Y(nS) analysis update

김용선

그룹 미팅

18-Mar-16

현재 상황

- Upsilon paper를 2개를 내는 것으로 결론
  - 참여인원
    - Manuel + 2 students in UC Davis
    - 김용선, 박재범
  - First paper : Double Ratio + upper limit of Y(3S) yield
    - UC Davis 가 주도
    - April 8th PAS approval 목표
    - 7월에 paper를 내고 SQM 에 첫 발표 목표
  - Second paper : R_AA vs pT, rapidity
    - 고려대 팀이 주도
    - 7월까지 analysis 결과를 미리 다 준비하여, SQM 직후 approval 목표
    - 11월경 pPb data taking period 전에 submit 하는 것이 목표

Overall status

task id	description	responsible	requires	status	Deadline
DR	Double Ratio				
DR_CR1	Crosscheck number of di-leptons pairs in each bins	Chad, Jaebeom		DONE	3/4
DR_BKG	Background shape and determination of parameter	UCDavis		DONE	
DR_CR2	Crosscheck yields and ratio	Chad, Jaebeom	DR_CR1	Satisfactorily agree (?)	3/16
Y3S	3S state search				3/15 - 3/22
Y3S1	Produce inv. mass distribution for (pT, y, centrality) matrix	Geonhee , Chad			3/15 - 3/22
EFF	acceptance and efficiency				
EFF_WEIGHT1	Determine cross-section weight in each pT bins of PbPb sample	Songkyo		DONE	
EFF_WEIGHT2	dN/dpT comparison of data/MC	Yongsun			
EFF_WEIGHT3	dN/y comparison of data/MC	Yongsun			
EFF_MC	Weight-corrected efficiency in py, y, centrality bins	Santona	EFF_WEIGHTn		3/7
EFF_ACC	Weight-corrected efficiency in py, y, centrality bins	Yongsun	EFF_WEIGHTn		Don't have sample yet
EFF_TNP	Check the size of T&P effect. If big, T&P weighted efficiency	Santona, Yongsun			
DIST	Kinematic distribution comparison in data and MC				
DIST1	dN/dpT, dN/dy using sideband background subtraction	Yongsun	DR_CR2	DONE	
Sys	Systematics study				
Sys_SIG	Signal variation	Songkyo			
Sys_BKG	Background variation	Chad	DR_BKG		
Sys_EFF	Uncertainty from efficiency	Santona(?)	EFF_MC, EFF_TNP		
Sys_ACC	Uncertainty from acceptance	Geonhee, Yongsun	EFF_acc		
Sys_VTX	Uncertainty from different vertex distribution in pp and PbPb	Songkyo			

- Closed issues
  - Chad/JB's sanity checks for their code. Their numbers were identical just before going into fitting
  - Upper limit of p_T set to 30 GeV/c
- Ongoing issues
  - JB/Chad cross-check for signal fit
  - dN/dpT and dN/dy in data and MC ➔ for MC reweight
  - Finding Y(3S)
- To be done on next week
  - Sys. by signal
  - Sys. by background
  - Sys. by acc./eff. variation

Overall status

Timeline, part 2

- Final checks on efficiency/acceptance cancellation for double ratio. ~1 week
  - MC but also any studies on data, pp vs PbPb.
- Systematic uncertainty studies. ~2 weeks
  - Fitting uncertainties, variations in signal PDF, background PDF, and method of yield extraction.
    - Note: should be done using pseudo experiments, if possible (not on the data).
    - Target date for above: March 22 dilepton meeting.

Manuel's timeline (presented on Feb.23rd)

5

Are we on track for AN freeze on 3/25?
Slightly behind the schedule, but it's attainable as we don't see any major potential showstopper (yet)

- Closed issues
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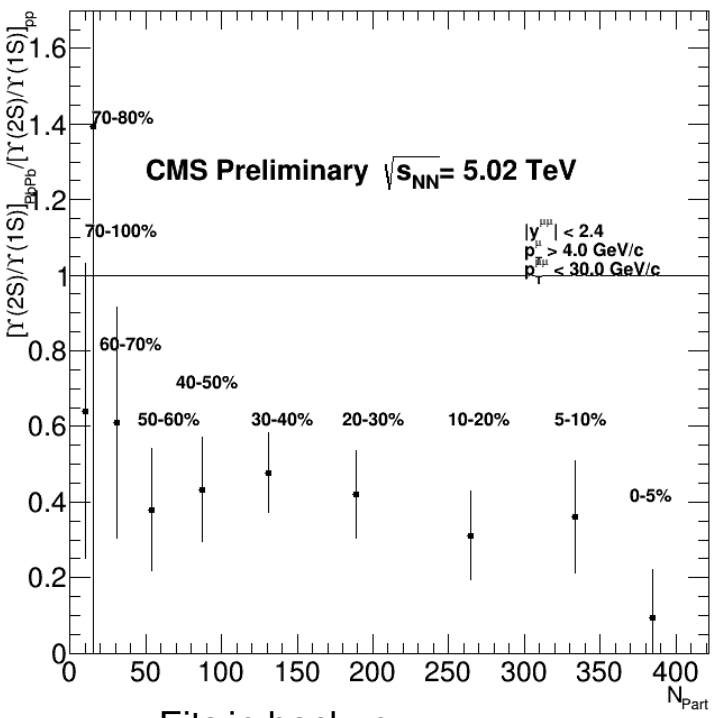
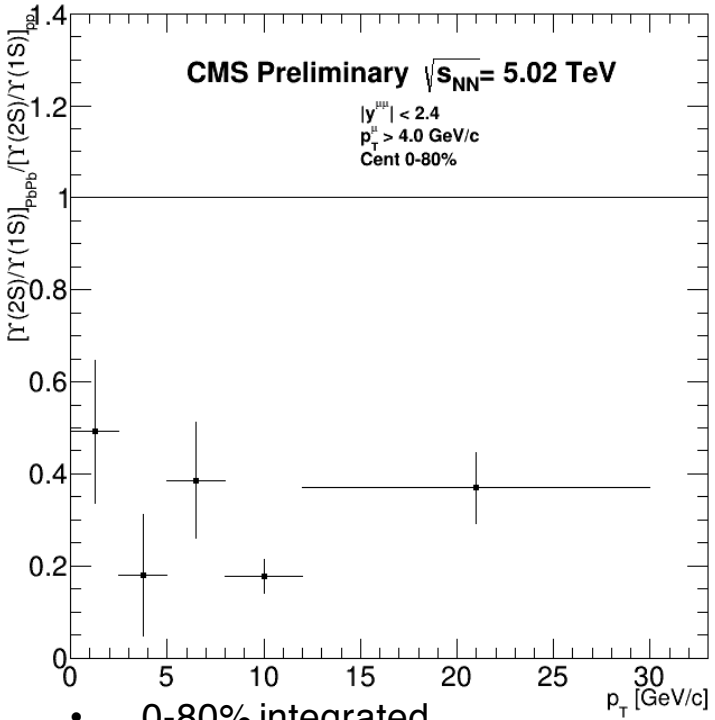
Double Ratio in p_T <30GeV



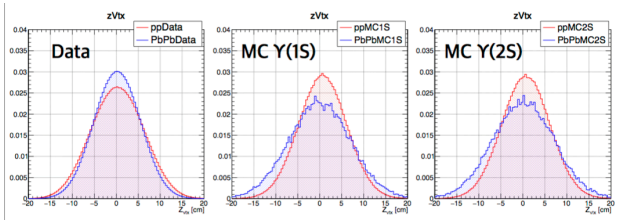
- Fits in backup



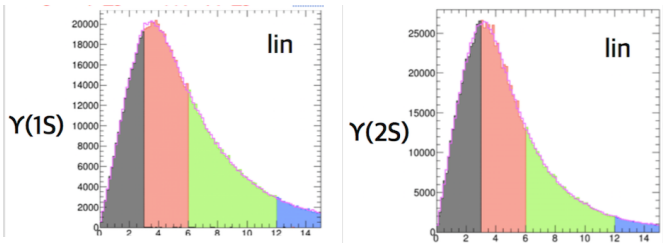
- 0-80% integrated
- L1_DoubleMu0 PD used
- More p_T bins than previous report
- Meaningful trend?

