[HIN-14-009]
- Z vertex weighting & cut
- binning check

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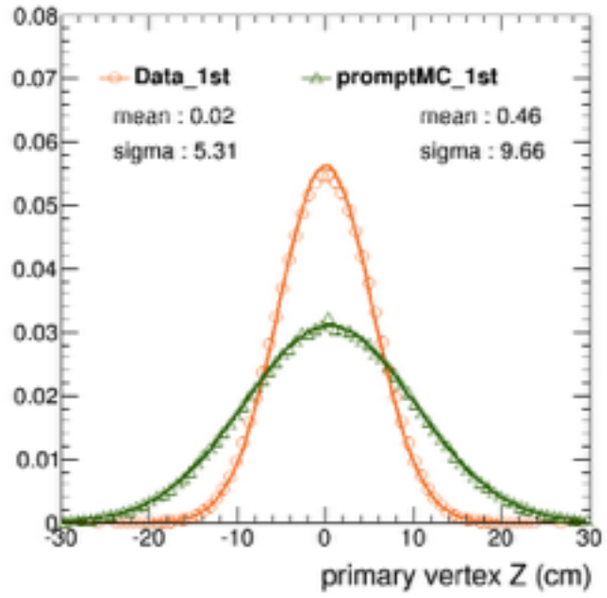
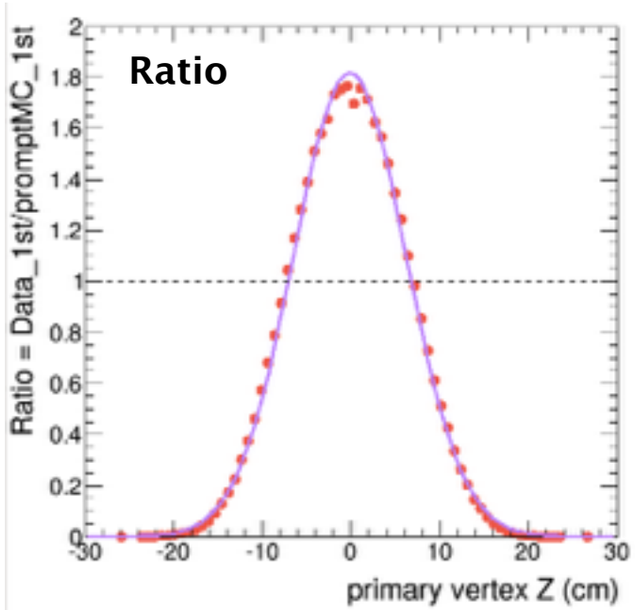
z vertex weight & cut

primary z vertex

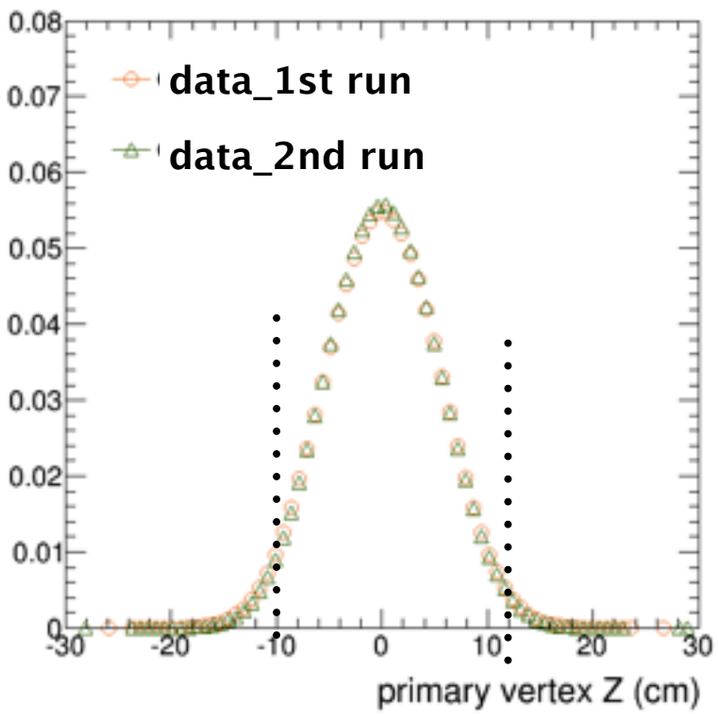
1) z vertex weight

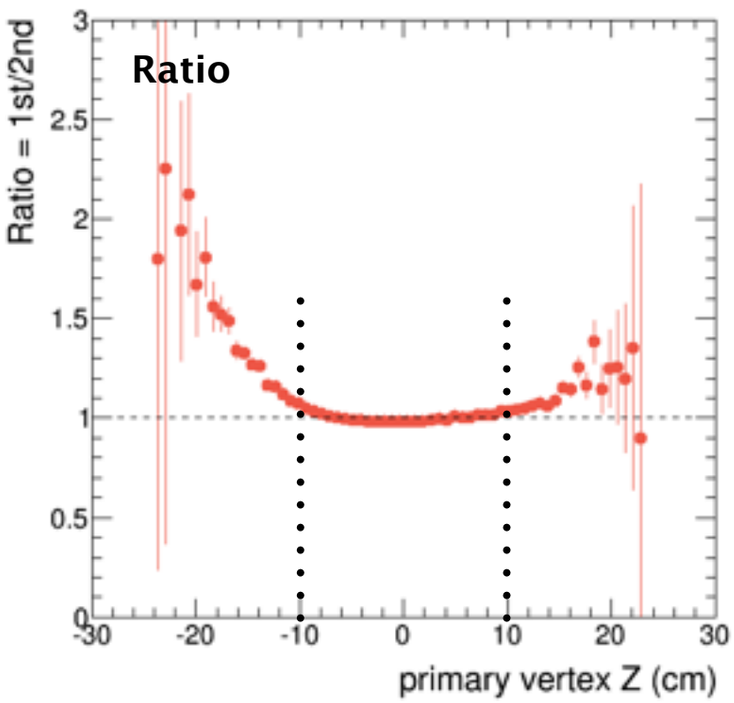




- Reweight MC using ratio function

2) z vertex cut





- Cut in |Zvtx| < 10 cm
  - exclude poor quality events
  - select where distributions match

z vertex weight + cut

- **Yields after cut |zVtx| < 10 cm**
  - In both Data and weighted MC, ~6% of events are exclude by z vertex cut

[Data]

1st run period (Pbp_v1) :
170314 -> 160505 (0.942 passed)

1st 7 run (Pbp_v2) :
59668 -> 55648 (0.933 passed)

2nd run period (pPb) :
154431 -> 146417 (0.948 passed)

[Z vertex weighted MC]

PromptMC_Pbp :
90776.5->85607.9 (0.943 passed)

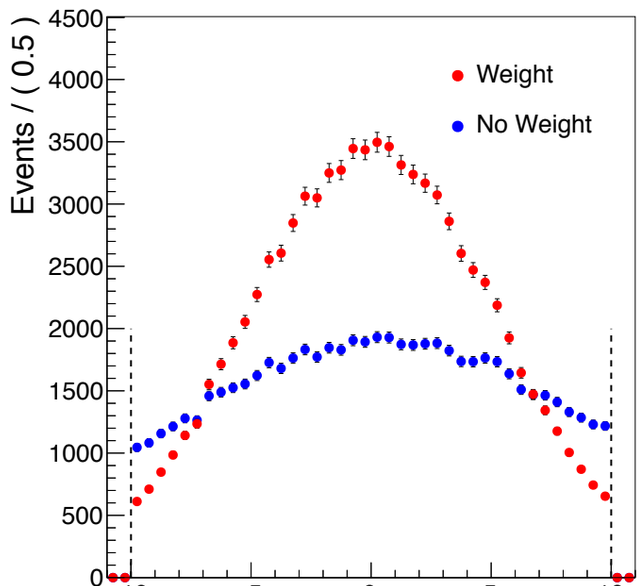
PromptMC_pPb :
79905.4 ->75308 (0.942 passed)

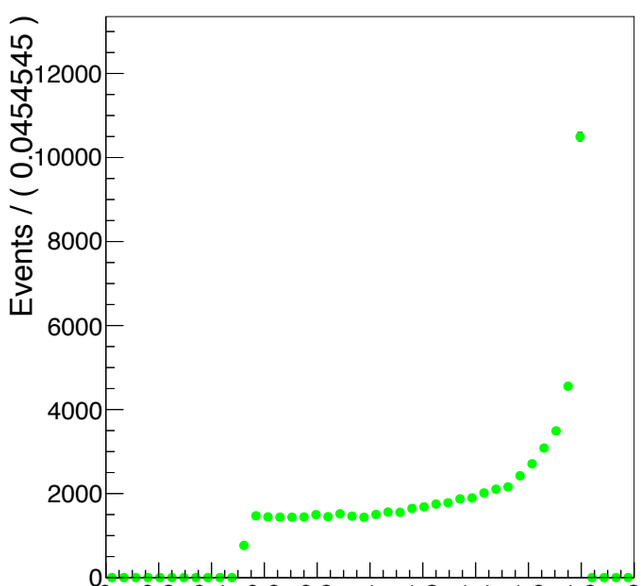
NonPromptMC_Pbp :
108263 -> 102118 (0.943 passed)

NonPromptMC_pPb :
108548->102377 (0.943 passed)

