

Status Report on $J/\psi \rightarrow e^+e^-$ Analysis (A Quick Update)

Himanshu Sharma

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A Quick Overview

In Last meeting :

- Events produced for LHC18q_pass1 \rightarrow 12.5M (around)
- Cuts were implemented to observe J/ψ peak in invariant mass distribution.
 - We got a small peak around 3.1 GeV/c

What I did after this (last week)

- Production of events 23M Events in Lego-Train - all runs of LHC18q (Thanks to Arvind and Xiaozhi Bai!)
- Applied postcalibration for e , π and p

Coming Up Next...

- Proper Extraction of J/ψ Signal (*Ionut promised for this*)
- Same to be repeated for LHC15o (*to compare*)

For more information visit [JPSiUsingML](#)

[Xiaozhi's slides](#)

Status

A) Production of Reduced Trees for Analysis

B) Analyzing the dstTrees

→ Invariant Mass Signatures

A) Production of Reduced Trees for Analysis



Newly switched ON branches in the dstTrees (Discussion with Jacek) :

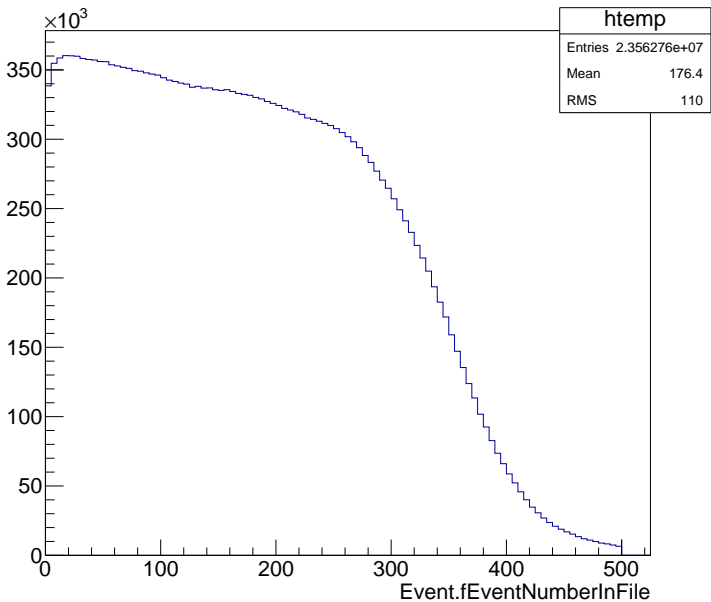
- flsSPDPileup
- fNpileupSPD
- fNpileupTracks

!hasMC

- fTracks.fMCMom*
- fTracks.fMCFreezeout*
- fTracks.fMCLabels*
- fTracks.fMCPdg*
- fTracks.fHFProc
- fTracks.fMCGeneratorIndex

These branches might be useful at some point, otherwise we will switch them OFF

Event.fEventNumberInFile



B) Analyzing the dstTrees



Event Cuts

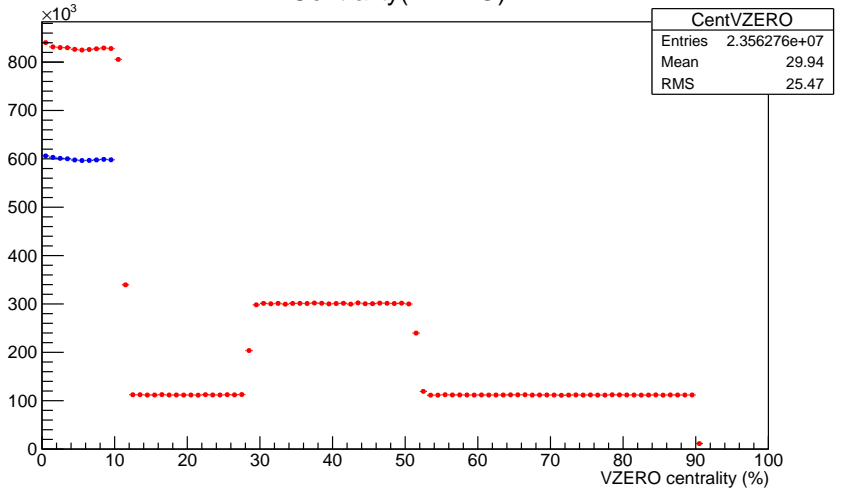
- INT7
- Central (For LHC18qr)
- SemiCentral (For LHC18qr)

```
***** Set event cuts *****
AliReducedEventCut* evCut1 = new AliReducedEventCut("Centrality", "Centrality selection");
evCut1->AddCut(AliReducedVarManager::kCentVZERO, 0., 10.);
evCut1->AddCut(AliReducedVarManager::kVtxZ, -10.0, 10.0);
if(!runOverMC) evCut1->AddCut(AliReducedVarManager::kVZEROTotalMultFromChannels, 0.0, 46000.);

TF1* pol2Func = new TF1("pol2Func", "[0]+[1]*x+[2]*x*x", 0., 1.e+7);
pol2Func->SetParameters(-3000., 0.0099, 9.426e-10); // tight, select the type 1 events

if((prod.Contains("LHC18q") || prod.Contains("LHC18r")) && !runOverMC)
    evCut1->AddCut(AliReducedVarManager::kSDDandSSDclusters, pol2Func, 99999., kFALSE, AliReducedVarManager::kNTPCclusters, 0., 600000.);
processor->AddEventCut(evCut1);
*****
```


