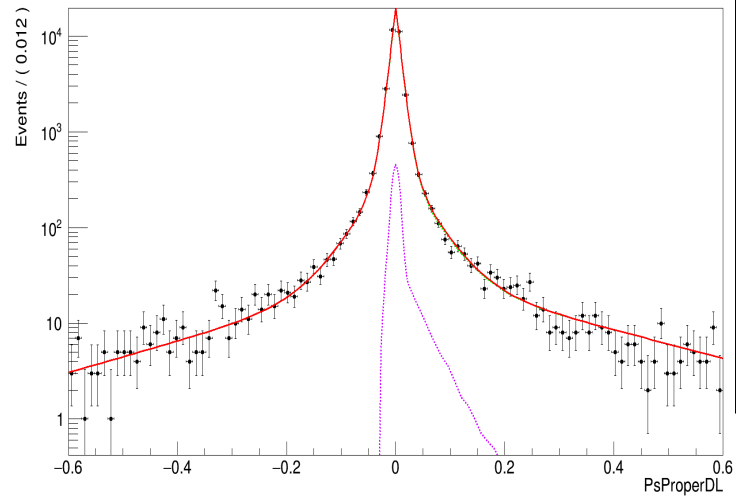


- $5 < Pt < 7 \text{ GeV}/c$
- $F_b = 0.24 \pm 0.002$
- $F_{\text{sig}} = 0.013 \pm 0.001$
- $M_{\chi^2/\text{Ndf}} = 1.2$
- $X_{\chi^2/\text{Ndf}} = 14$

A RooPlot of "Mass"

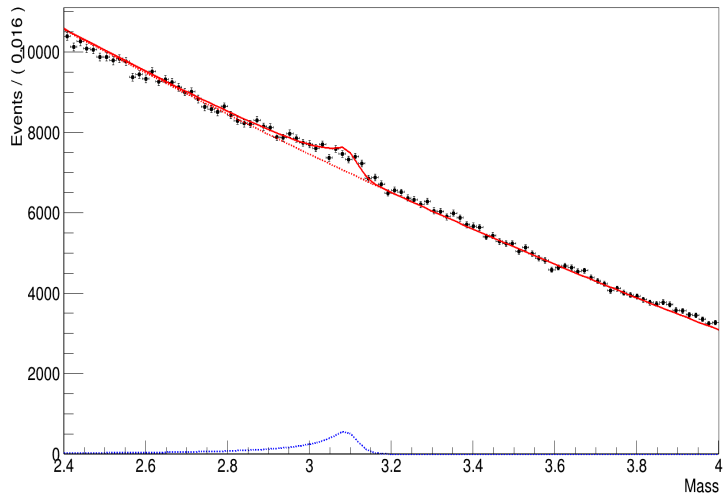


A RooPlot of "PsProperDL"

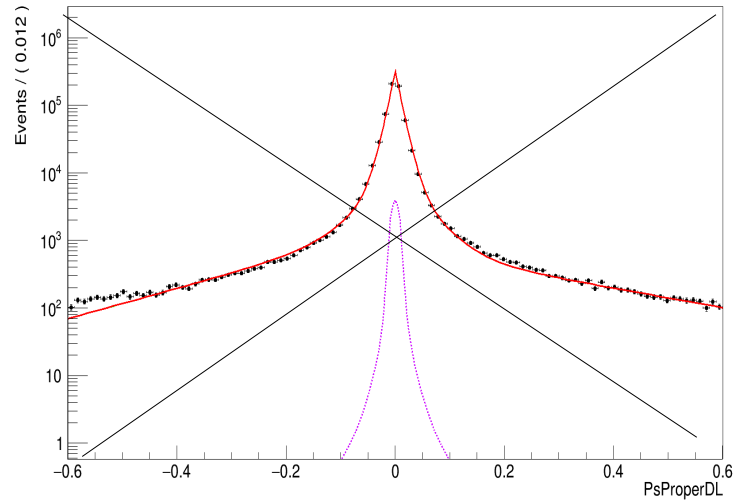


- $7 < Pt < 10 \text{ GeV}/c$
- $F_b = 0.31 \pm 0.08$
- $F_{\text{sig}} = 0.023 \pm 0.003$
- $M_{\chi^2/\text{Ndf}} = 1.1$
- $X_{\chi^2/\text{Ndf}} = 1.8$