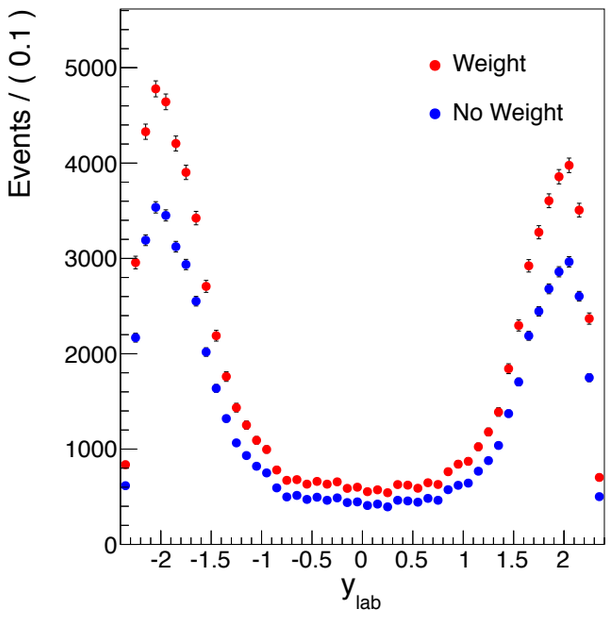
dimuon distributions

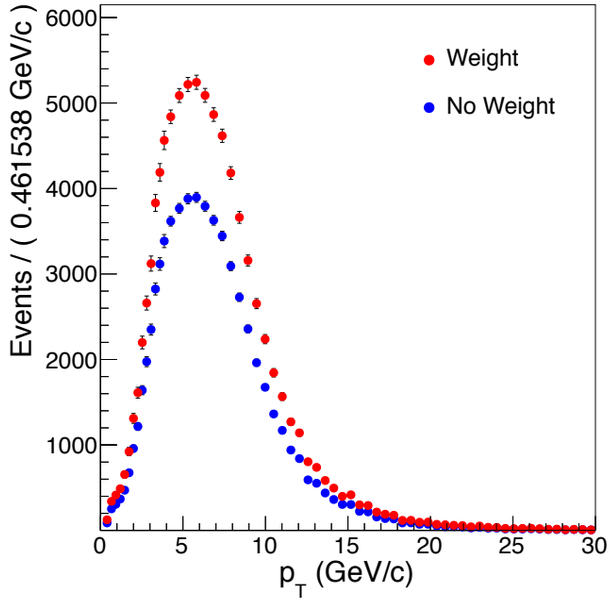
- **e.g. Prompt MC 1st run**

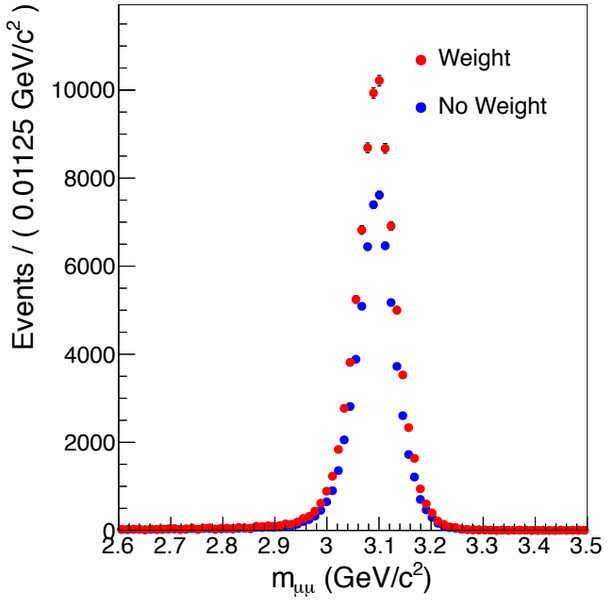




- **Other dimuon variables**





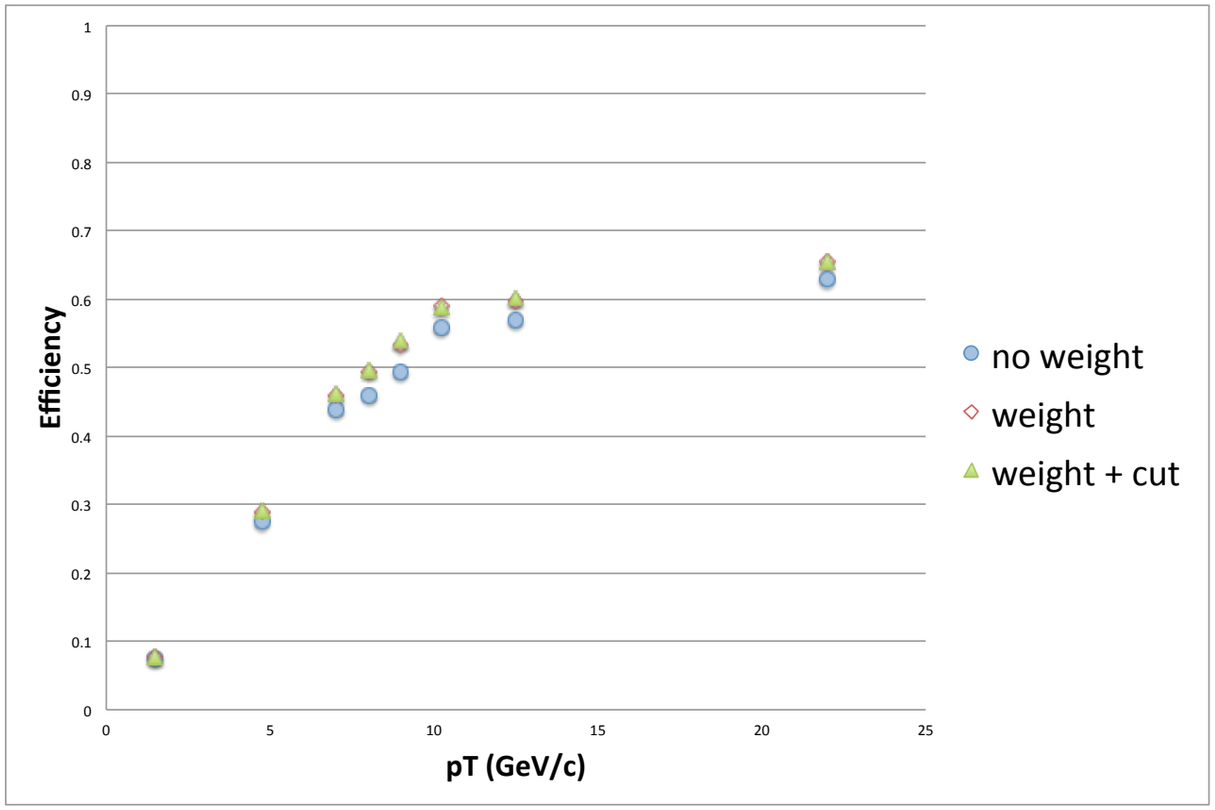


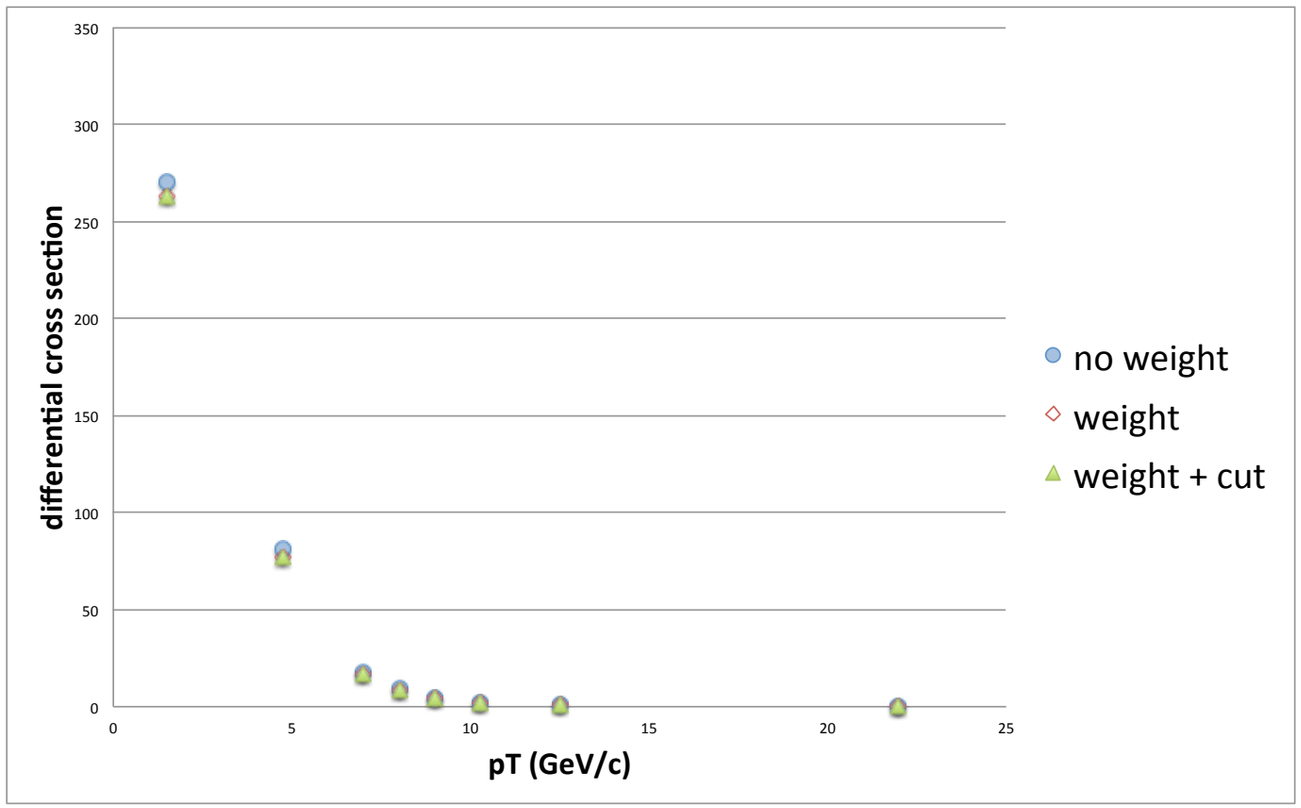
- To-do : check the ratio

results

- **e.g. Prompt J/psi, 1st run period, $1.5 < y_{CM} < 1.93$**

* uncertainties NOT drawn
* scale factors NOT applied





- zVtx Weight : Efficiency values become higher & cross-sections smaller. (Good news?!)
- zVtx Cut : Cross-section becomes smaller, but the effect is relatively small.

-> Apply to other study too! (muon ID, TNP, etc.)

fitting and binning check

binning check

- **Binning for Cross-sections**

$$y_{CM} = [-2.4, -1.5, -1, 0, 1, 1.5, 1.93]$$
$$p_{\mathrm{T}} = [6.5, 7.5, 8.5, 9.5, 11, 14, 30] GeV/c.$$

- **Binning for R_{FB}**

$$y_{CM} = [-1.93, -1.5, -1.2, -0.9, -0.5, 0, 0.5, 0.9, 1.2, 1.5, 1.93]$$
$$p_{\mathrm{T}} = [6.5, 10, 30] GeV/c.$$

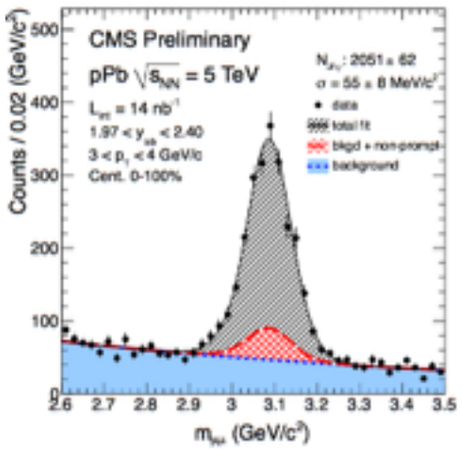
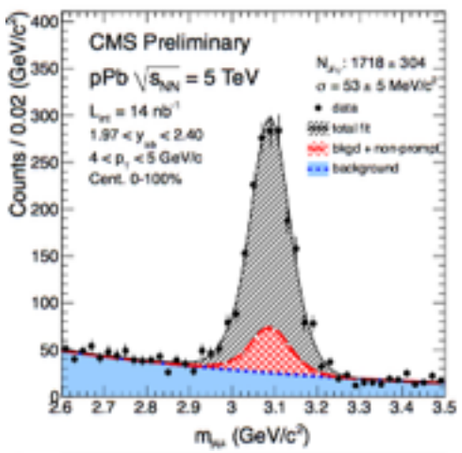
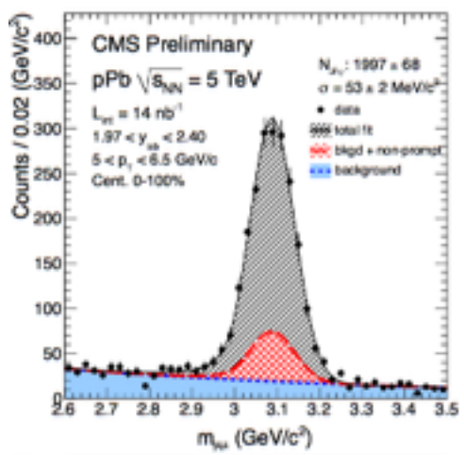
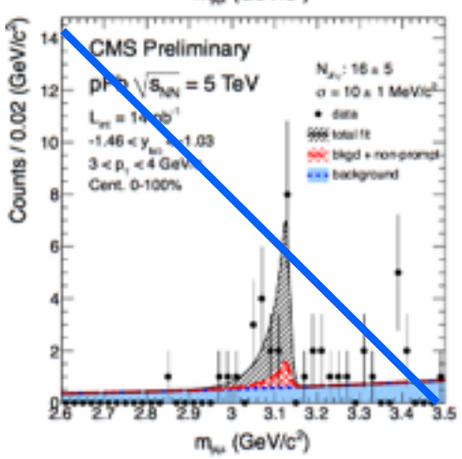
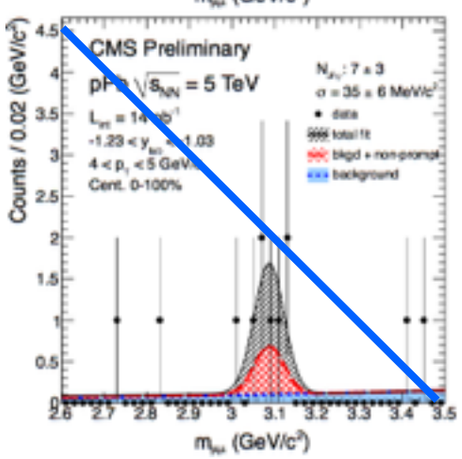
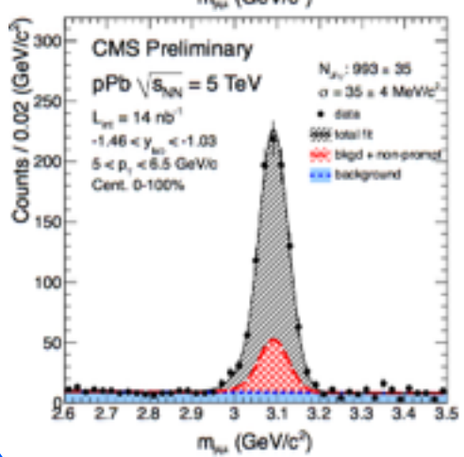
- **New Binning study**
  - Yields have been changed (new ID cut, Zvtx weight + cut, etc.)
  - Make the binning consistent for cross-sections and R_{FB}
  - First, start from fine binning!

y_{CM} = [-2.4, -1.93, -1.5, -1.2, -0.9, -0.5, 0, 0.5, 0.9, 1.2, 1.5, 1.93]
p_T = [5, 6.5, 7.5, 8.5, 9.5, 11, 14, 30] GeV/c

binning check

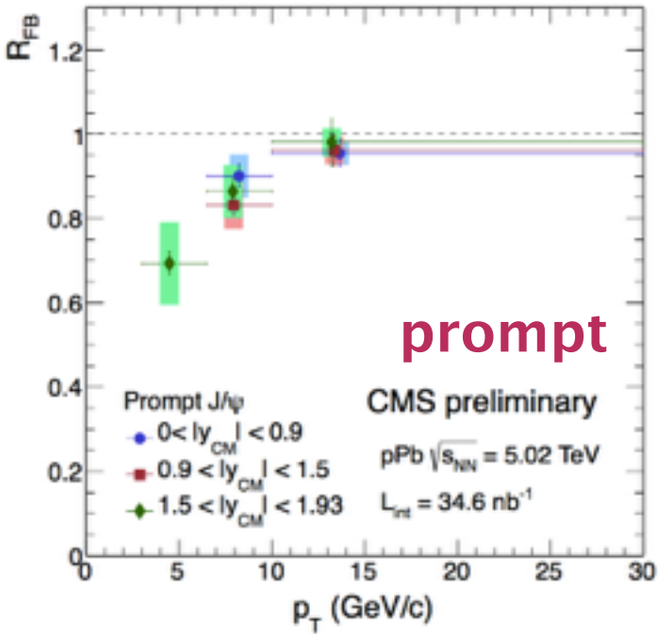
- **Finer bins for p_T < 6.5 GeV/c**

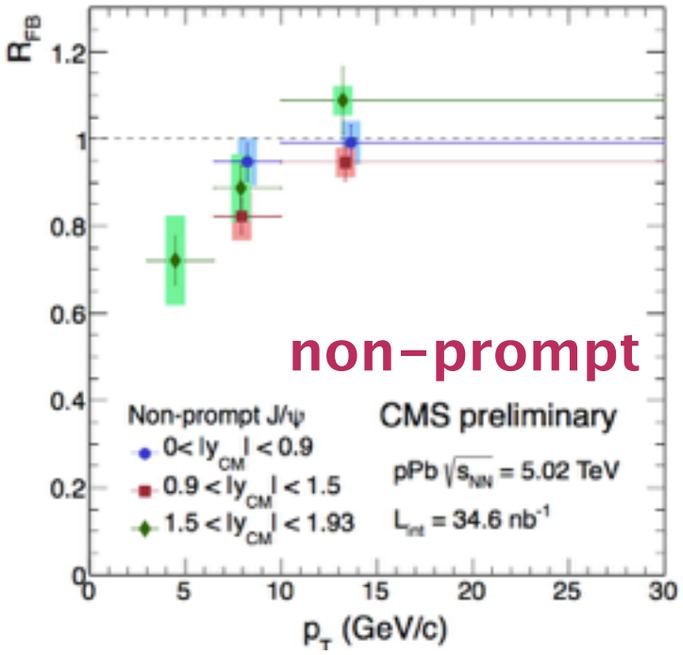
  1) p_T 3-6.5 GeV/c
  - change to 3, 4, 5, 6.5 GeV/c (for cross-section measurement)
  - For 3-5 GeV, almost no signal at backward regions (for R_{FB} measurement)
  - we would change the binning from **3-6.5 GeV/c** to **5-6.5 GeV/c**

