

B-meson measurement via secondary J/psi production with CMS at LHC

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Status and plans

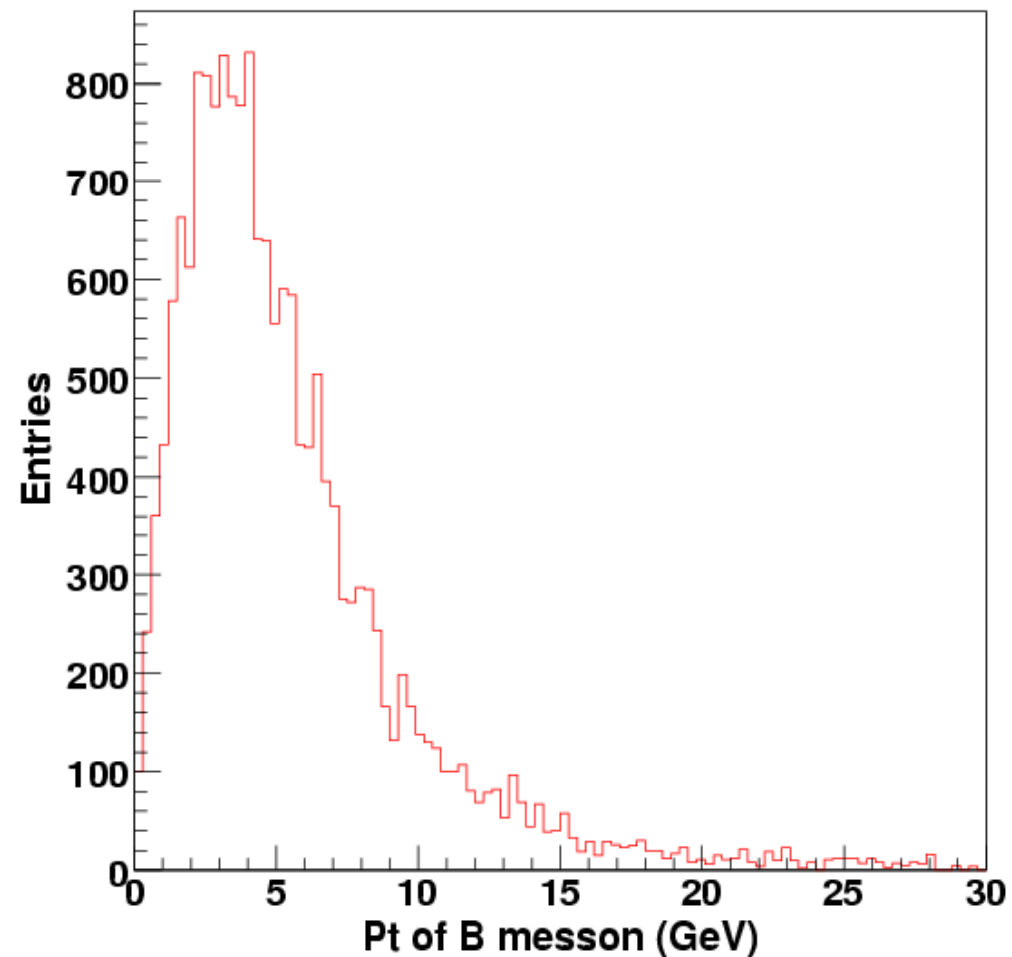
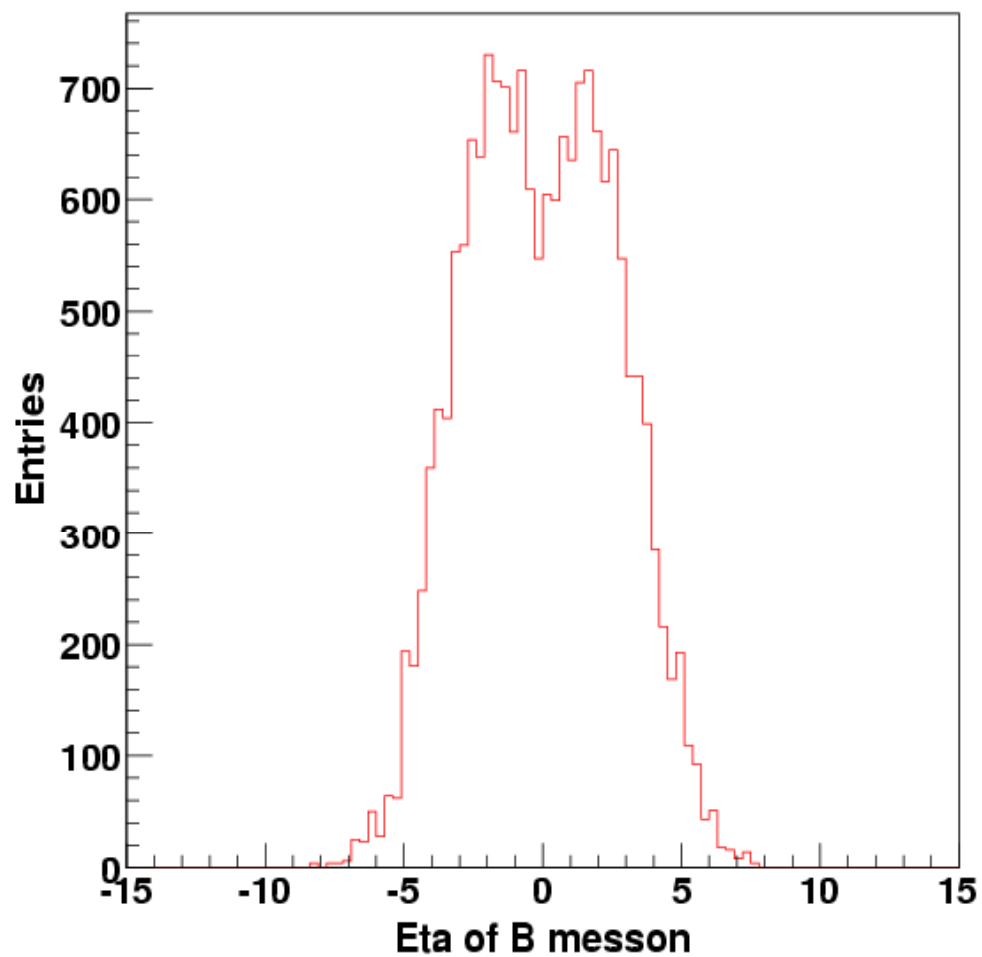
- 1. Generator level studies for acceptances:**
 - * **Direct J/psi and B->J/psi for pp 5.5 TeV,**
 - * **Extrapolation to Pb+Pb**