Reweights for MC samples

- Vertex check : DONE



- Reweight 1 : MC pT bin reweight : DONE



- Reweight 2 : dN/dpT, dN/dy reweight : ongoing

We're following HIN-15-001 Procedure

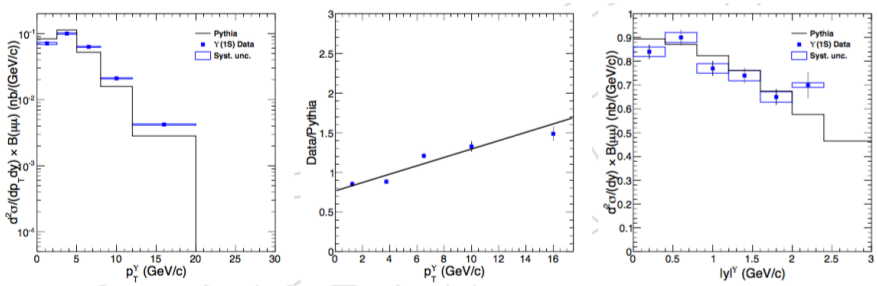


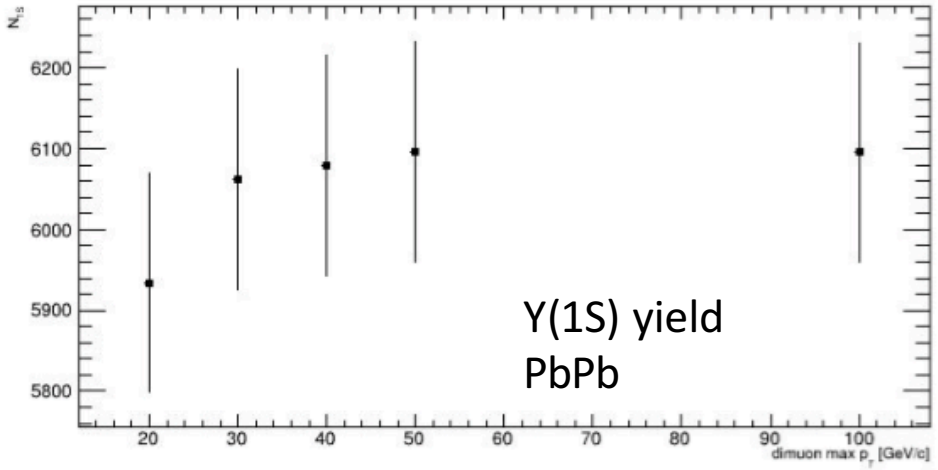
Figure 23: The measured data vs Pythia distributions as a function of p_T and Rapidity for pp Υ(1S) with loose p_T cuts.

Backup

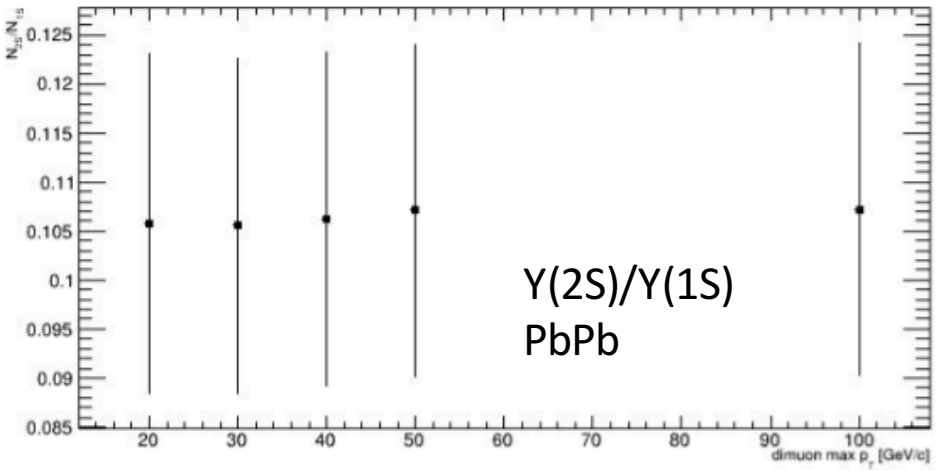
Why 30 GeV for p_T cutoff?

Chad's slide in upsilon meeting

- PbPb L1DoubleMu0 (ABCD) was studied in this yield and ratio. Fit in normal procedure.
- Conclude:
  - ***Pt Max should be 30GeV/c***



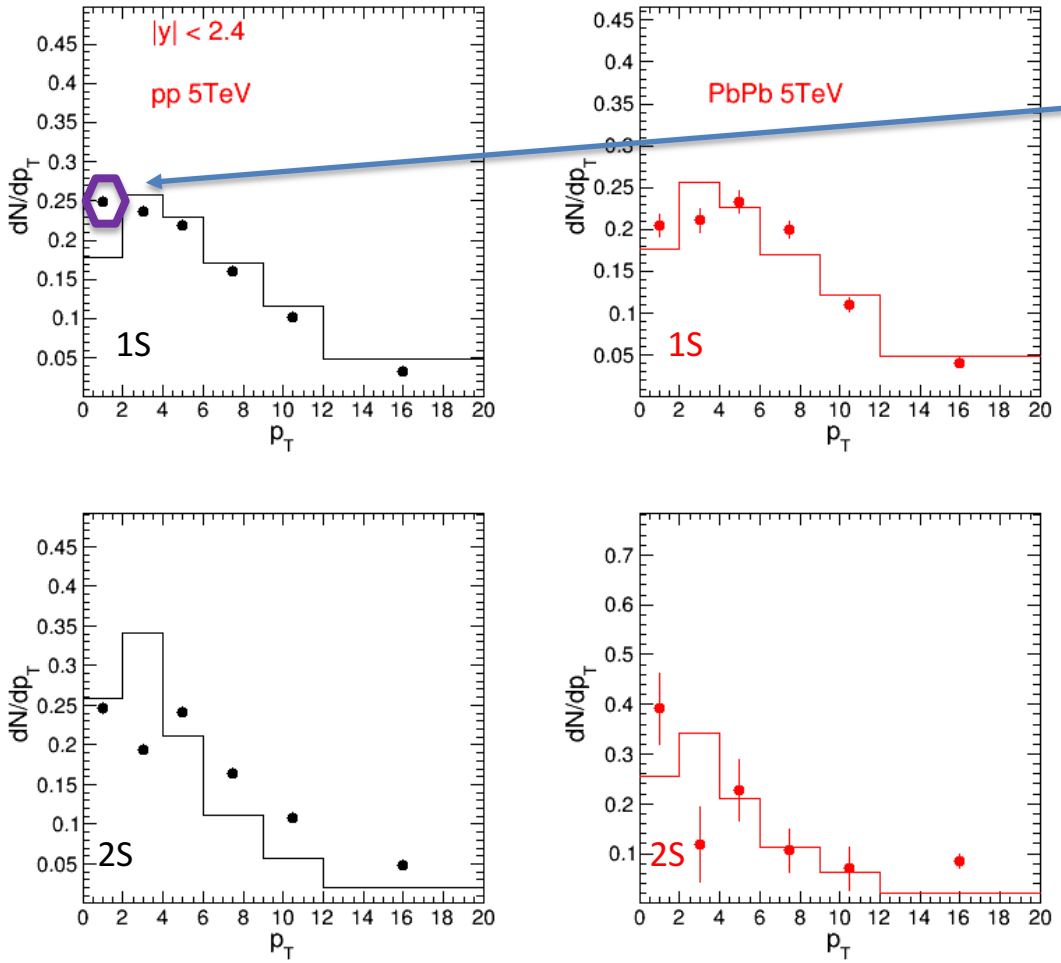
Y(1S) yield
PbPb



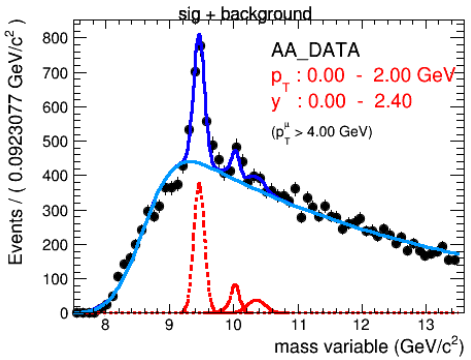
Y(2S)/Y(1S)
PbPb

Data/MC comparison

Unreliable result yet

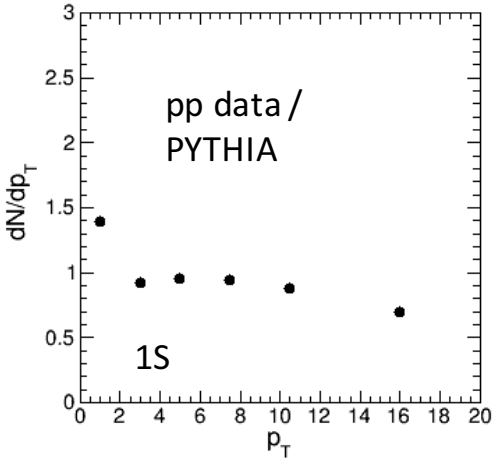


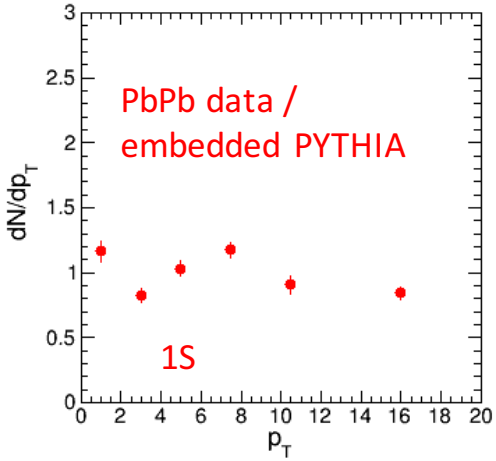
- Need to improve the fits in low p_T bins, e.g. point