	3-4 GeV/c	4-5 GeV/c	5-6.5 GeV/c
Forward			
Backward			

R_{FB} vs p_T

Previous results

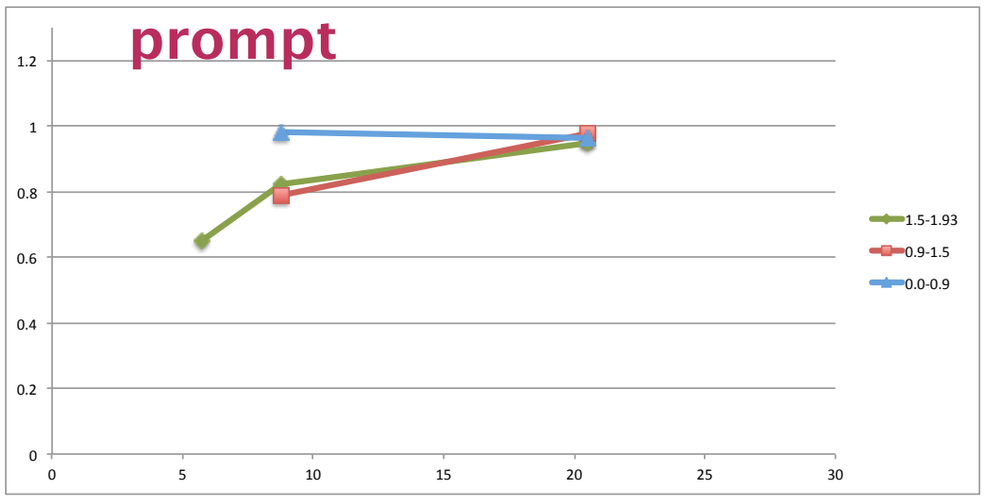


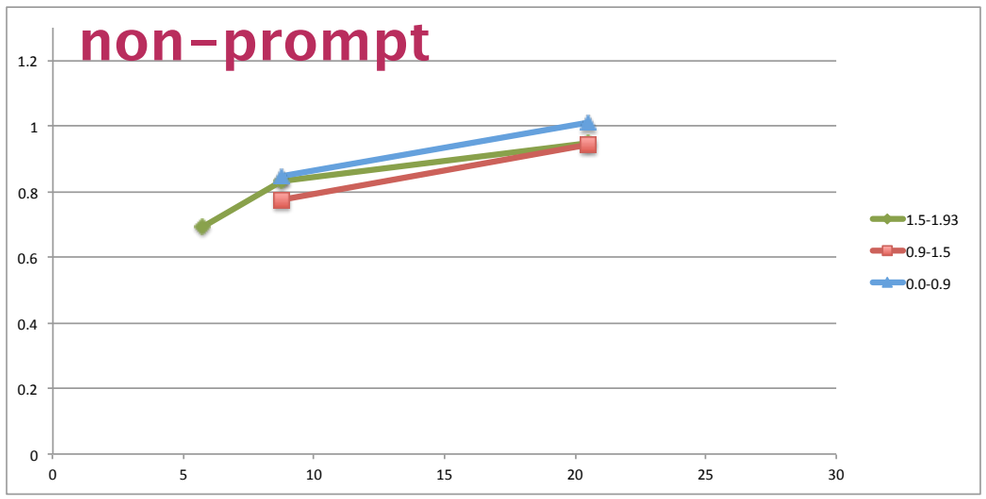


- **R_{FB} at 3- 6.5 GeV**
  prompt : 0.69
  non-prompt : 0.72

- correct MC sample
- new soft muID
- z vertex weight & cut applied
- new binning (still ongoing)
- uncertainties are not drawn
- Data points at bin center

New results

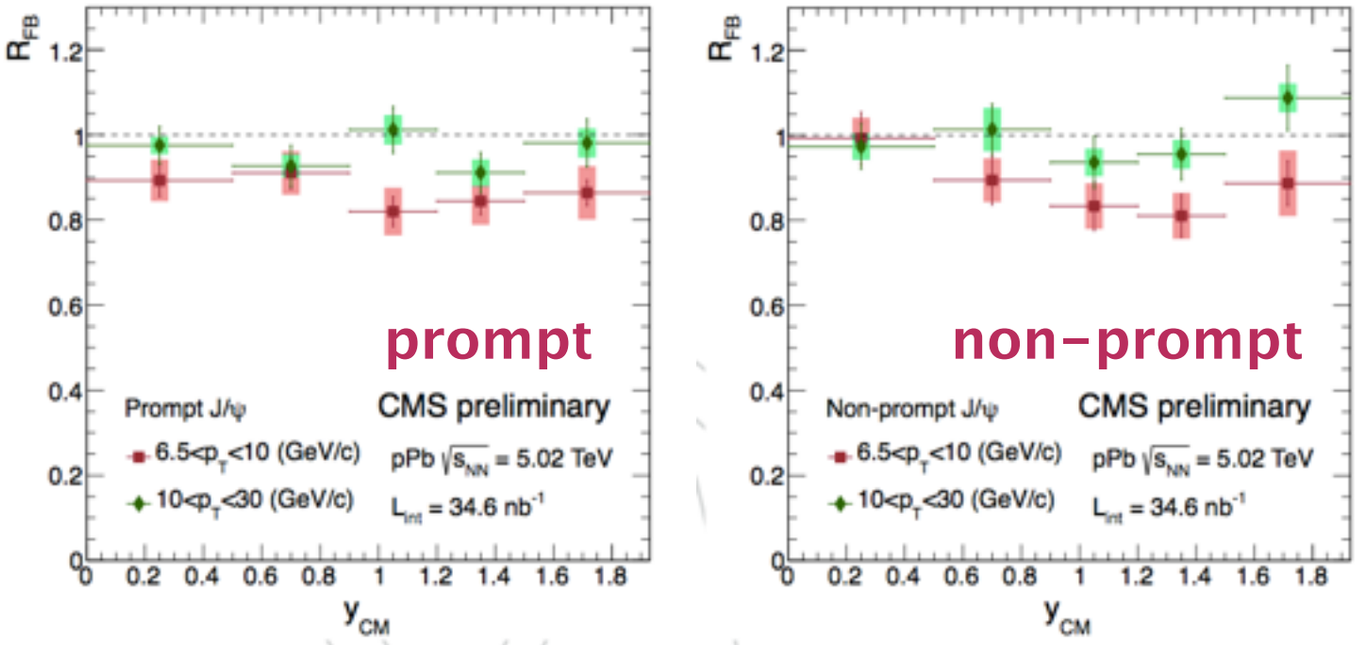




- **R_{FB} at 5- 6.5 GeV**
  prompt : 0.65
  non-prompt : 0.69

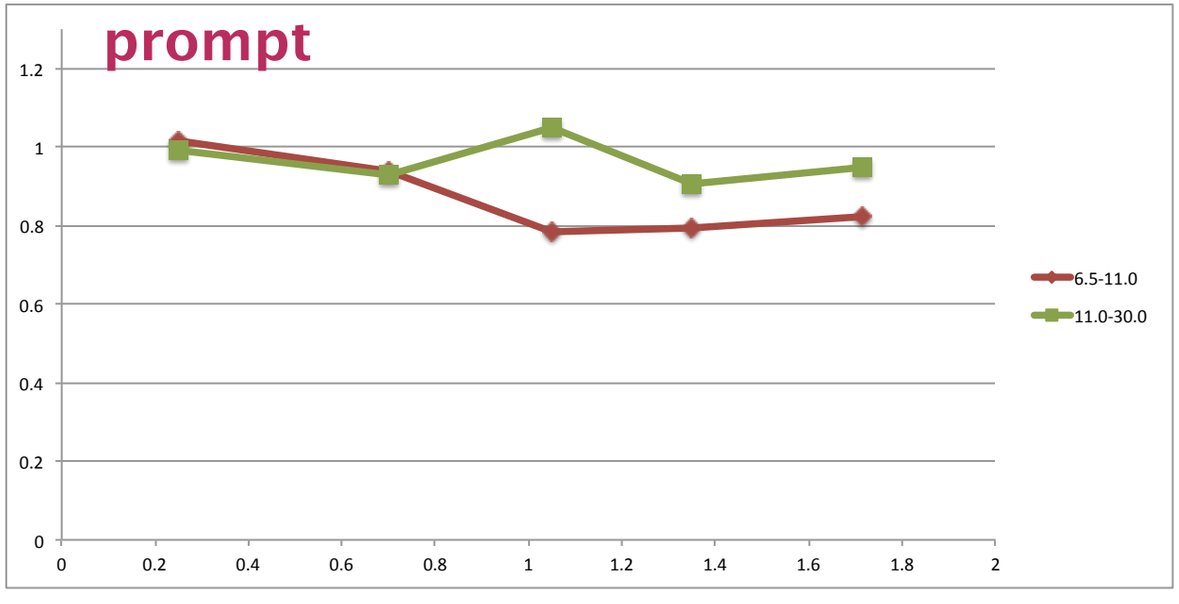
R_{FB} vs rapidity

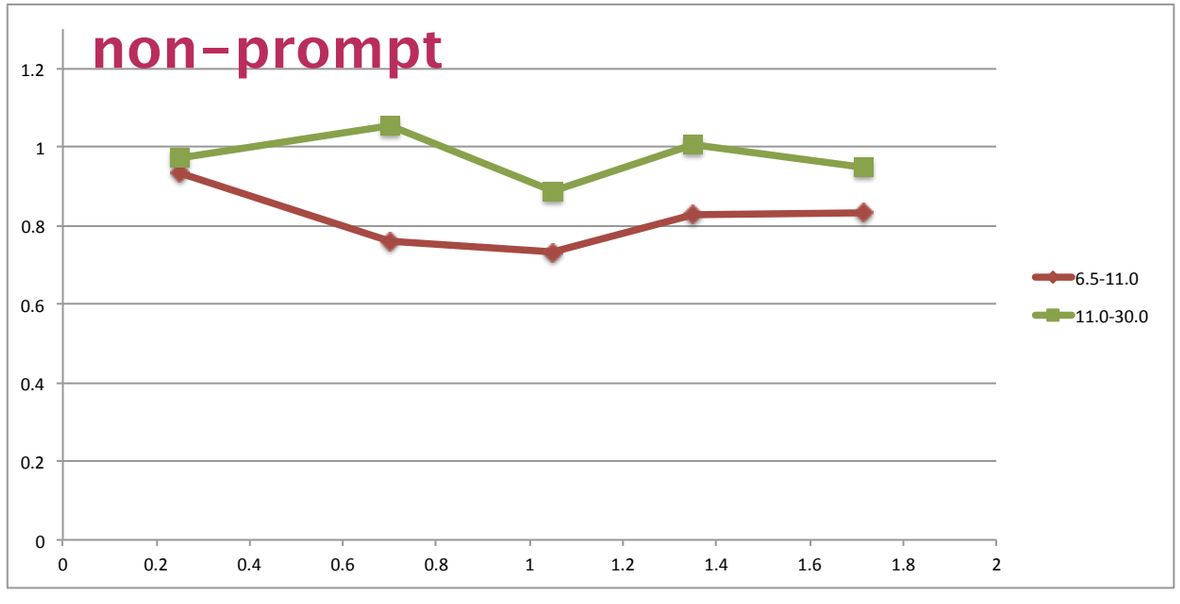
- **Previous results**



- **New results**

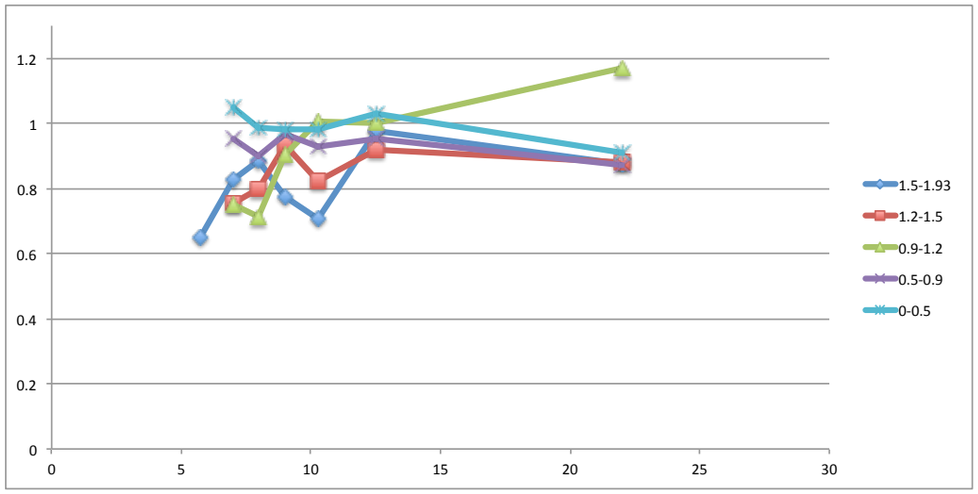
- correct MC sample
- new soft muID
- z vertex weight & cut applied
- new binning (still ongoing)
- uncertainties are not drawn