- 2. Reconstruction for pp**
 - * **Reconstruction efficiency**
 - * **Secondary Vertex reconstruction -- Prashant**
 - * **L1/L2 trigger efficiencies -- Ji Hyun**

- 3. Reconstruction Heavy Ions:**
 - * **CMSSW_1_6_6 + Min Bias HI Tracking Code**
 - * **Tracking (Signal + HydJet events)**
 - * **Secondary Vertex**

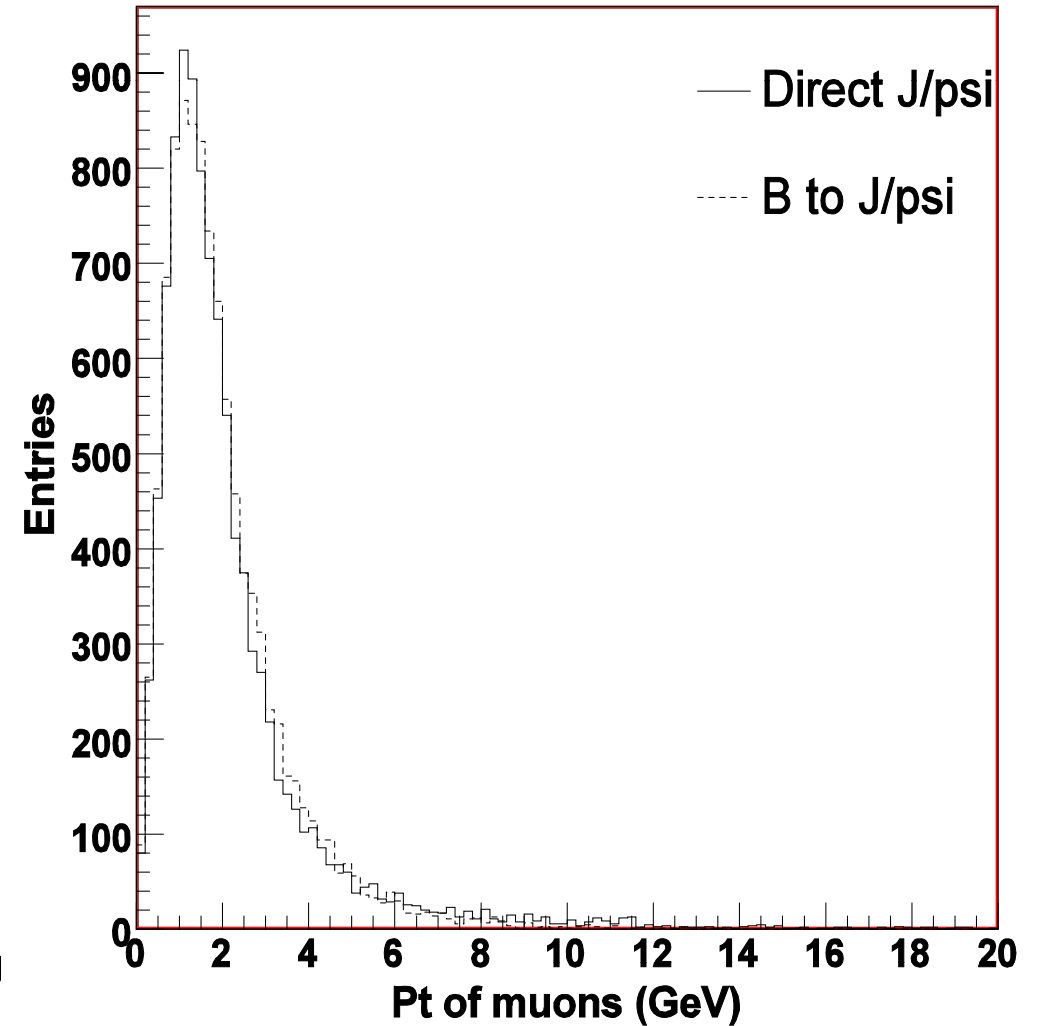
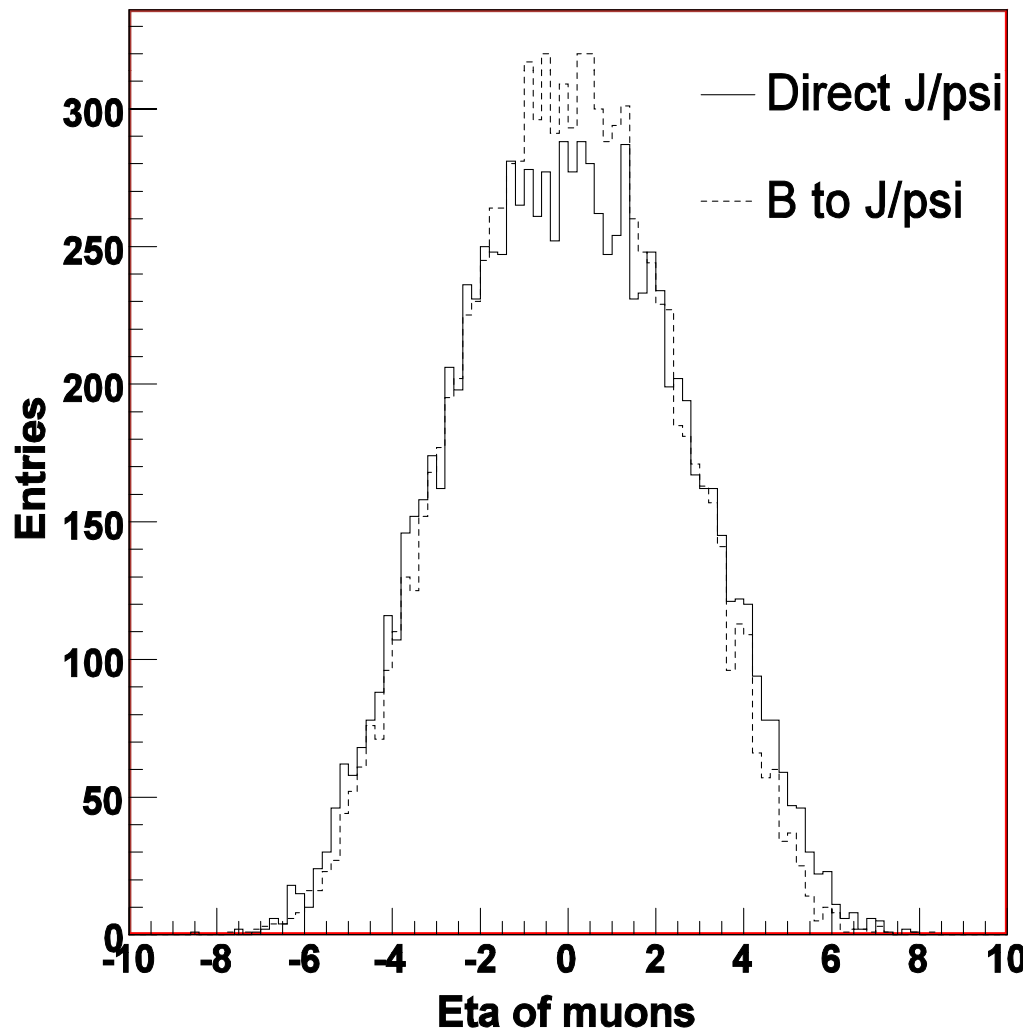
Eta and Pt Distribution of B mesons