Centrality(VZERO)



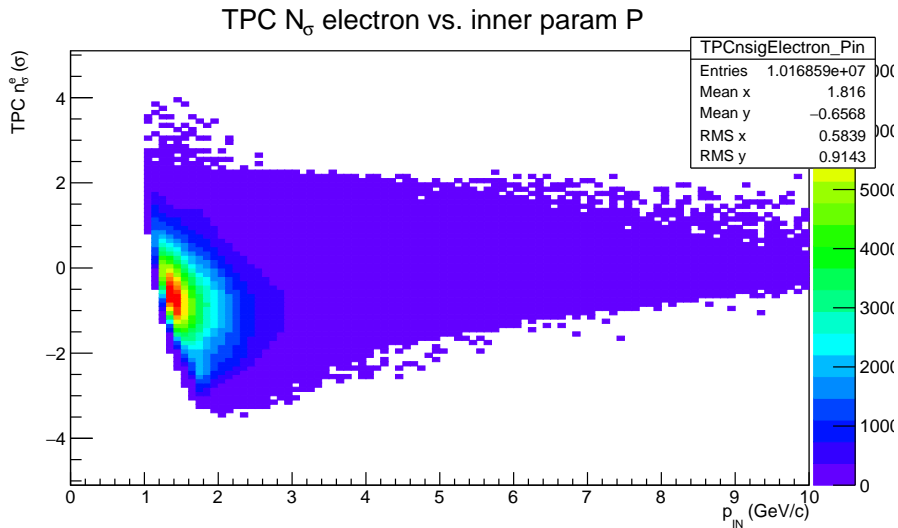
Standard Cut

- $1.2 < p_T < 30$
- $|\eta| \leq 0.9$
- $|\text{DCA}_{xy}| \leq 1.0 \text{ cm}$
- $|\text{DCA}_z| \leq 3.0 \text{ cm}$
- $70 \leq \text{TPCNcls} \leq 160$
- $0.3 \leq \text{TPCNclsSharedRatio} \leq 2.0$
- $0.8 \leq \text{CrossedRowsOverFindable} \leq 2.0$
- $0.1 \leq \chi_{\text{TPC}}^2 \leq 4.0$
- No Kinks
- Atleast 1-hit in any of two layers of ITS
- ITS-refit && TPC-refit

PID Cuts

- e^\pm inclusion $|N_\sigma^e| \leq 3.0$
- π exclusion $|N_\sigma^\pi| \geq 3.5$ (was 3.0)
- p exclusion $|N_\sigma^p| \geq 3.5$ (was 3.0)

After Standard Cut

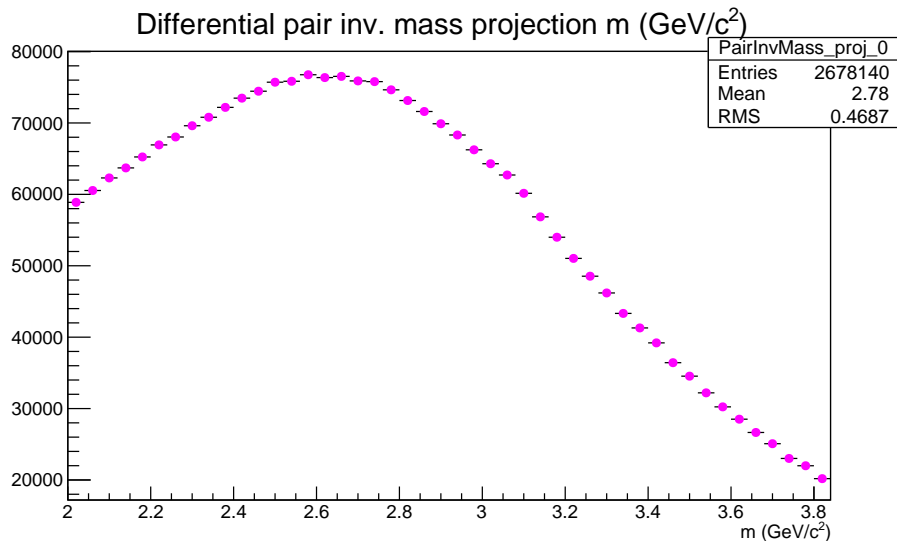


- Instead of applying postcalibration on the previous trees, I used new trees with new cuts (mentioned above).
- Ionut suggested, bin width should be $40\text{MeV}/c$ for inv mass, but with this I kept our fine binning also there.
- In addition, I run the previous analysis (w/o postCal.) for the new trees (23M events).

Ionut's message :

between 1.5 and 4.5 GeV. The jpsi signal peak itself is ofcourse at 3.1 but due to resolution and also energy loss of the electrons it is smeared around the peak, and with a long tail towards lower masses. So, we normally use 40 MeV bins to look at this. Also, in central collisions, the signal to bkg ratio is around 1.5% so you should not be able to see it very well just by eye. We normally employ signal extraction procedures for that, which are described in analysis notes. You can

Invariant Mass SEPM



Invariant Mass MEPM