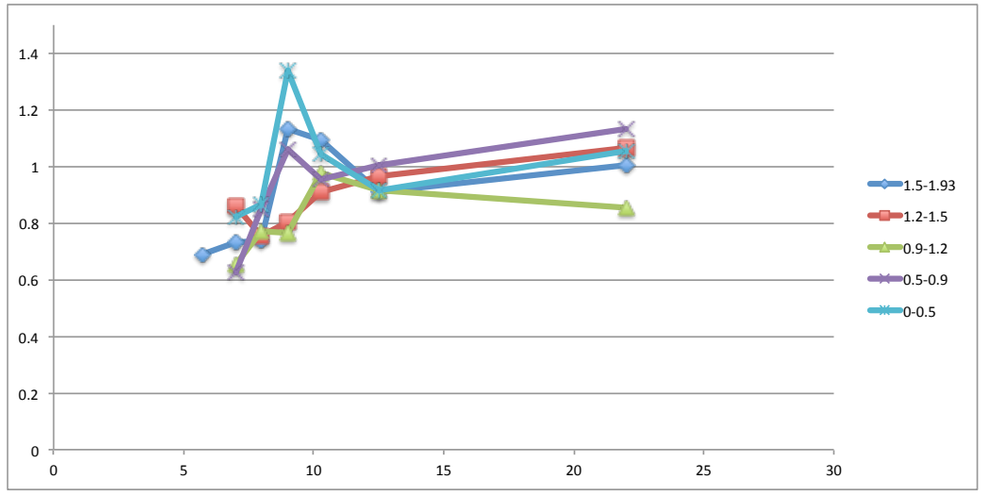




Status and summary

- **Current binning is too finer**
  - check the same binning with previous results
  - Re-binning to make reliable statistics for each bin