PP at 5.5 TeV, Pythia source



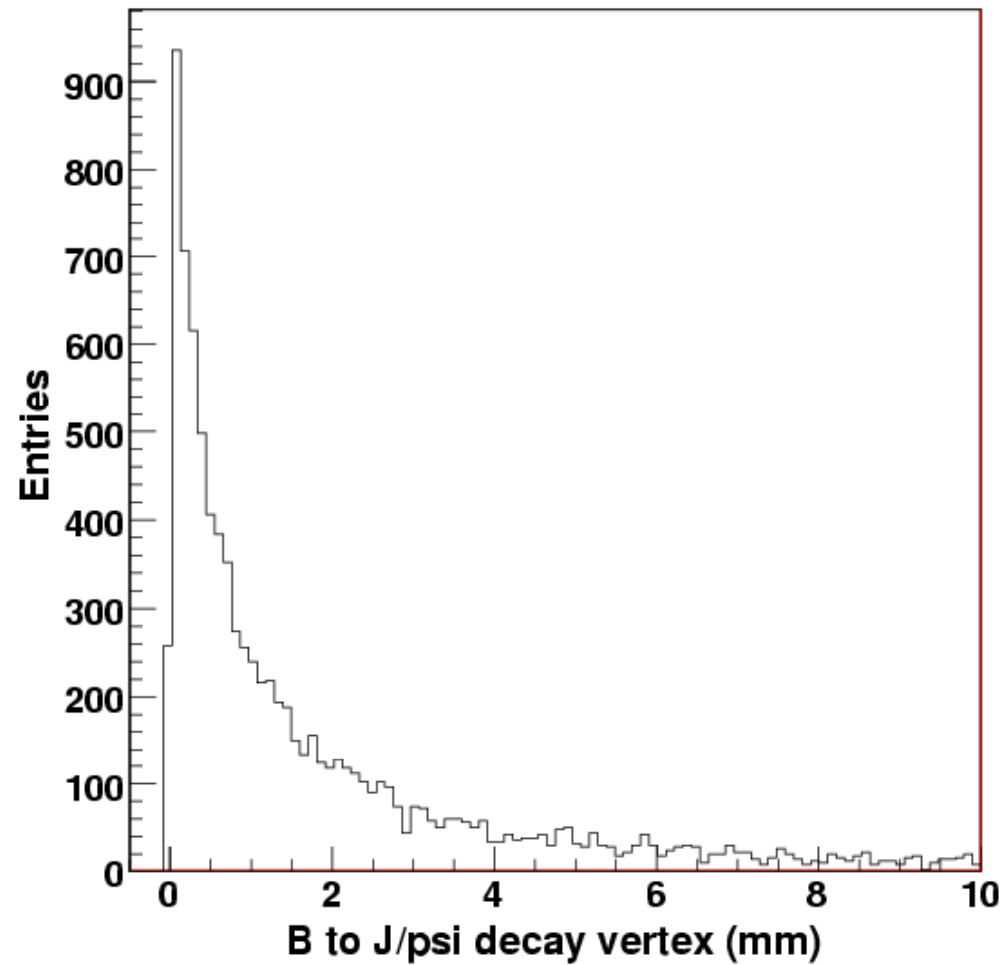
Eta and Pt Distribution of decay muons

PP at 5.5 TeV, Pythia source, 5000 Events



Vertex Distribution of B mesons

PP at 5.5 TeV, Pythia calculations



Comparison of direct J/ψ and B to J/ψ

PbPb at 5.5 TeV, for one month of LHC Running

	$J/\psi \rightarrow \mu^+ \mu^-$	$B \rightarrow J/\psi \rightarrow \mu^+ \mu^-$
cross section	506 mb (J/ψ)	7355 mb ($B\bar{B}$)
No. of $B\bar{B}$	-	3.7×10^9
No. of J/ψ	2.5×10^8	8.6×10^7
No. of $\mu^+ \mu^-$ pairs	1.5×10^7	5.15×10^6
η acceptance	0.5386	0.6169
η and $P_T > 5.0$ acceptance	0.016	0.0022
η and $P_T > 3.5$ acceptance	0.030	0.011
η and $P_T > 2.0$ acceptance	0.079	0.063
Accepted $\mu^+ \mu^-$ for $P_T > 5.0$	2.3×10^5	11300
Accepted $\mu^+ \mu^-$ for $P_T > 3.5$	4.4×10^5	57000