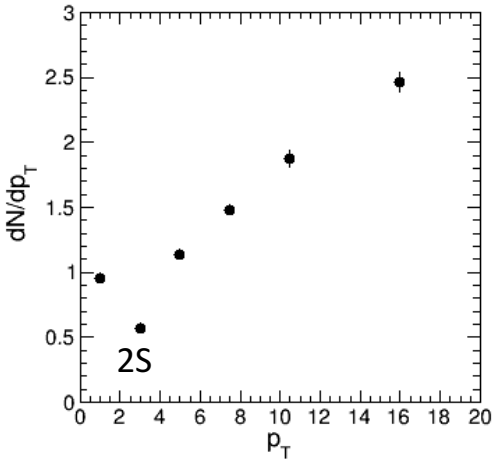


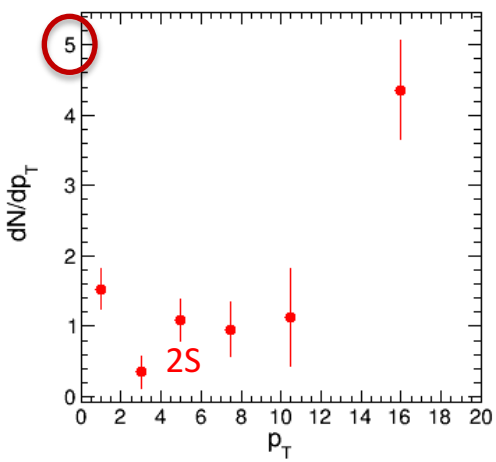
- The ratio Once we those fits are fixed, we'll fit

Data/MC ratio









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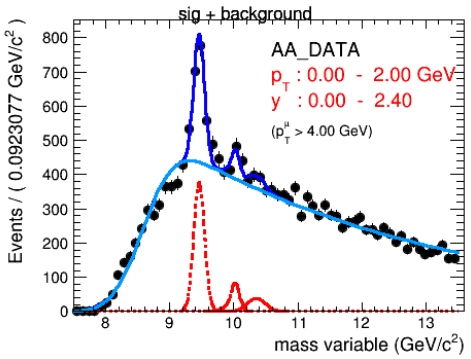
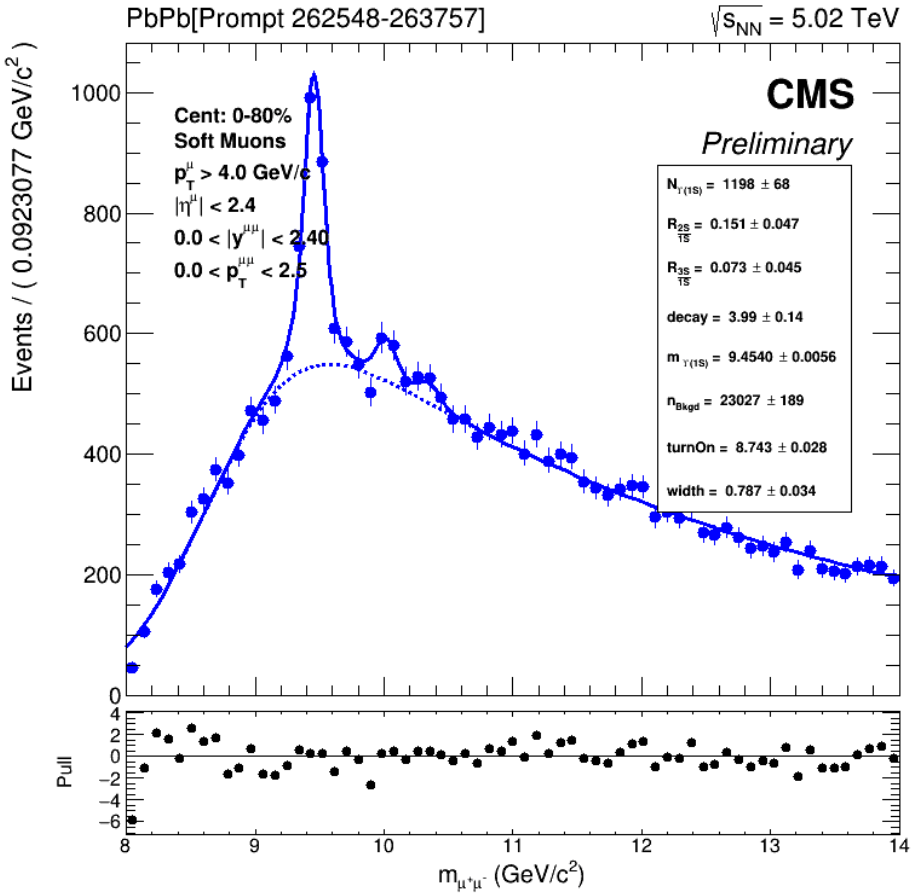


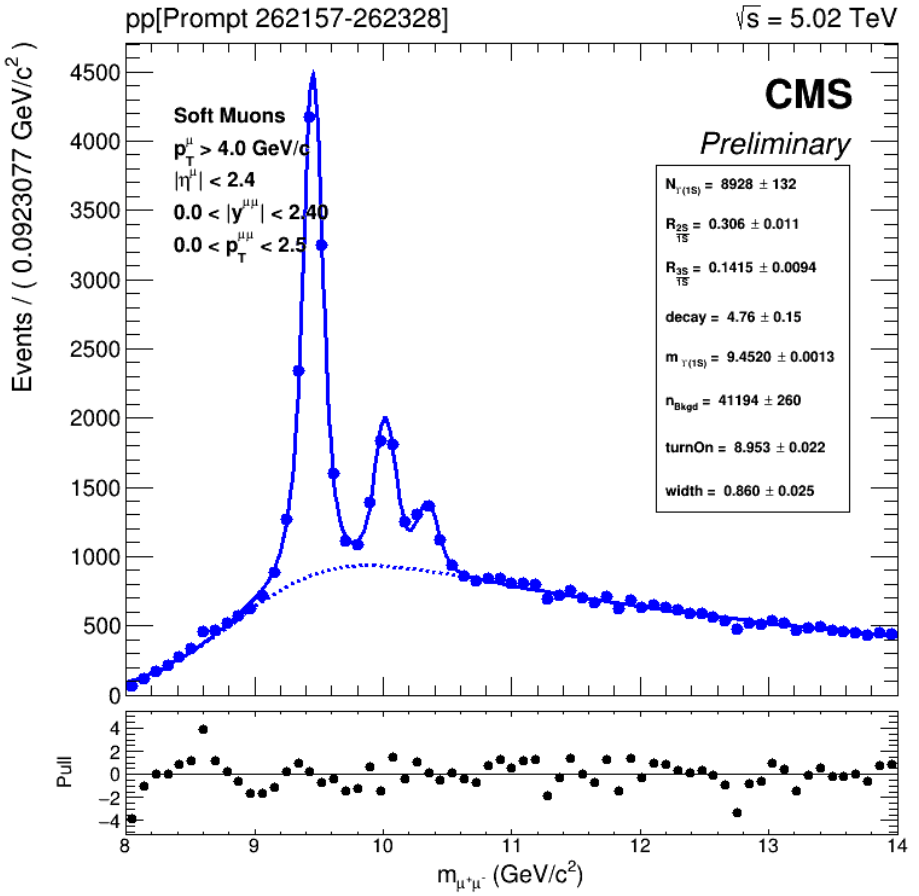
- For pp, Data/MC will be fit by linear function of pT
- Big statistical fluctuation of Y(2S) in PbPb. What can we do?

Pt Fits (Chad)

Fits Pt[0,2.5]