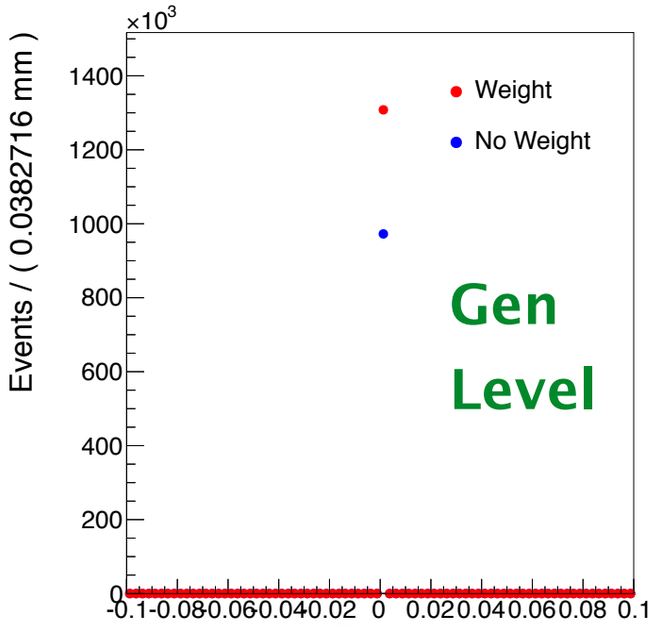


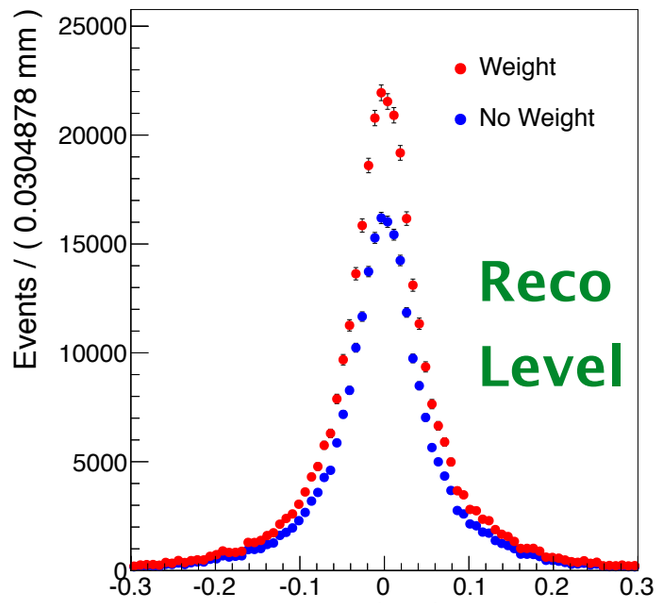


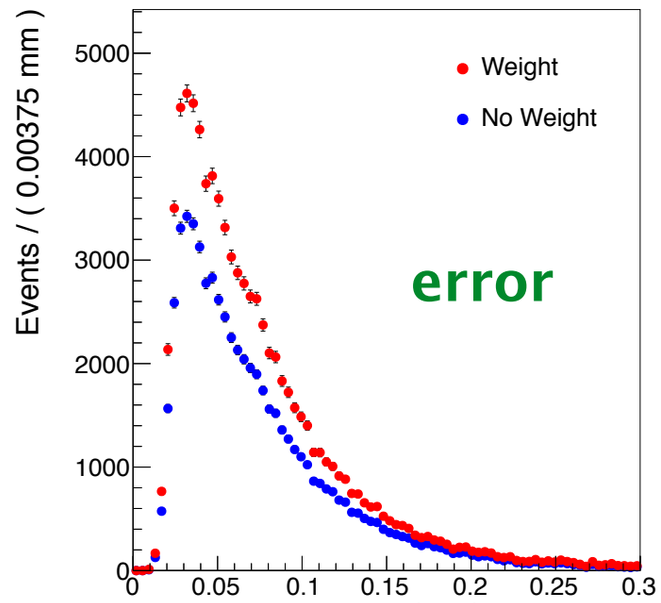
Back up

Effect of weighting

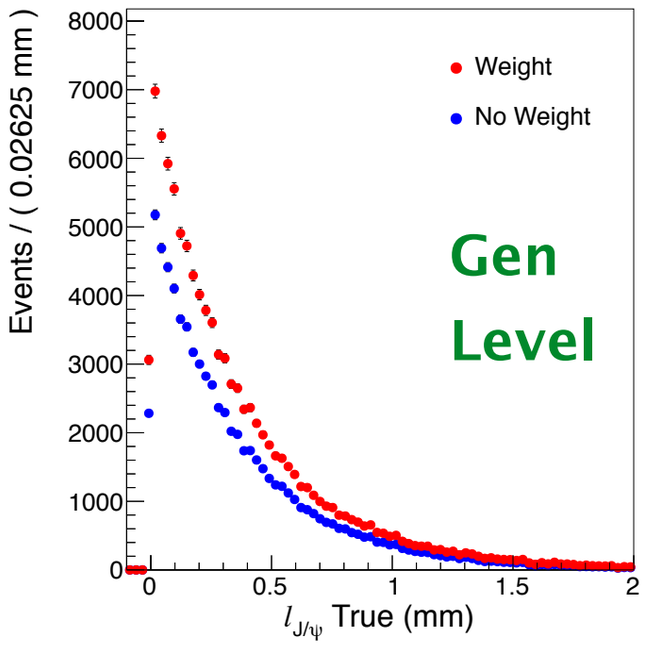
- **Prompt MC 1st run**

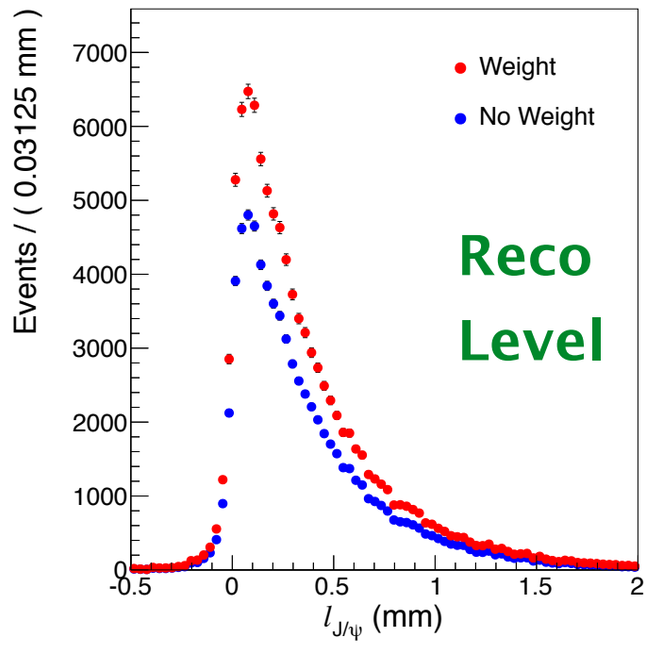


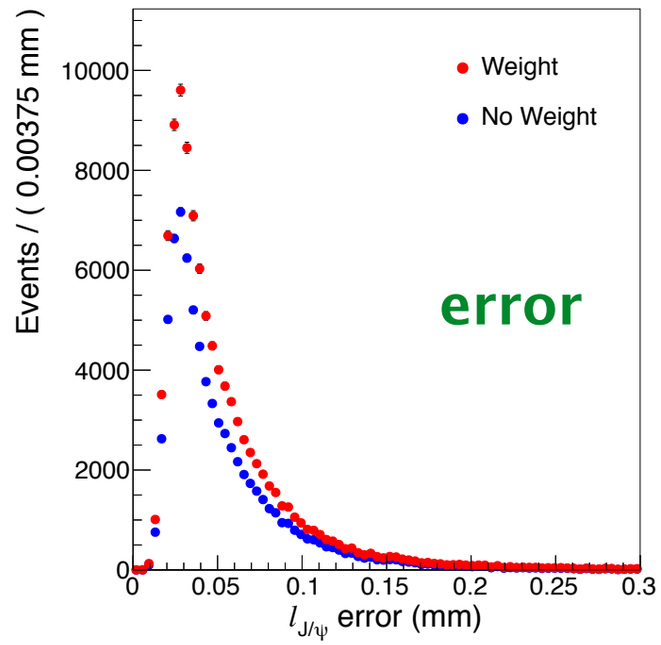




- **Non-prompt MC 1st run**



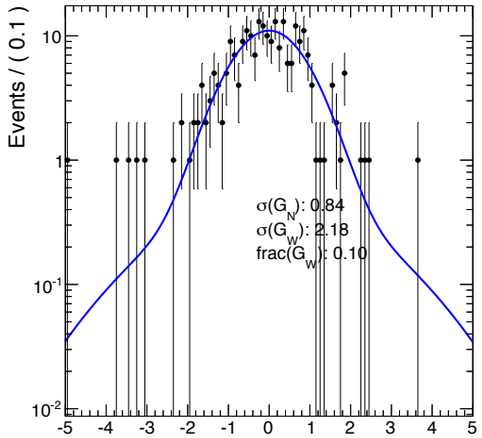


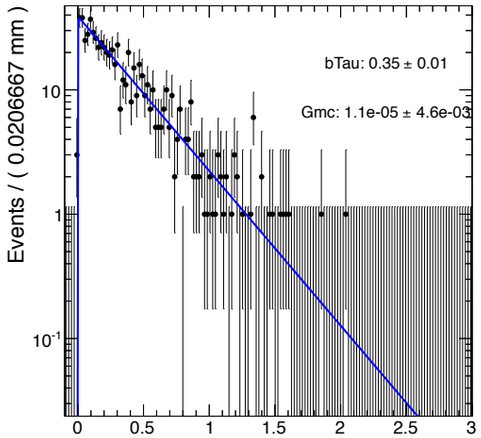


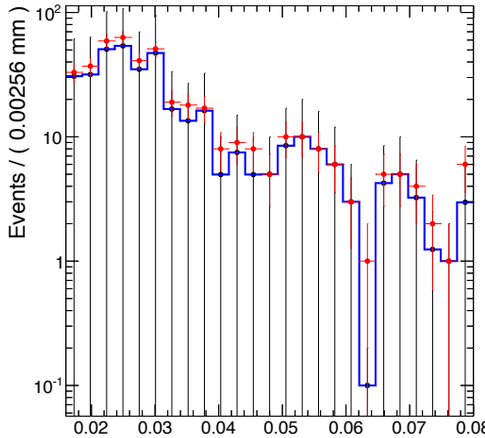
Effect of weighting

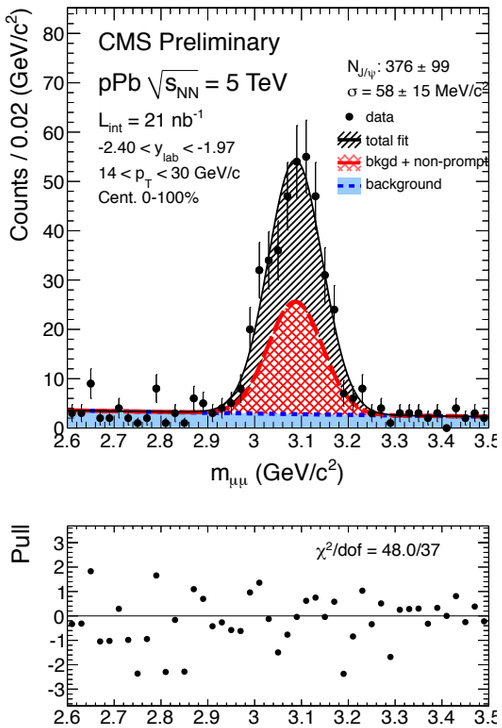
Before weight & cut

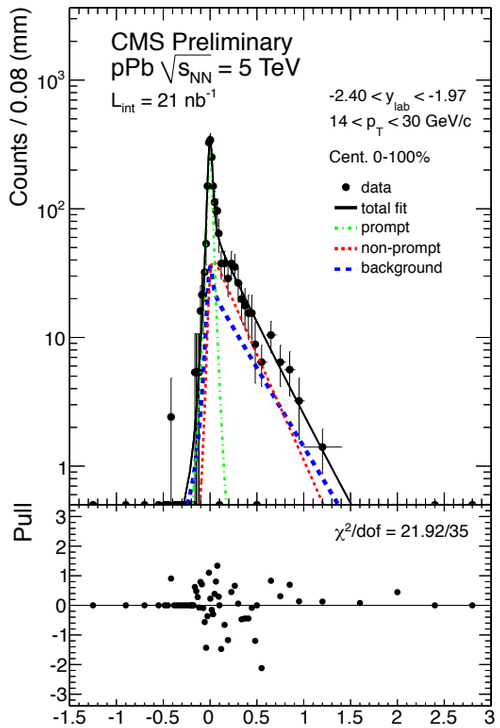
- RawYield : 376
- B-frac : 0.44





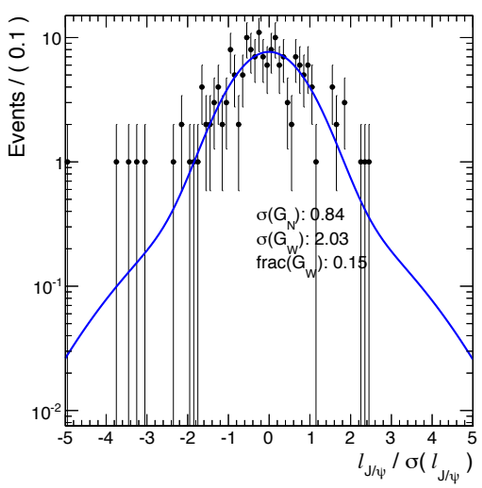