A RooPlot of "Mass"



A RooPlot of "PsProperDL"



- **4 < Pt < 5 GeV/c**
- **Fb = -- ± --**
- **Fsig = 0.009 ± 0.0005**
- **M<sub>χ<sup>2</sup>/Ndf</sub> = --**
- **X<sub>χ<sup>2</sup>/Ndf</sub> = --**

This is to be improved..

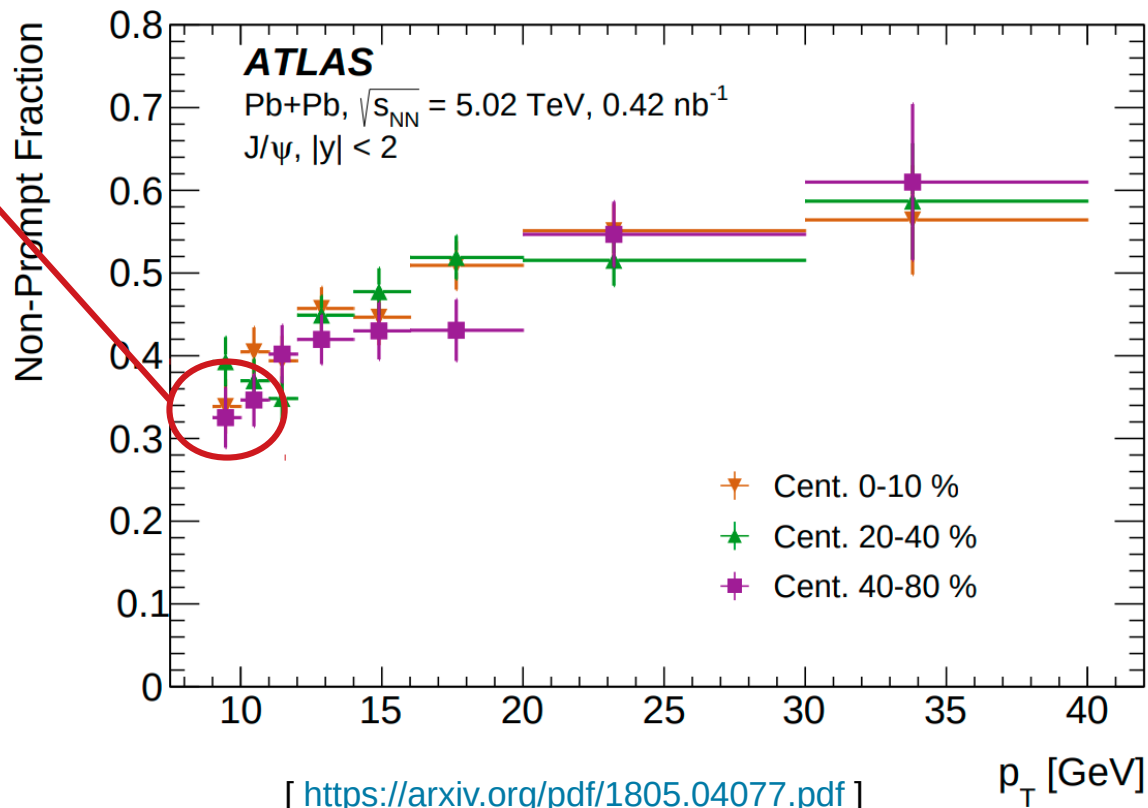


- $F_b \sim 0.34 : p_T \sim 9-10 \text{ GeV}/c$

- $F_b \sim 0.31 : p_T = 7-10 \text{ GeV}/c$

In our case

**Note** : Central barrel region but  $\eta$  ranges are different.



# Rough Comparison: (5-7 GeV/c + 7-10 GeV/c)