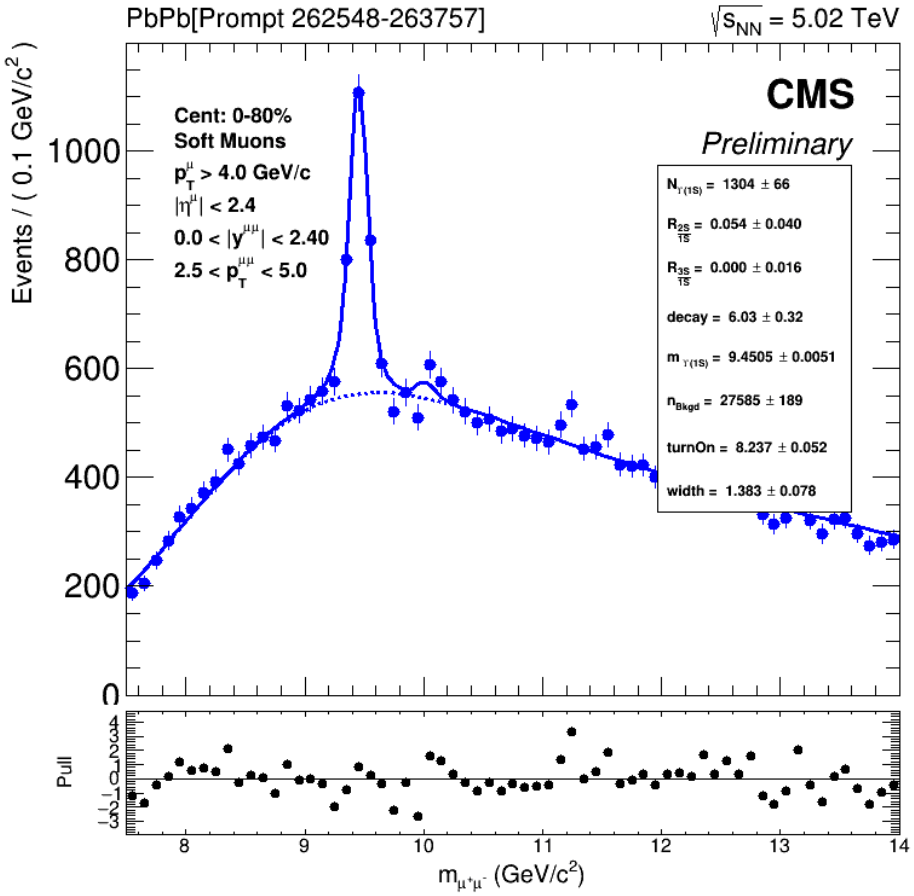


PbPb

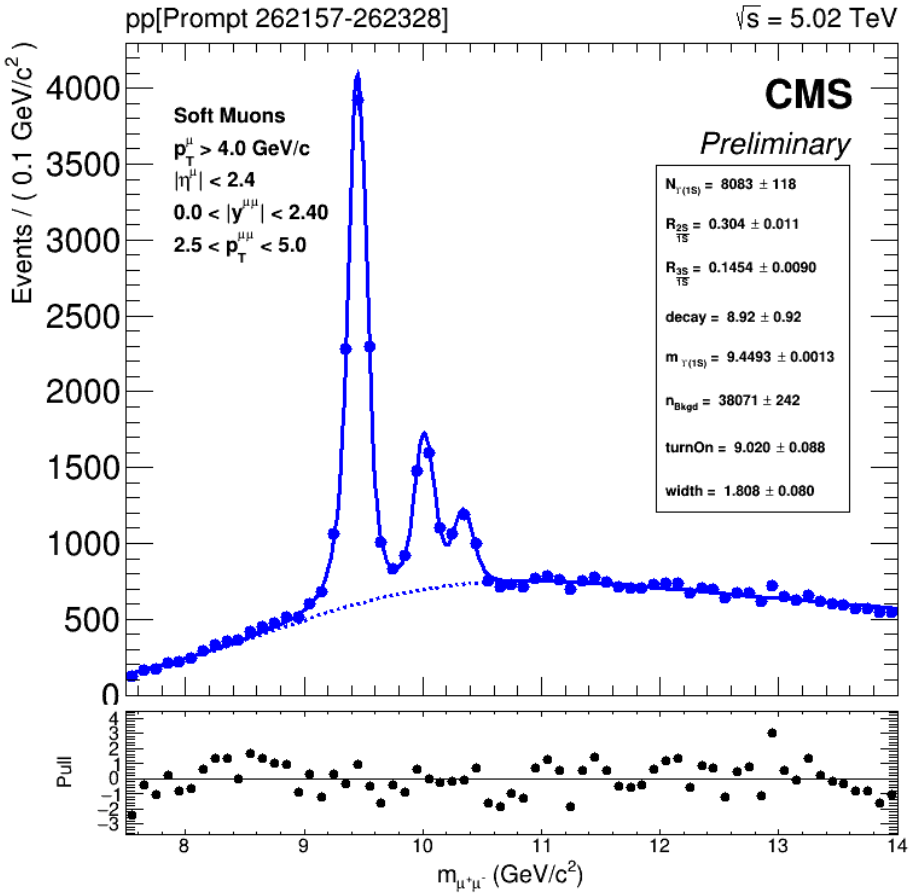


PP

Fits Pt[2.5,5.0]

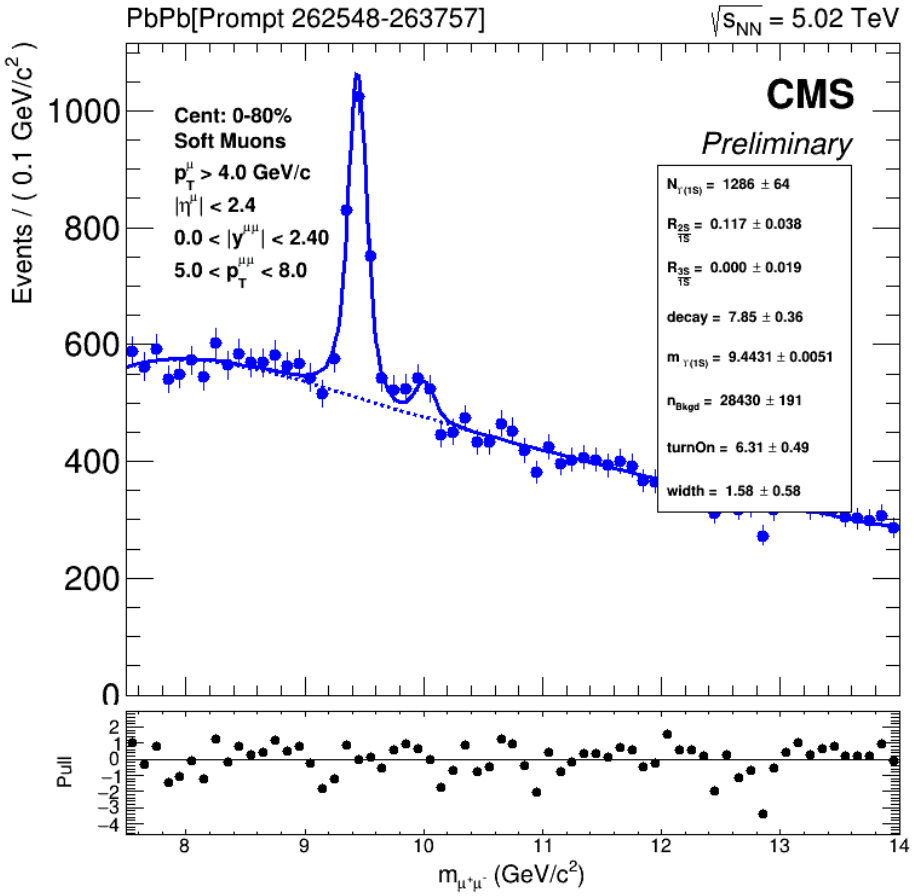


PbPb

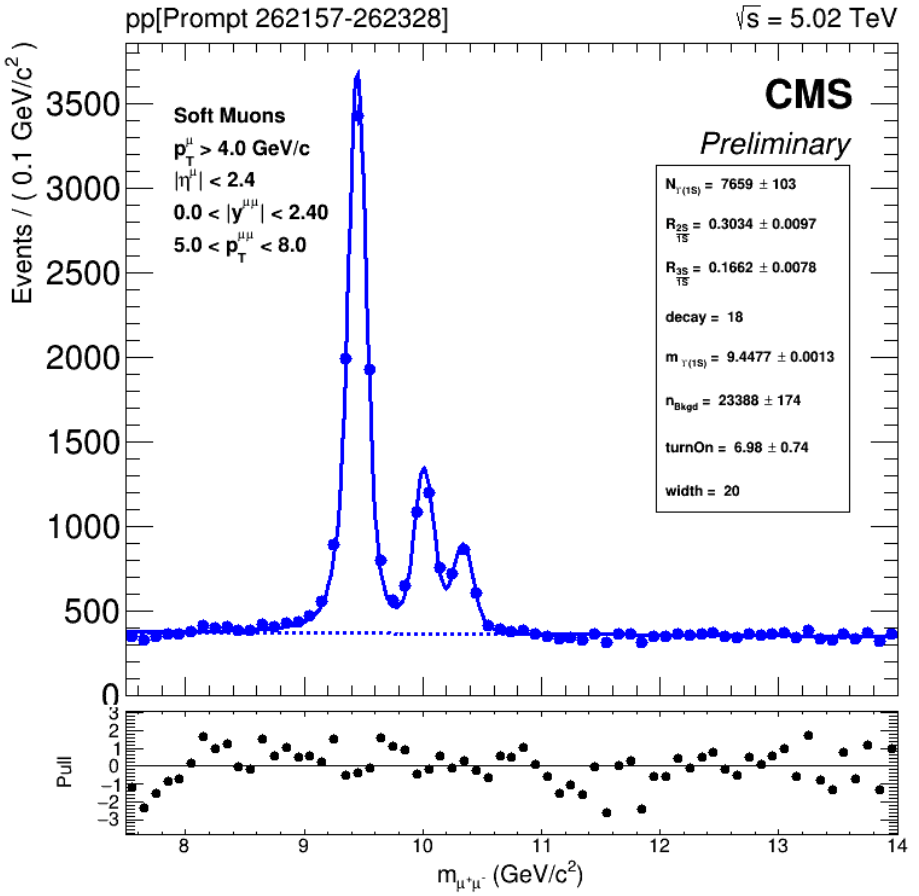


PP

Fits Pt[5.0,8.0]