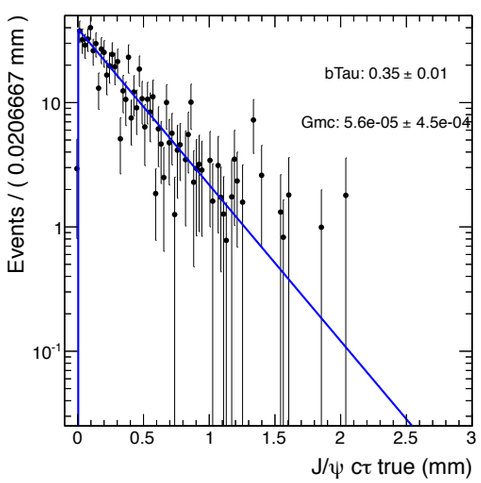


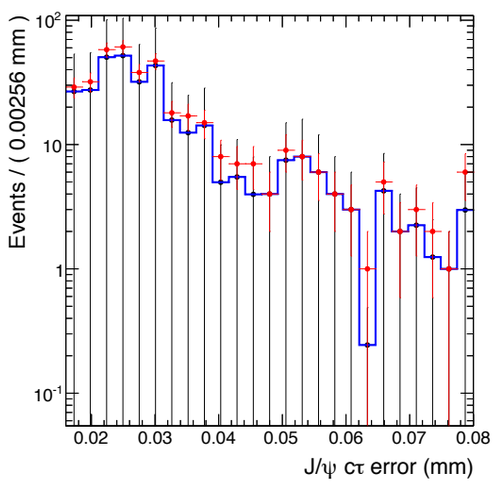


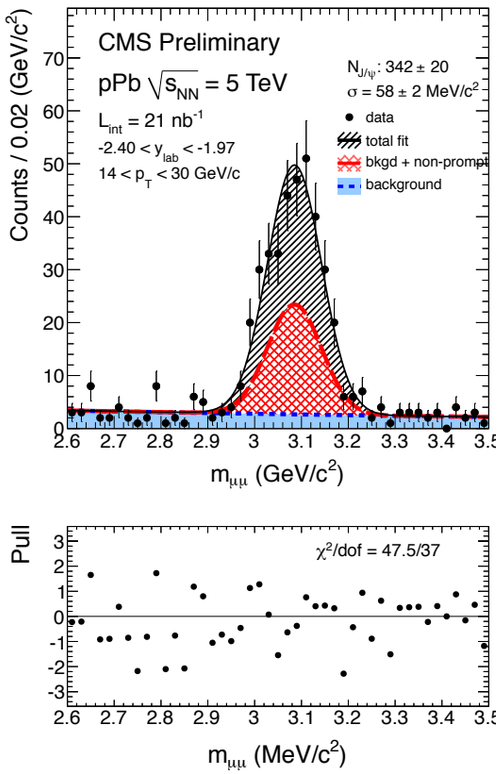
After weight & cut

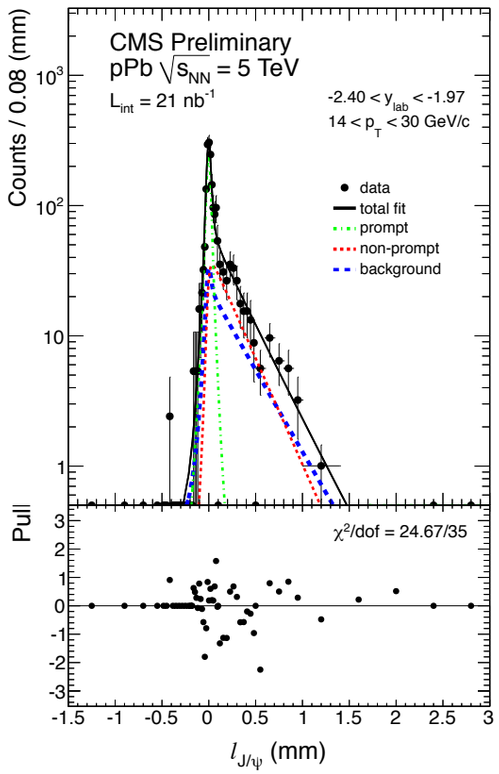
- RawYield : 342
- B-frac : 0.44









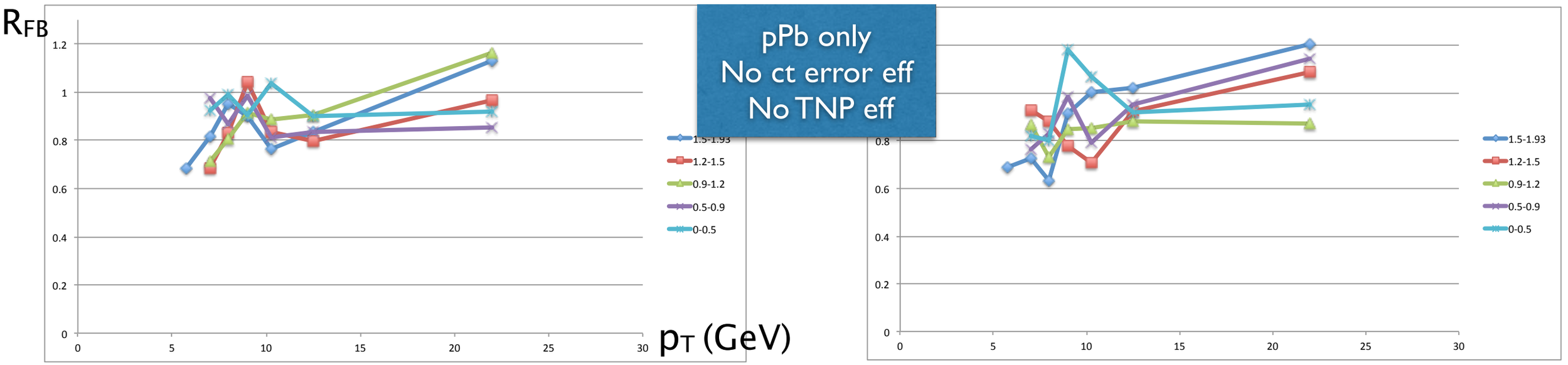


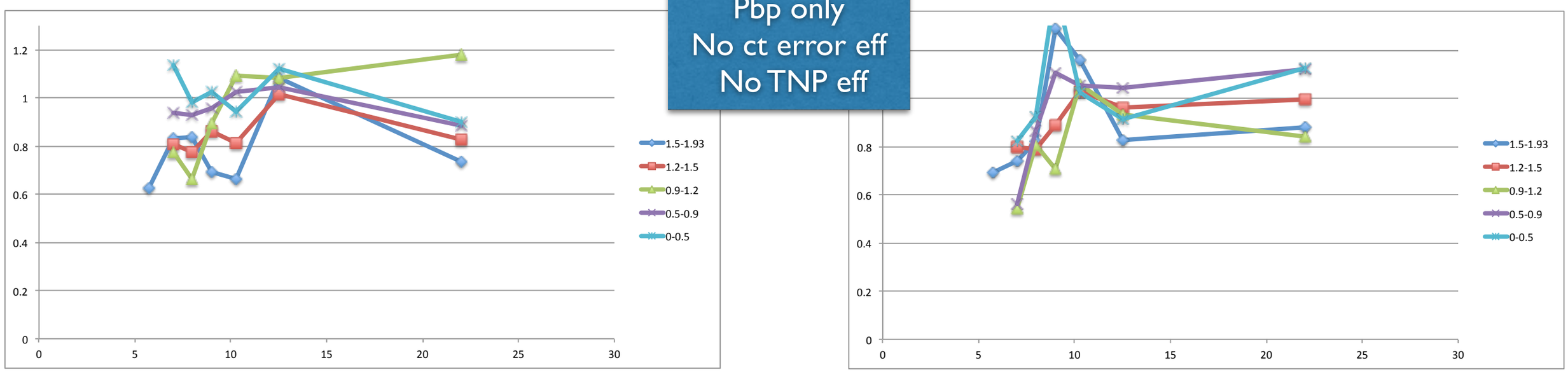
binning check

Prompt

non-prompt

1. same with cross-sections [5, 6.5, 7.5, 8.5, 9.5, 11, 14, 30] GeV



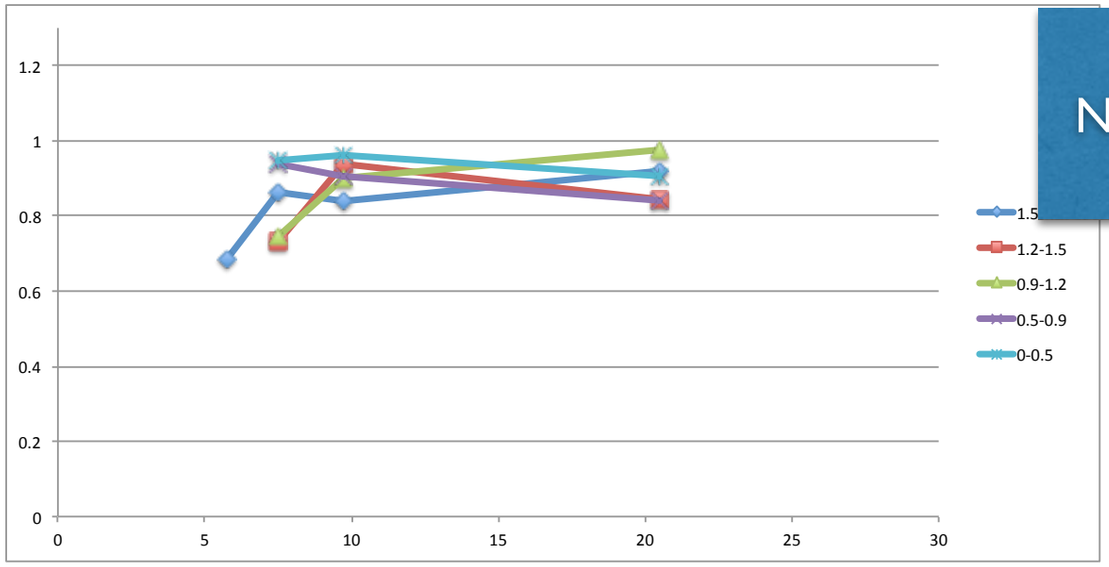


binning check

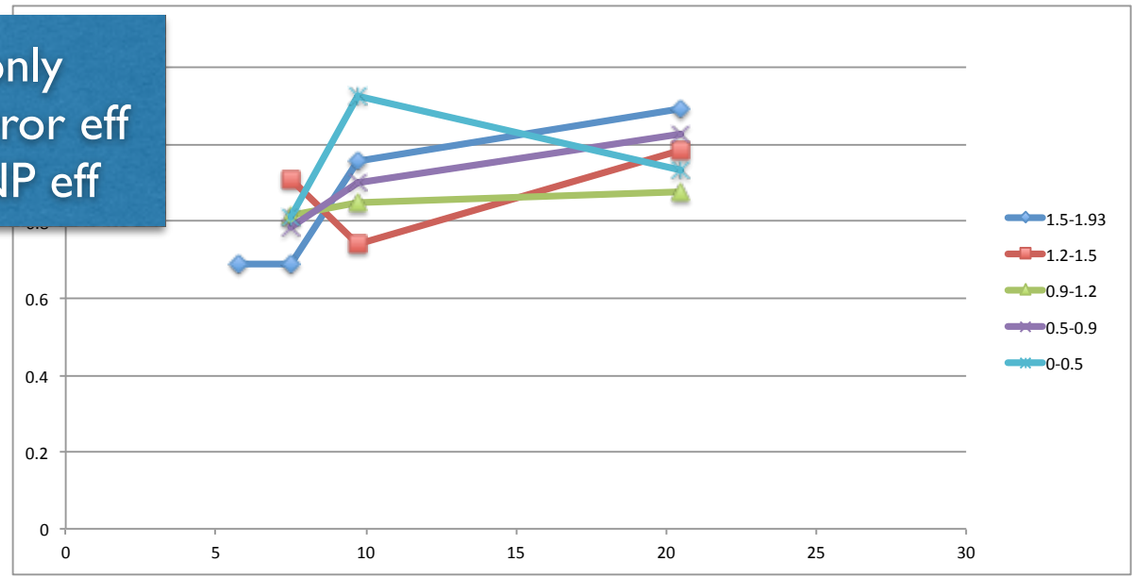
Prompt

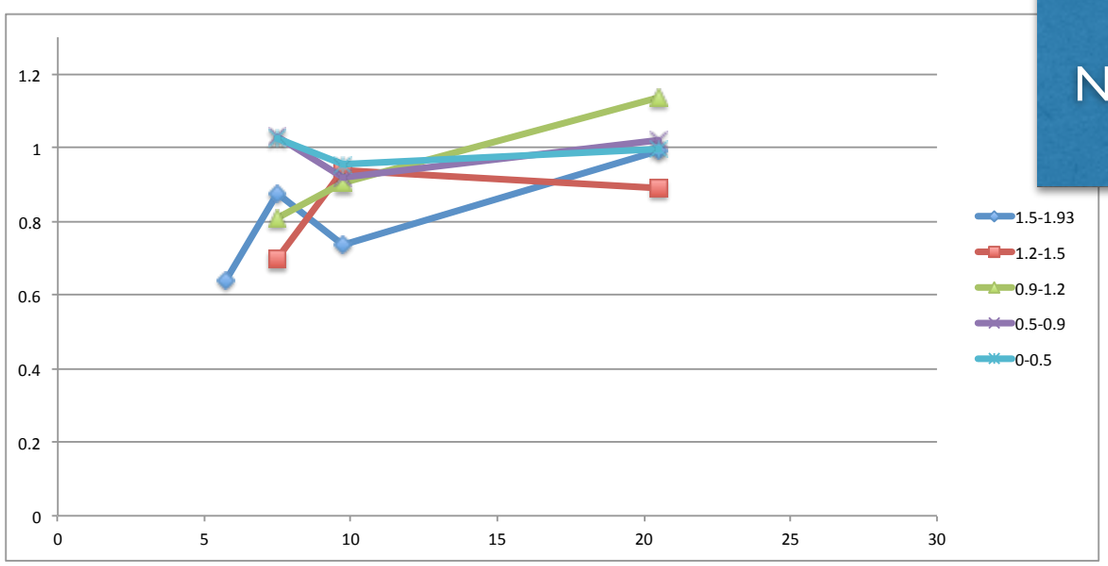
non-prompt

2. pT bin merged [5, 6.5, 8.5, 11, 30] GeV