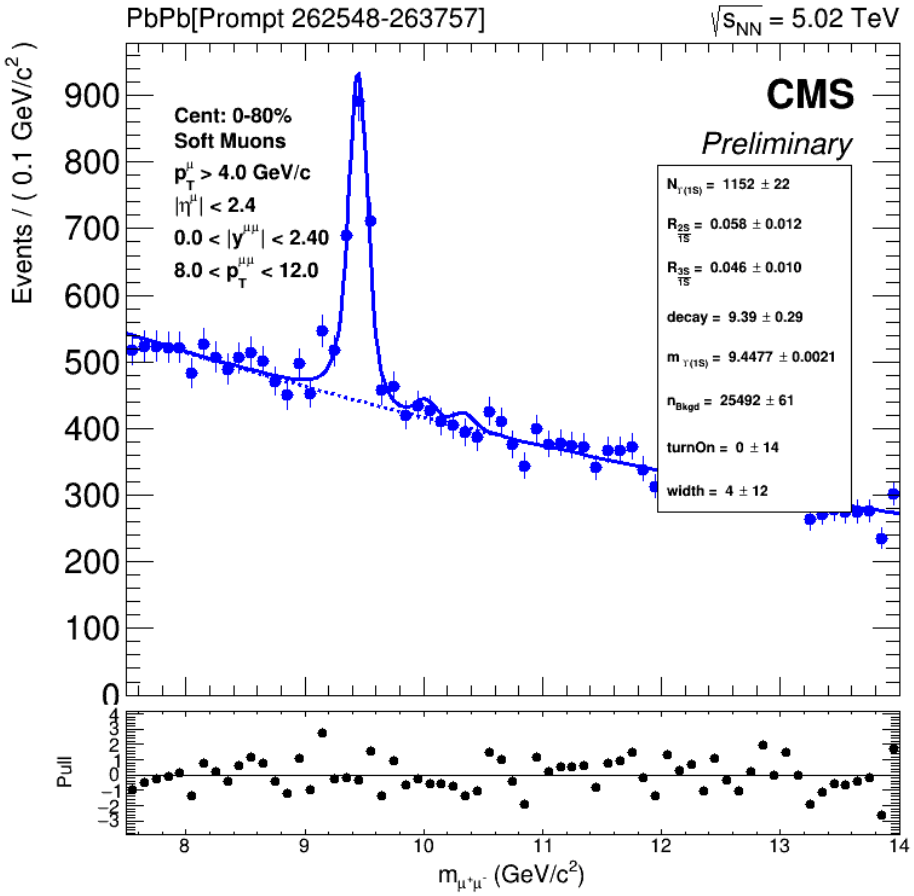


PbPb

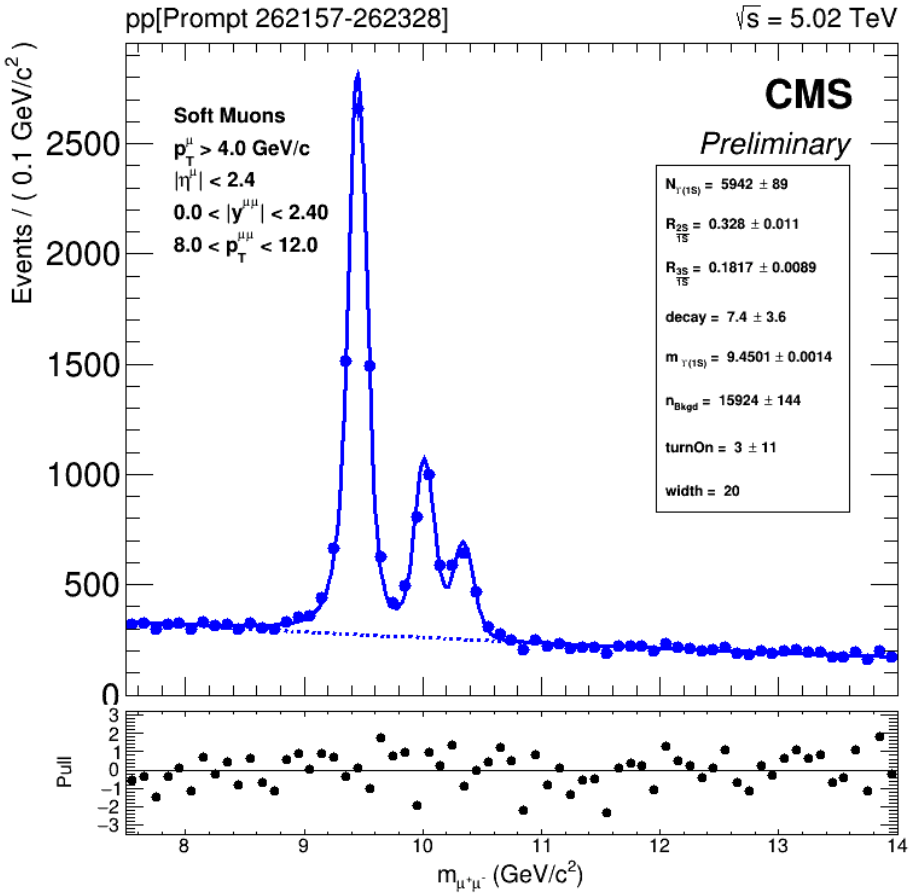


PP

Fits Pt[8.0,12.0]

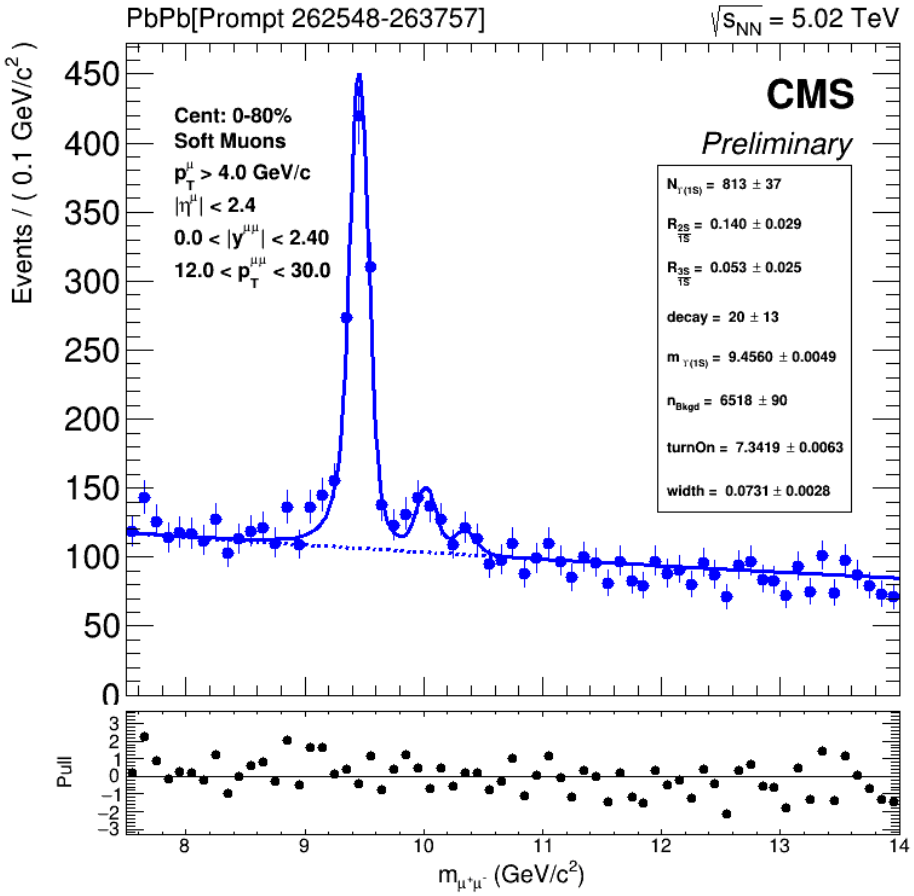


PbPb

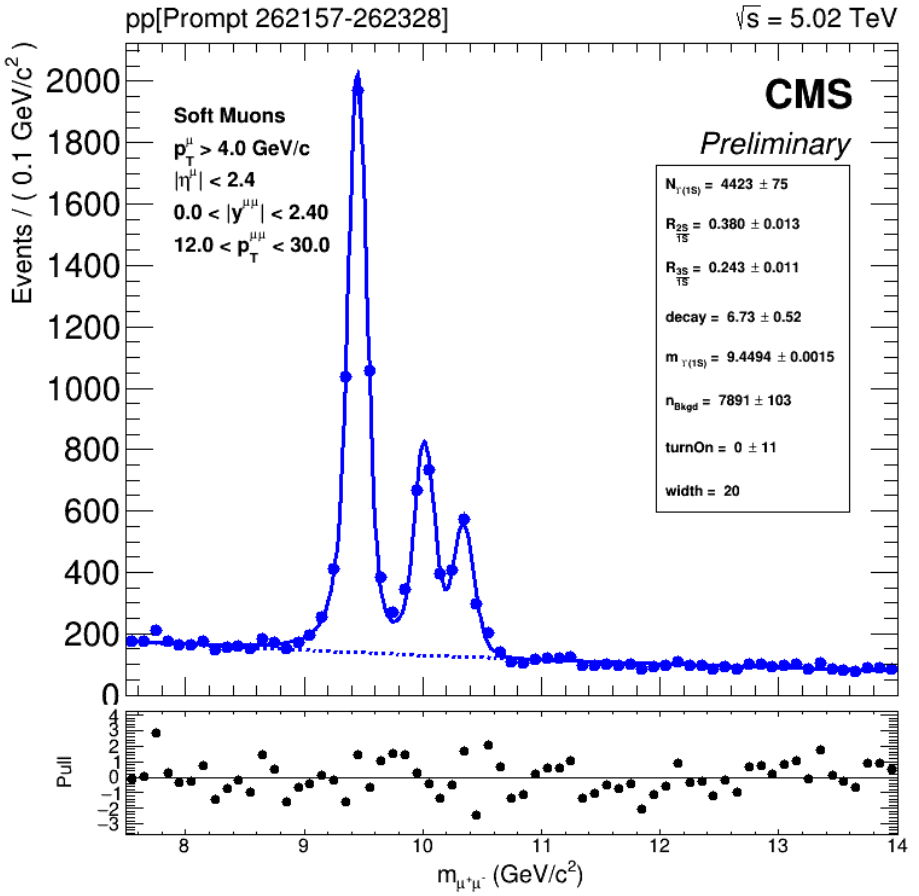


PP

Fits Pt[12.0,30.0]



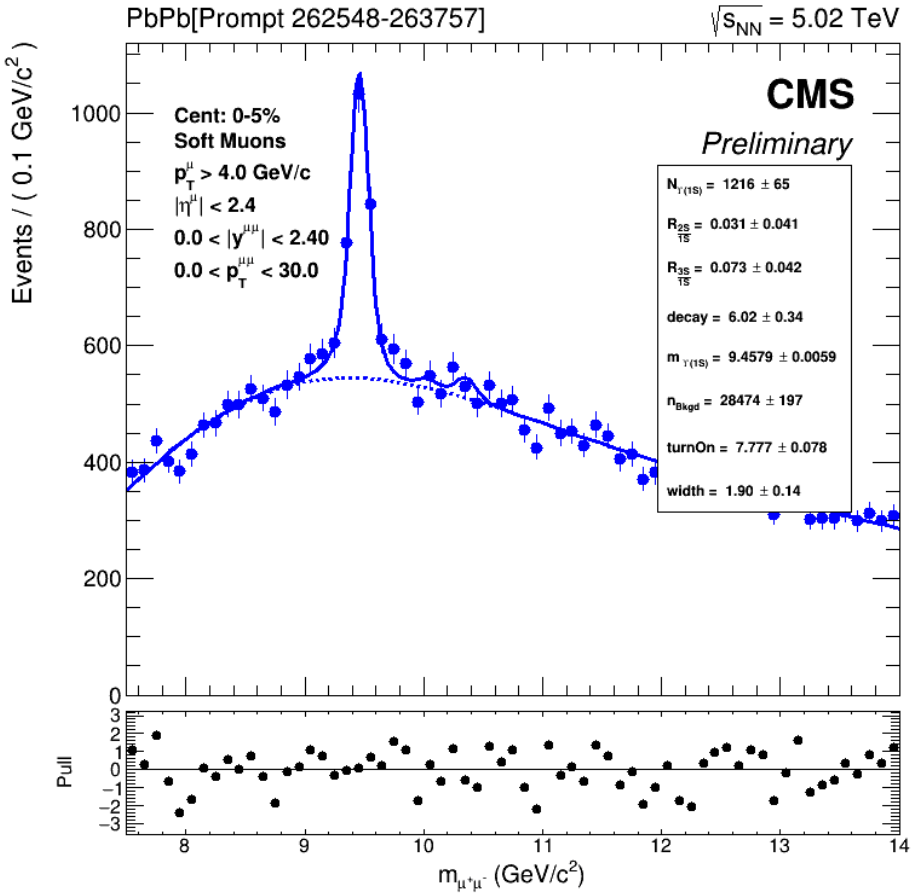
PbPb



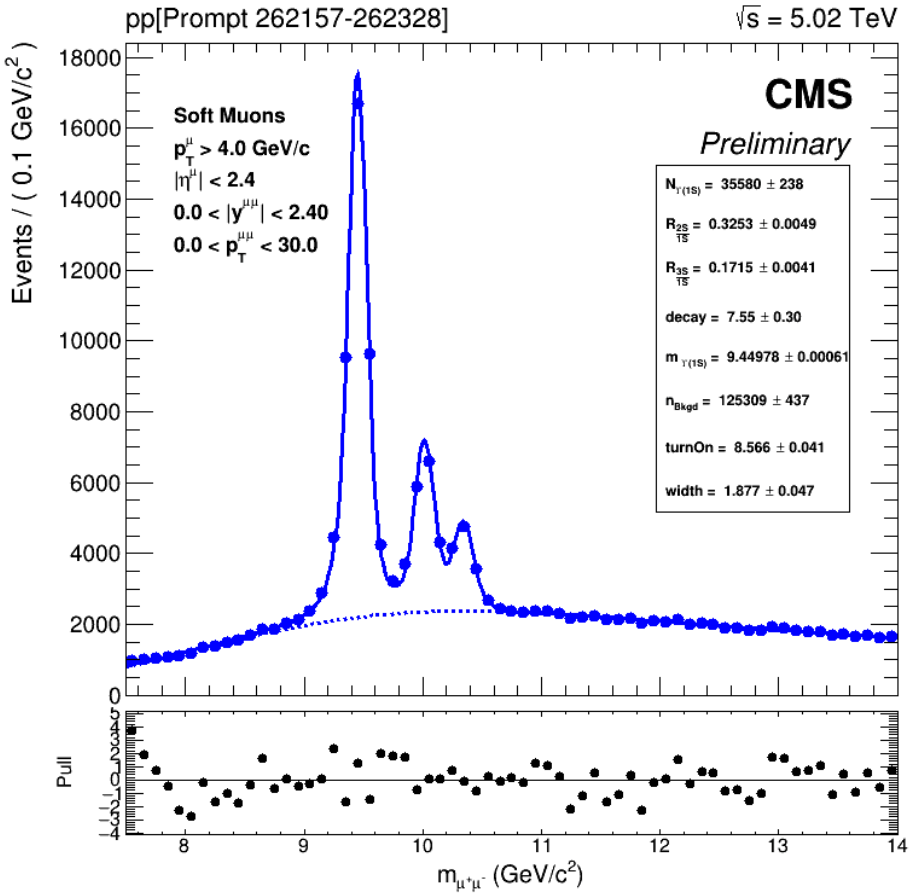
PP

Centrality Fits

Fits Centrality

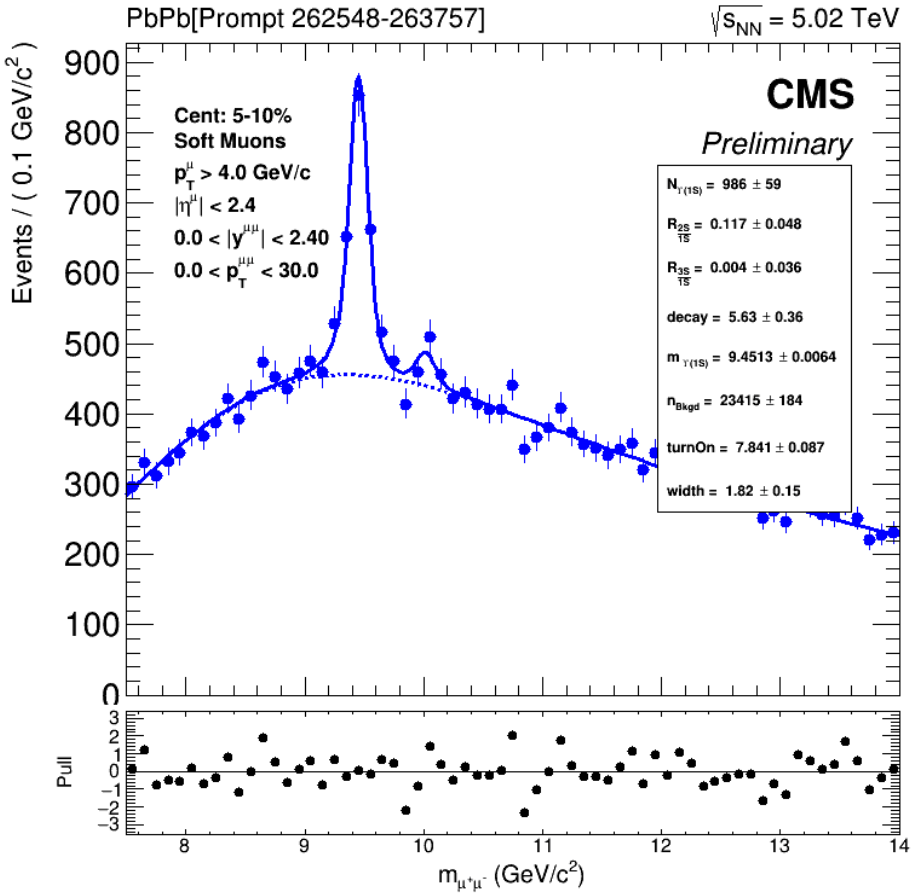


0-5% PbPb

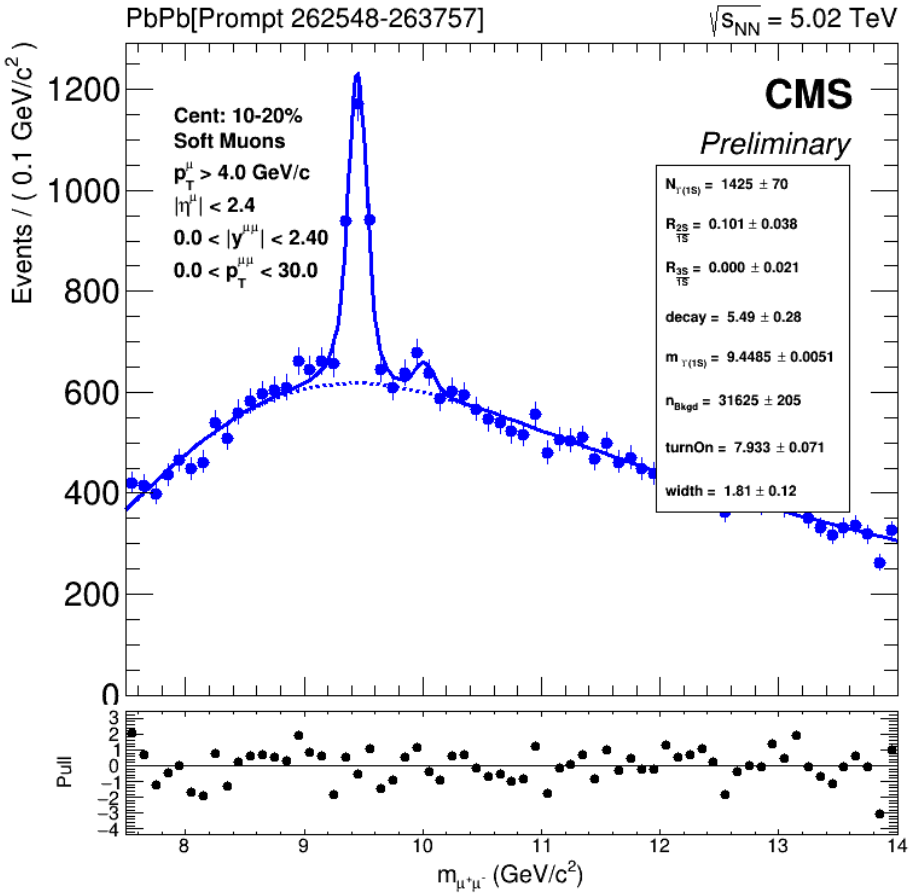


PP