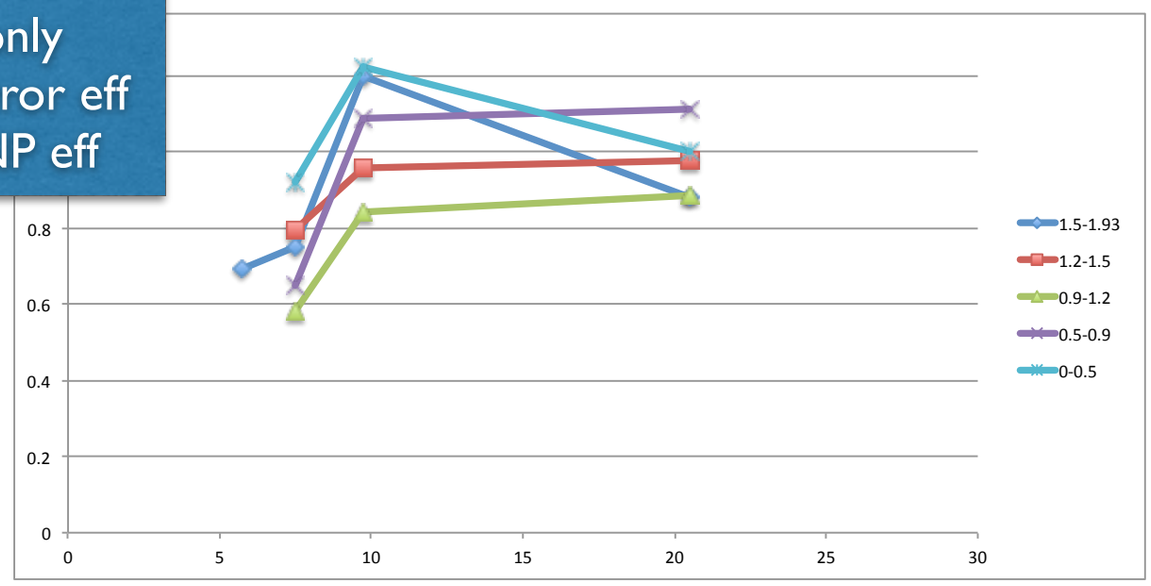


pPb only
No ct error eff
No TNP eff





Pbp only
No ct error eff
No TNP eff

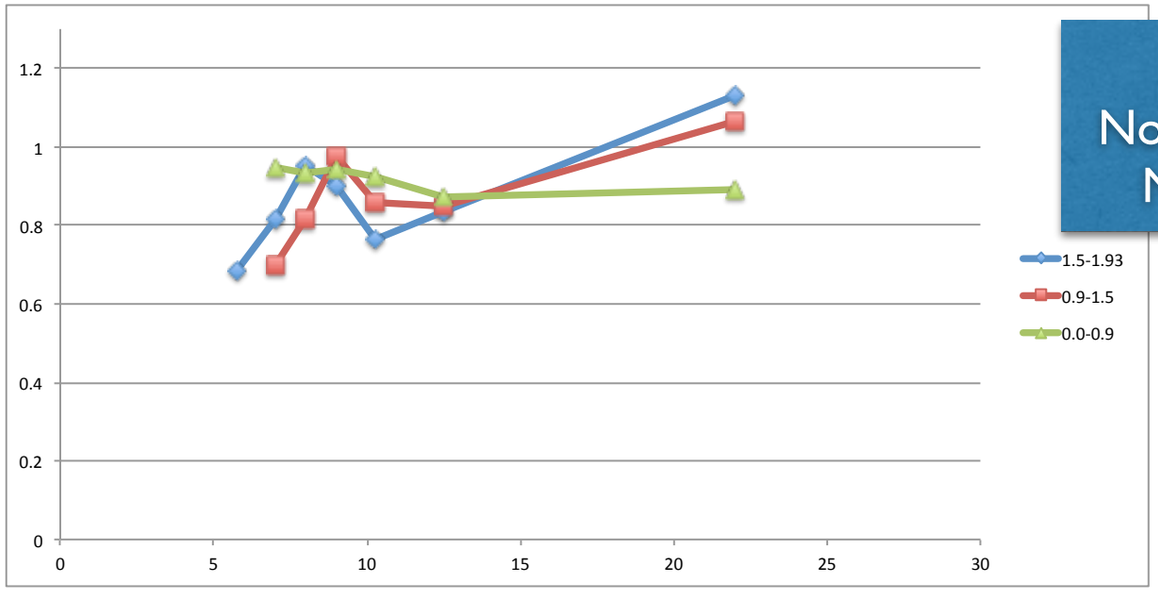


binning check

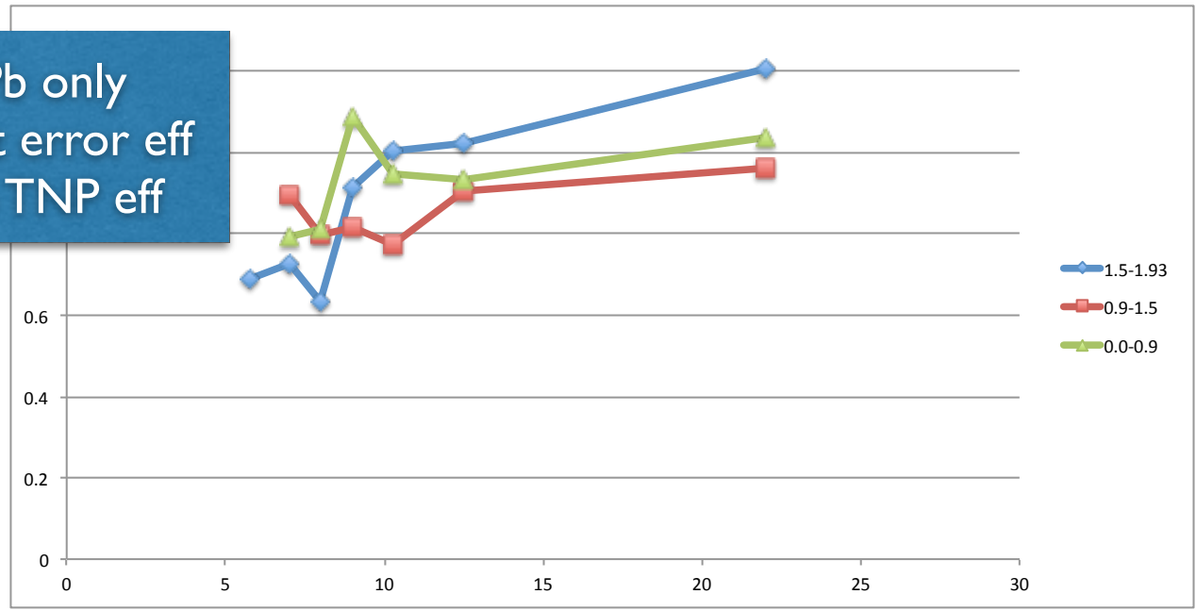
Prompt

non-prompt

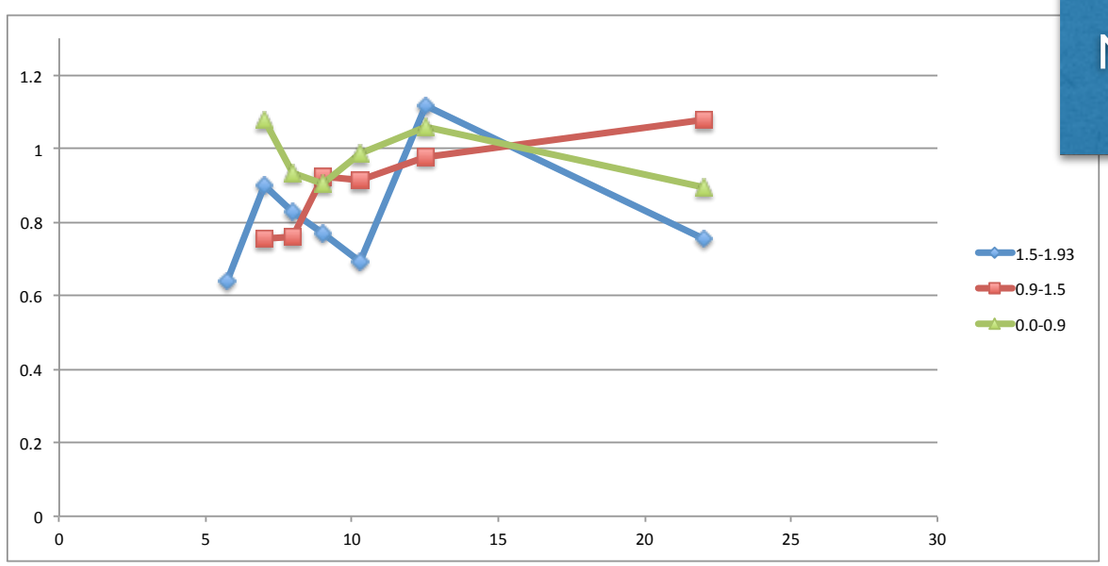
3. rapidity bin merged

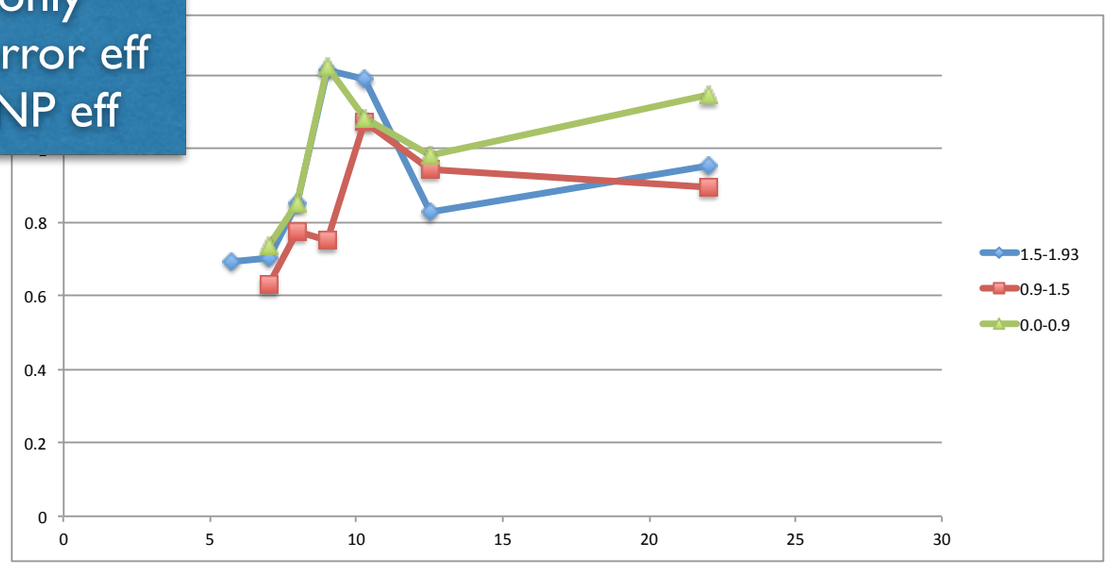


pPb only
No ct error eff
No TNP eff



Pbp only
No ct error eff
No TNP eff



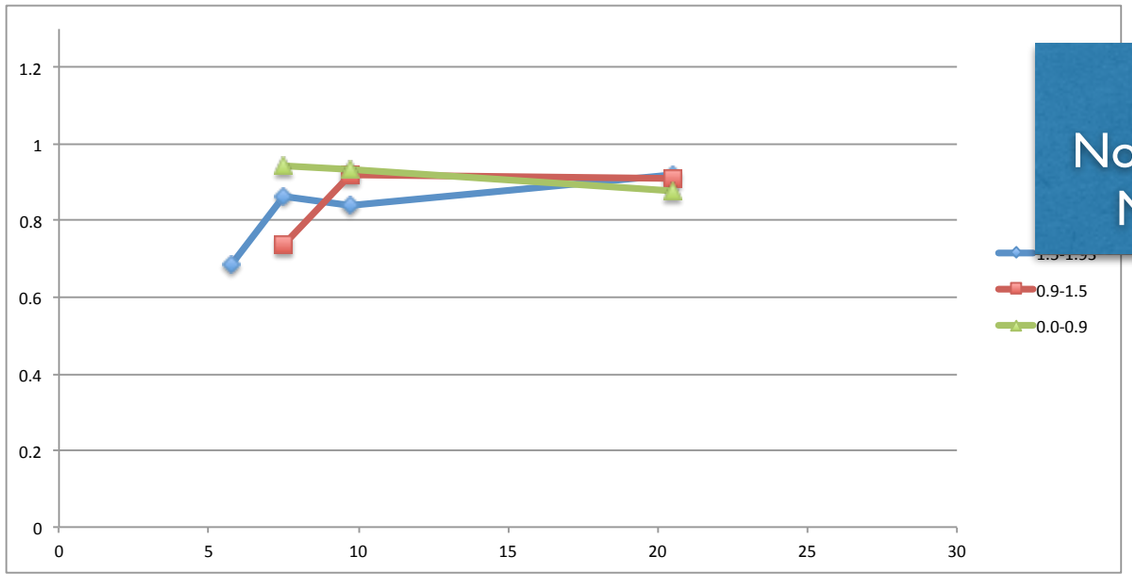


binning check

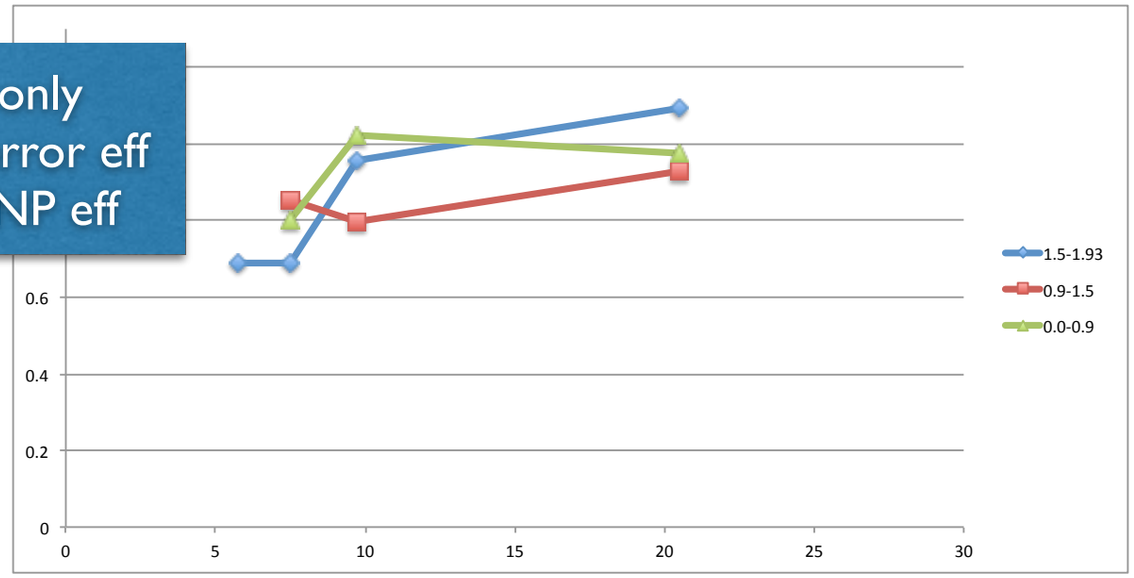
Prompt

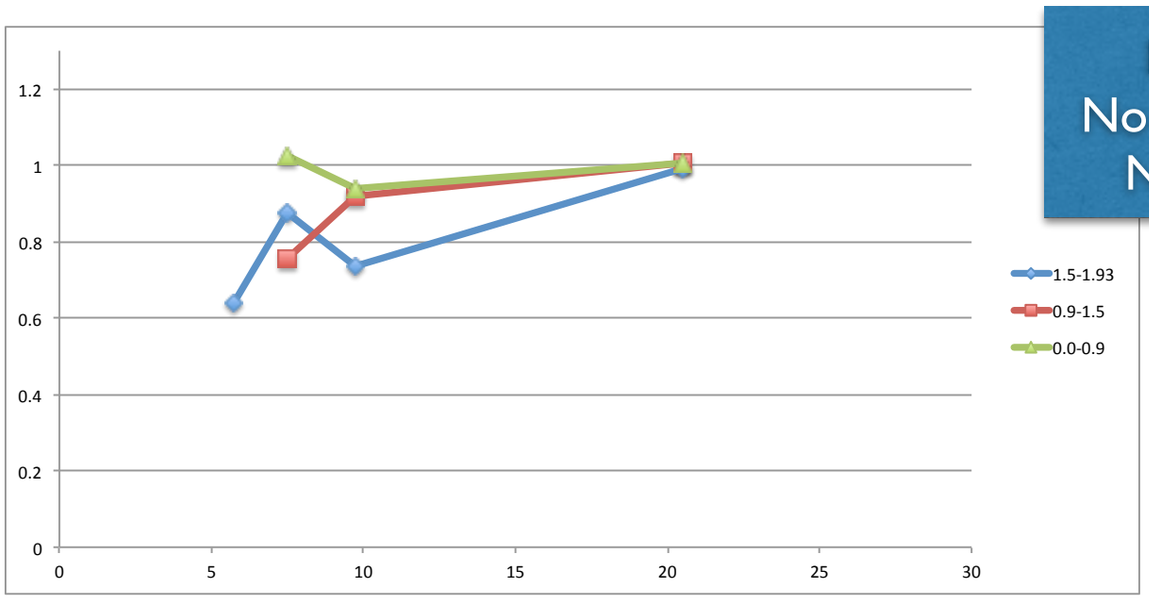
non-prompt

4. pT bin merged + rapidity bin merged

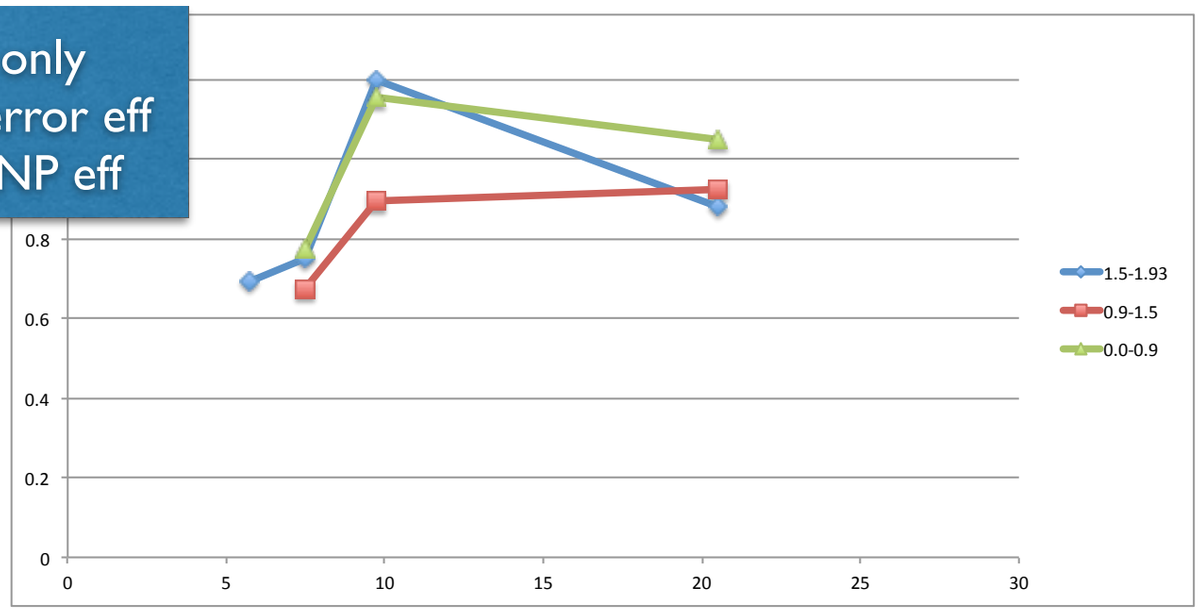