Fits Centrality

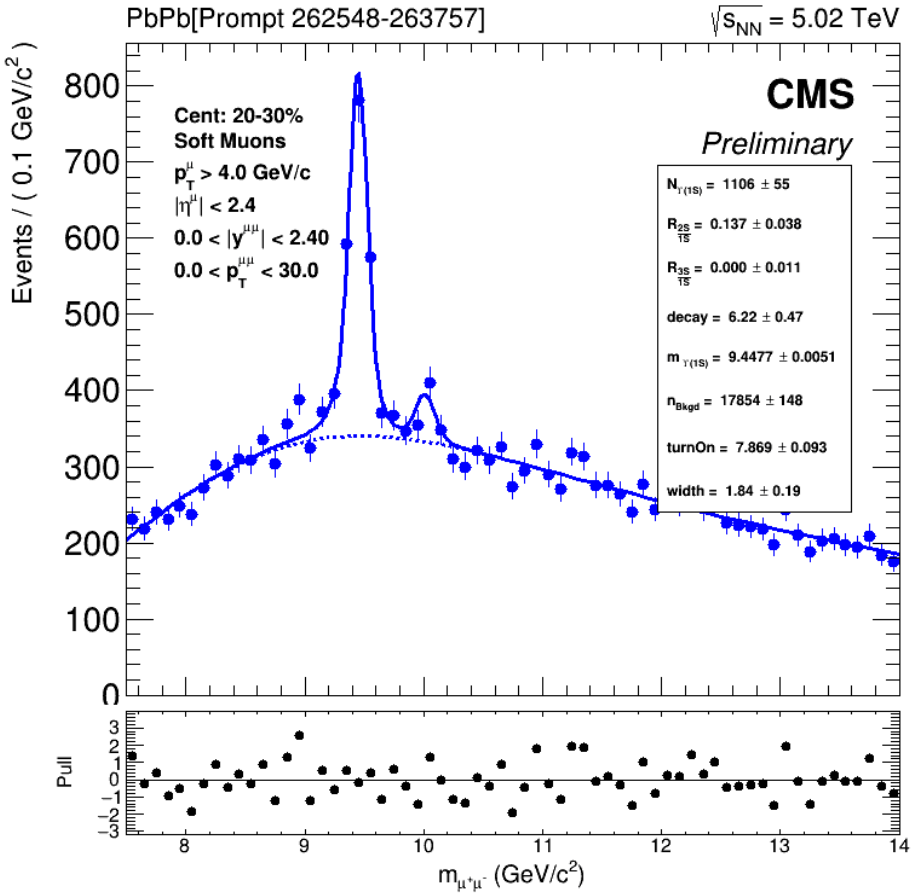


5-10% PbPb

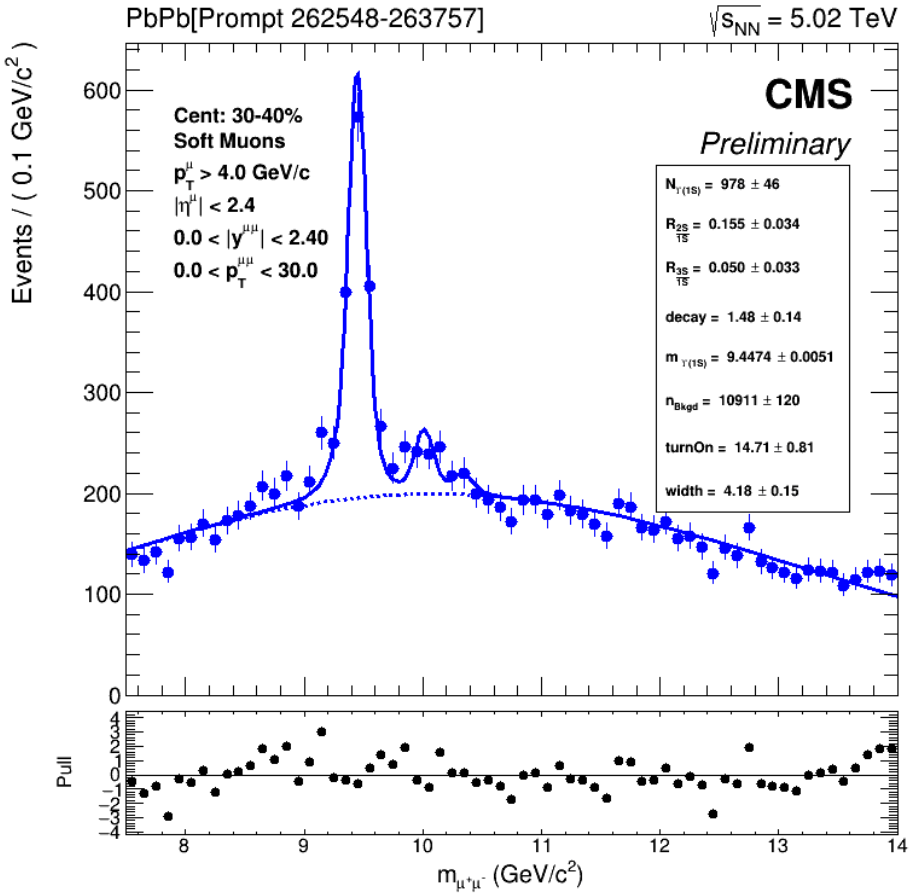


10-20% PbPb

Fits Centrality

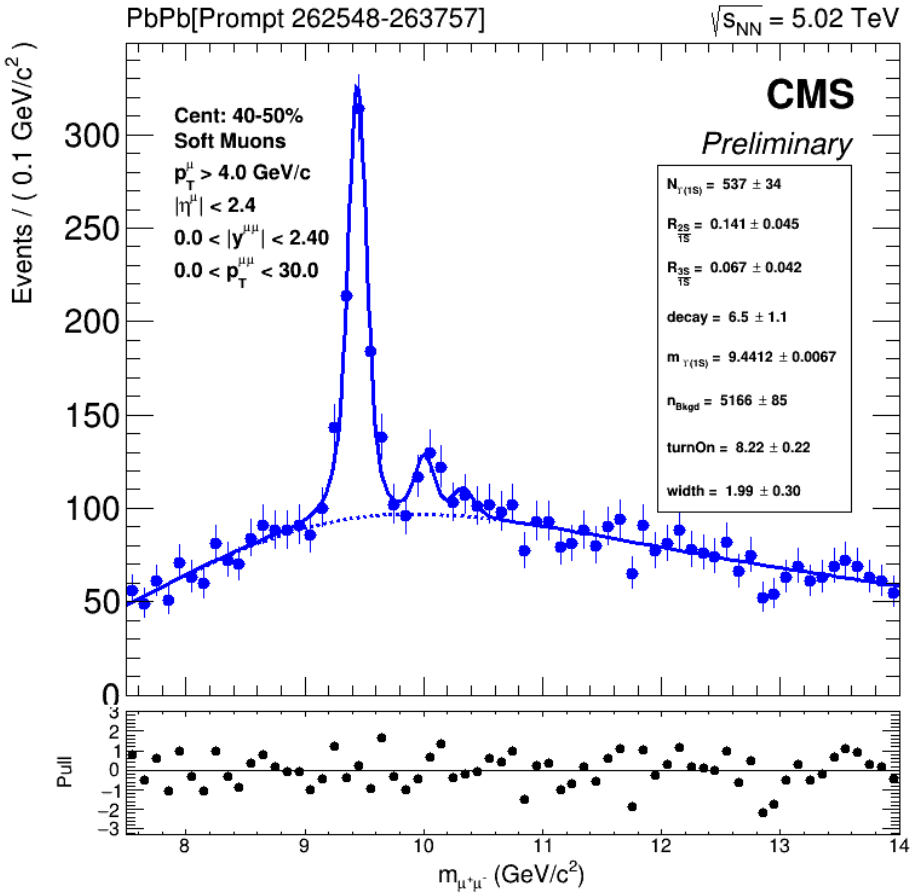


20-30% PbPb

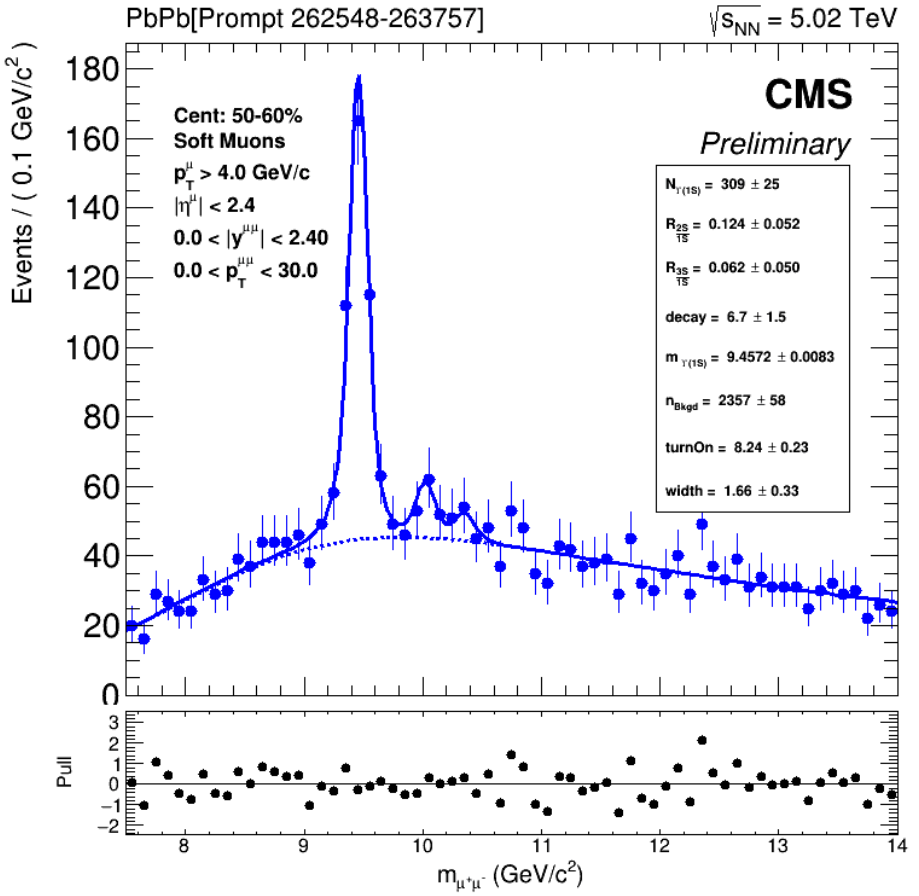