pPb only
No ct error eff
No TNP eff





Pbp only
No ct error eff
No TNP eff

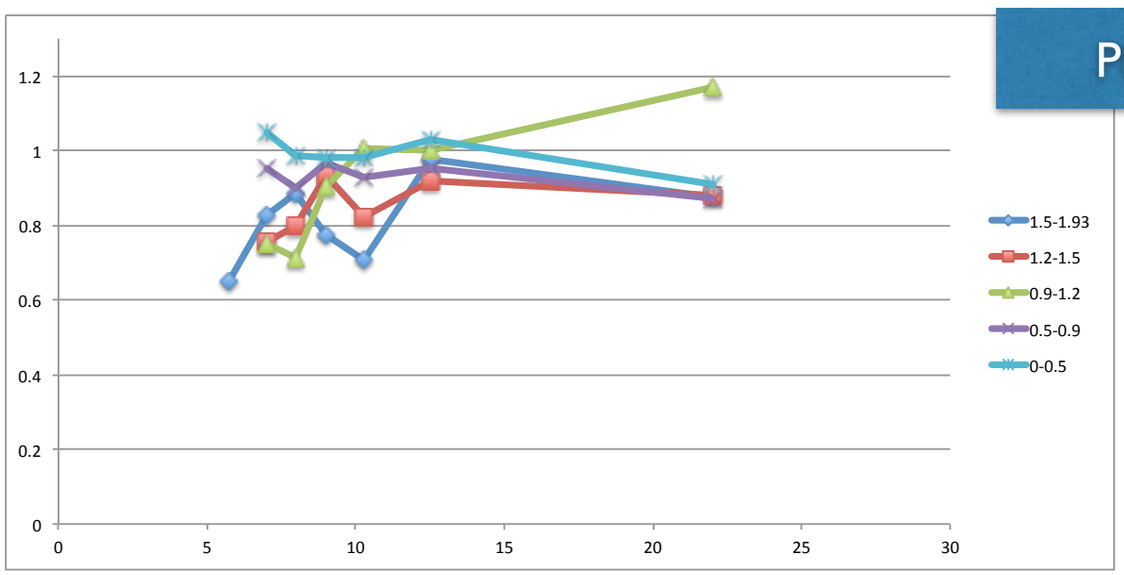


total

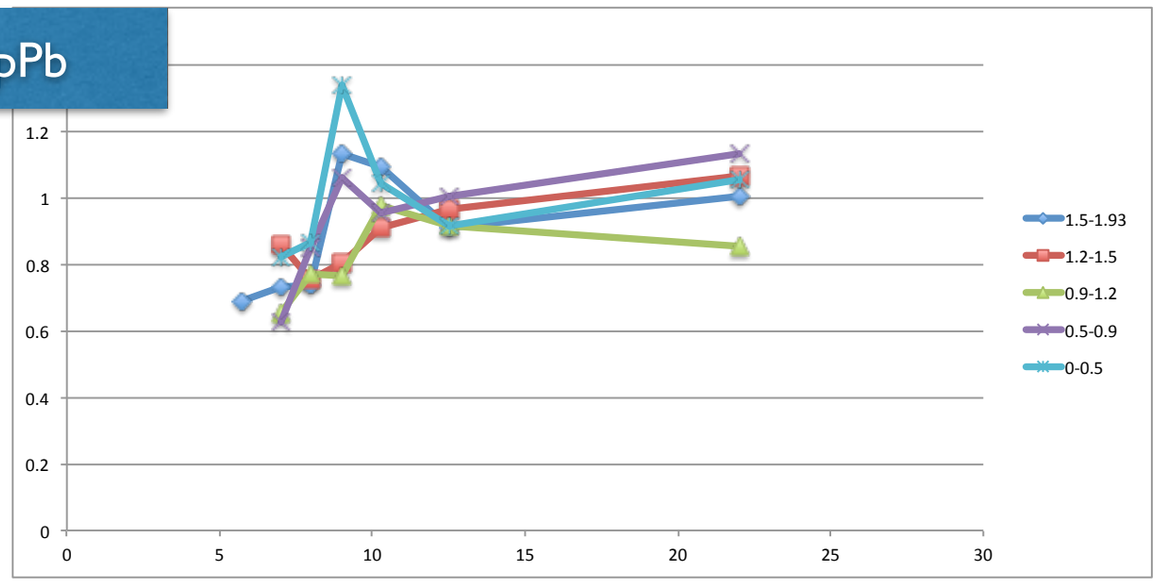
Prompt

non-prompt

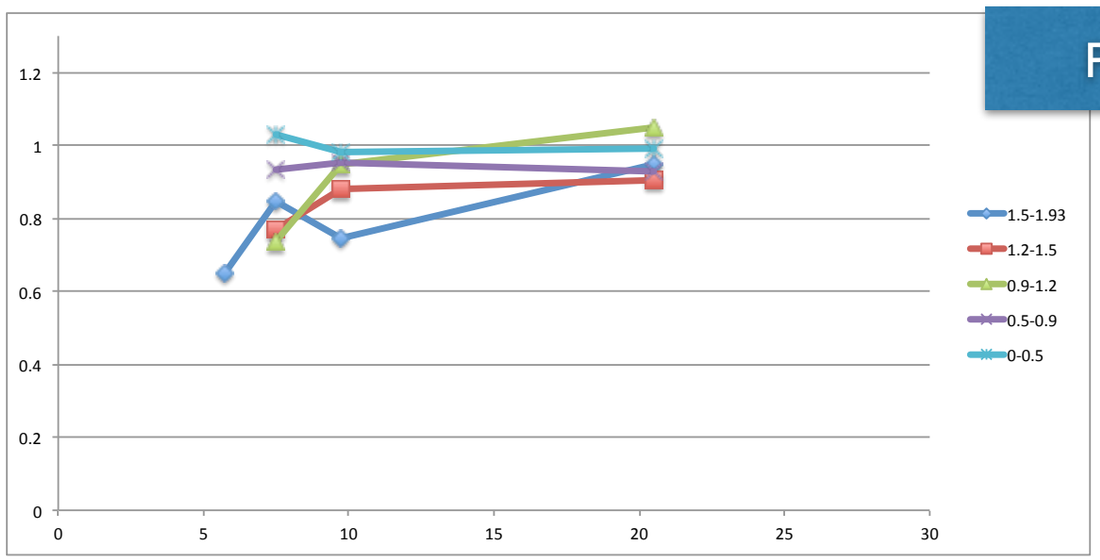
1. same with cross-sections [5, 6.5, 7.5, 8.5, 9.5, 11, 14, 30] GeV



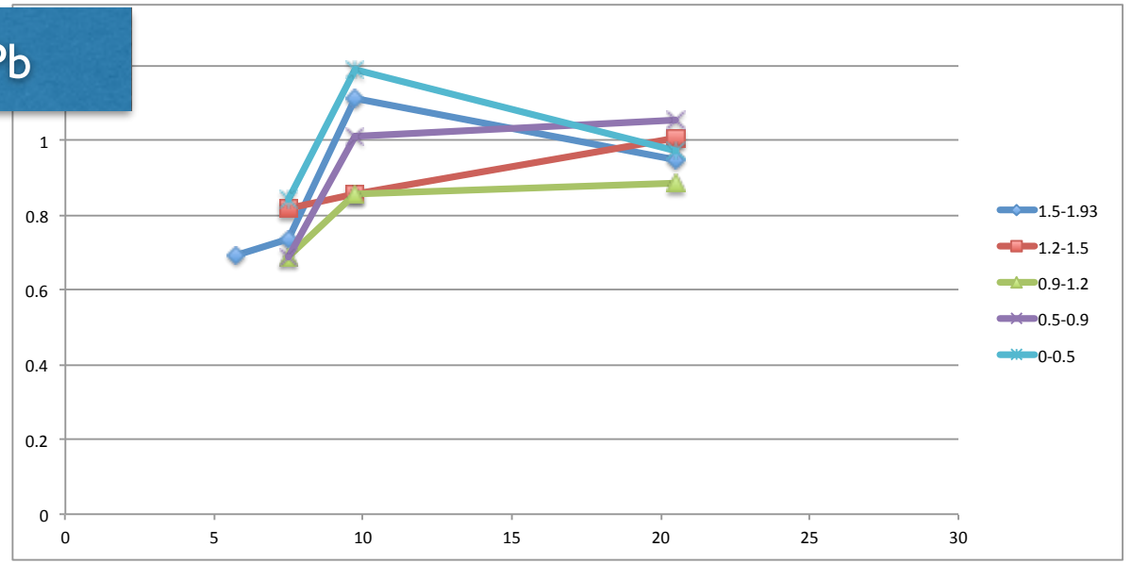
Pbp+pPb



2. pT bin merged [5, 6.5, 8.5, 11, 30] GeV



Pbp+pPb

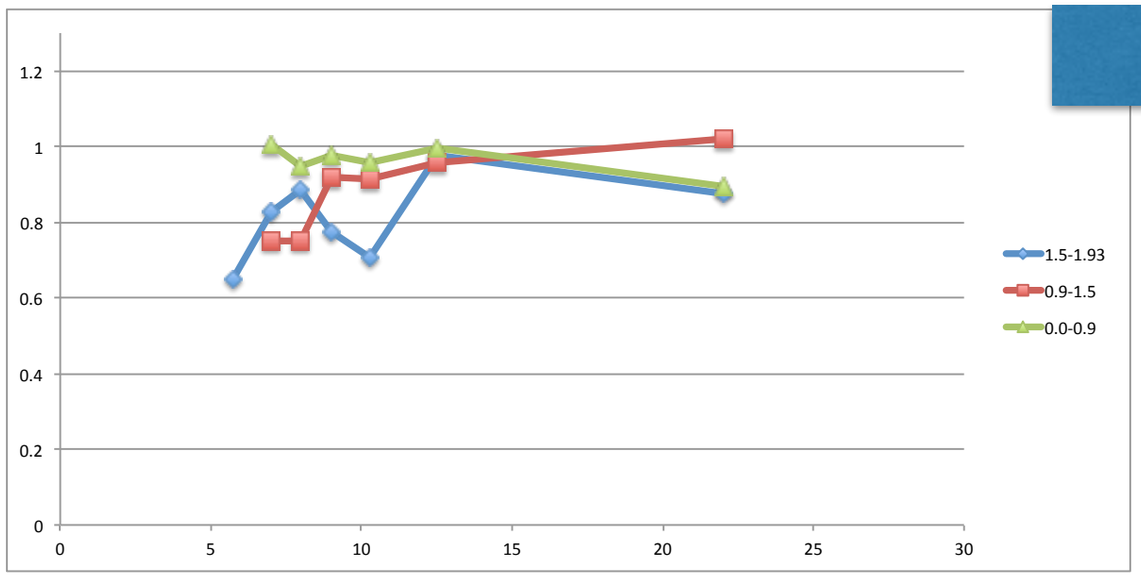


total

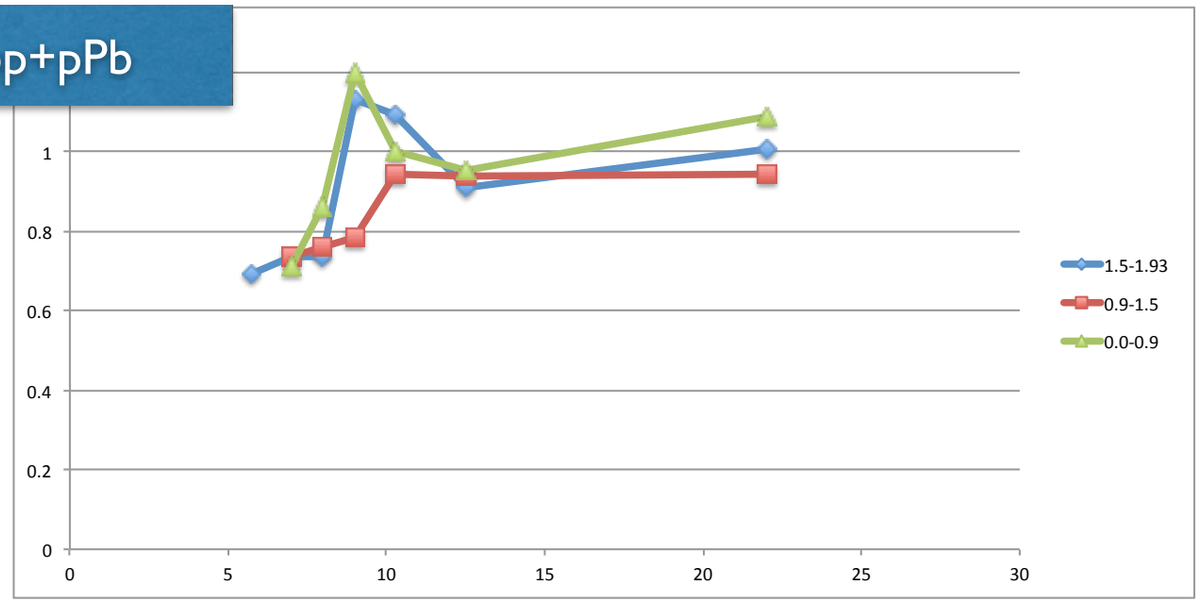
Prompt

non-prompt

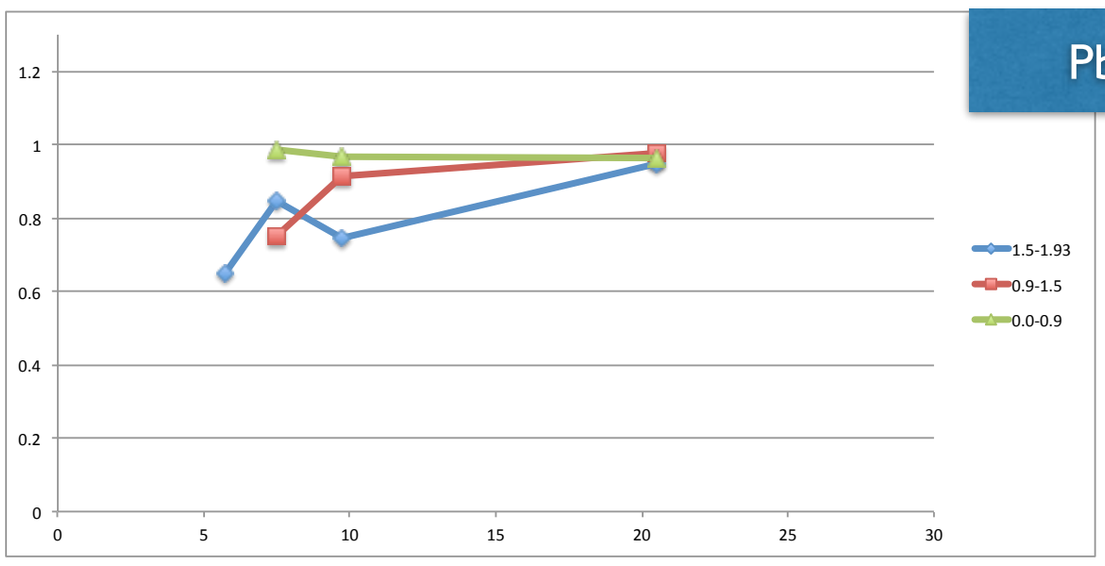
3. rapidity bin merged



Pbp+pPb



4. pT bin merged + rapidity bin merged



Pbp+pPb