30-40% PbPb

Fits Centrality

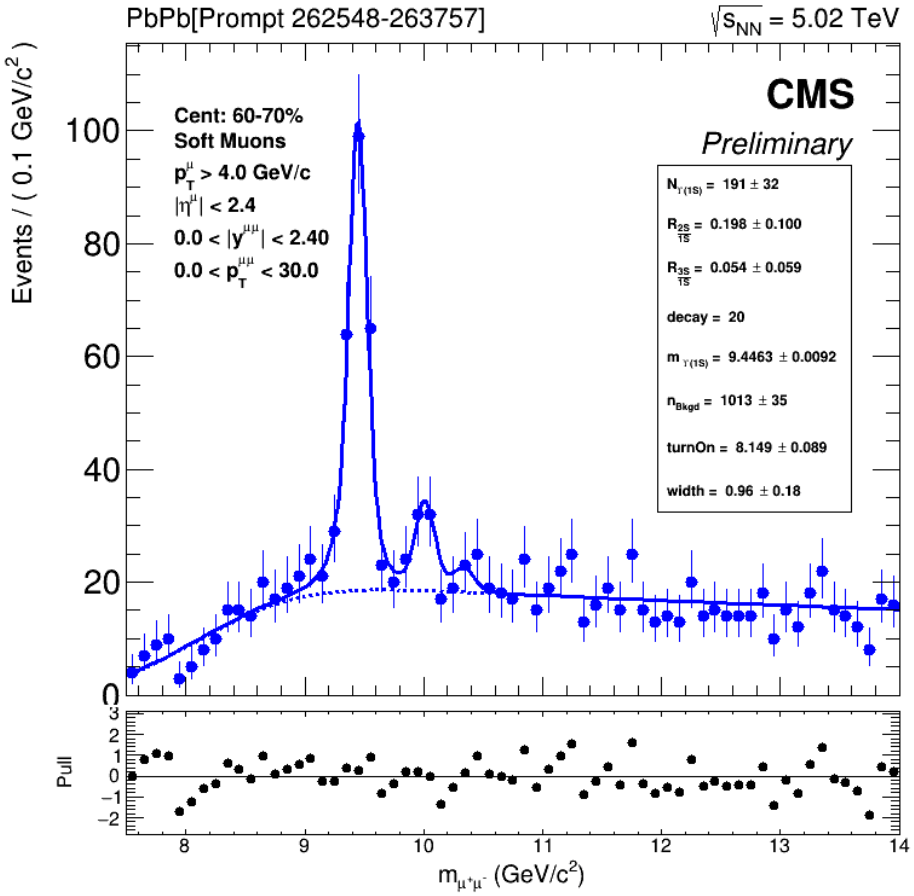


40-50% PbPb

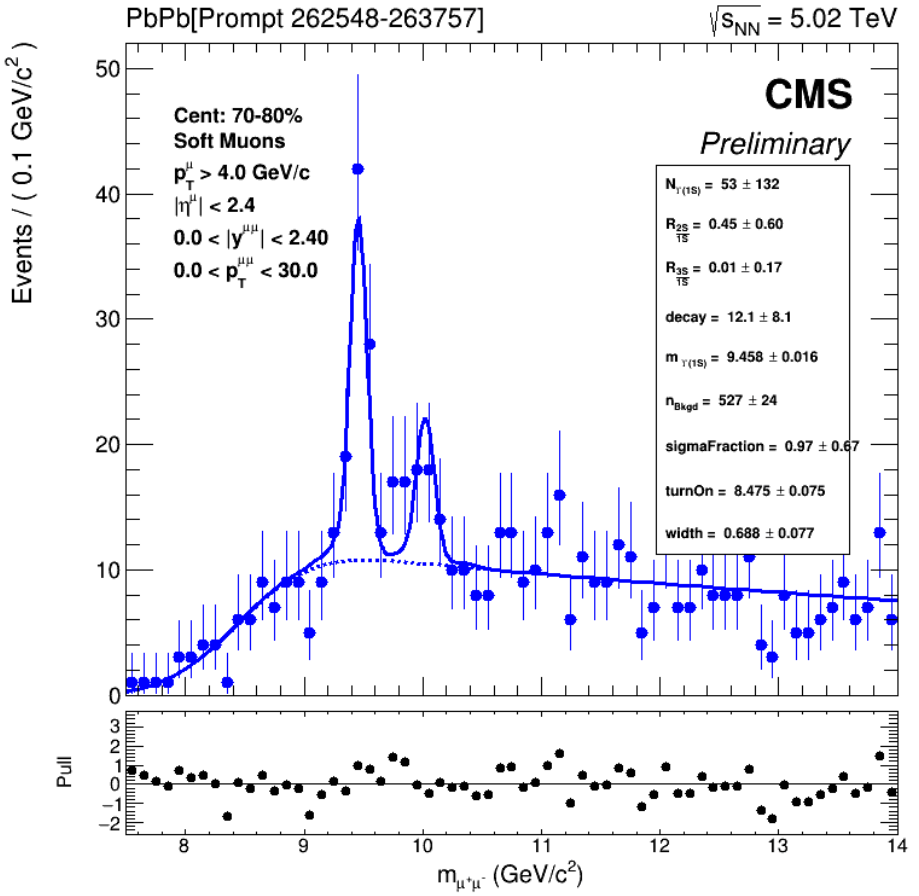


50-60% PbPb

Fits Centrality



60-70% PbPb



70-80% PbPb

Fits Centrality

70-100%