**Cross section
taken from CERN
yellow report**

Does not include tracking and PID efficiency

The ratio of secondary to primary Jpsi

PP at 5.5 TeV, Pythia calculations for
one month of LHC Running

In all phase space;
Ratio = 0.29

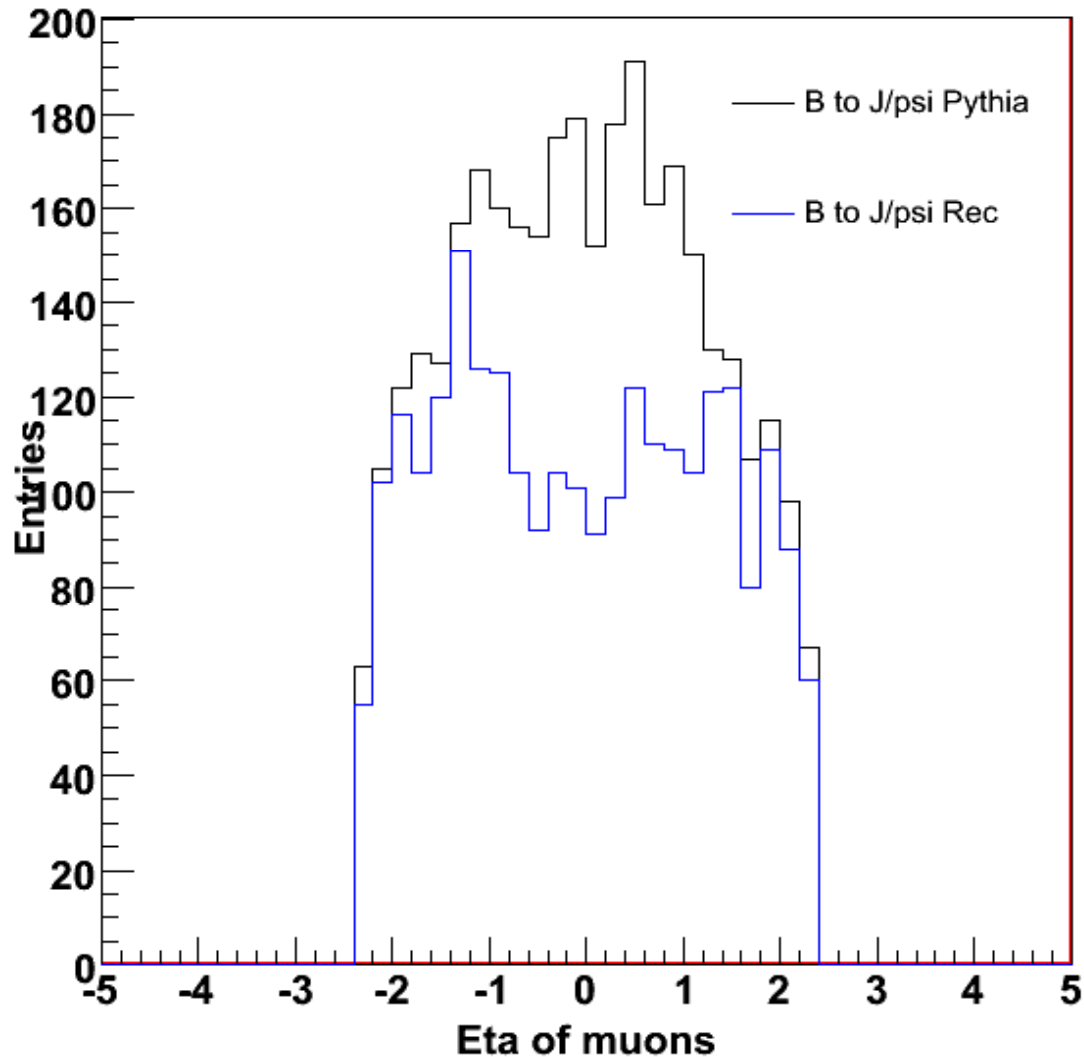
In CMS acceptance
|Eta| < 2.4
Pt > 3.5
Ratio = 0.106



Reconstructed Muons from B->J/psi

PP at 5.5 TeV, CMSSW_1_6_6

for 3586 events in $|\text{Eta}| < 2.4$, $\text{Pt} > 2 \text{ GeV}$



$|\text{Eta}| < 2.4$, $\text{Pt} > 3.5 \text{ GeV}$

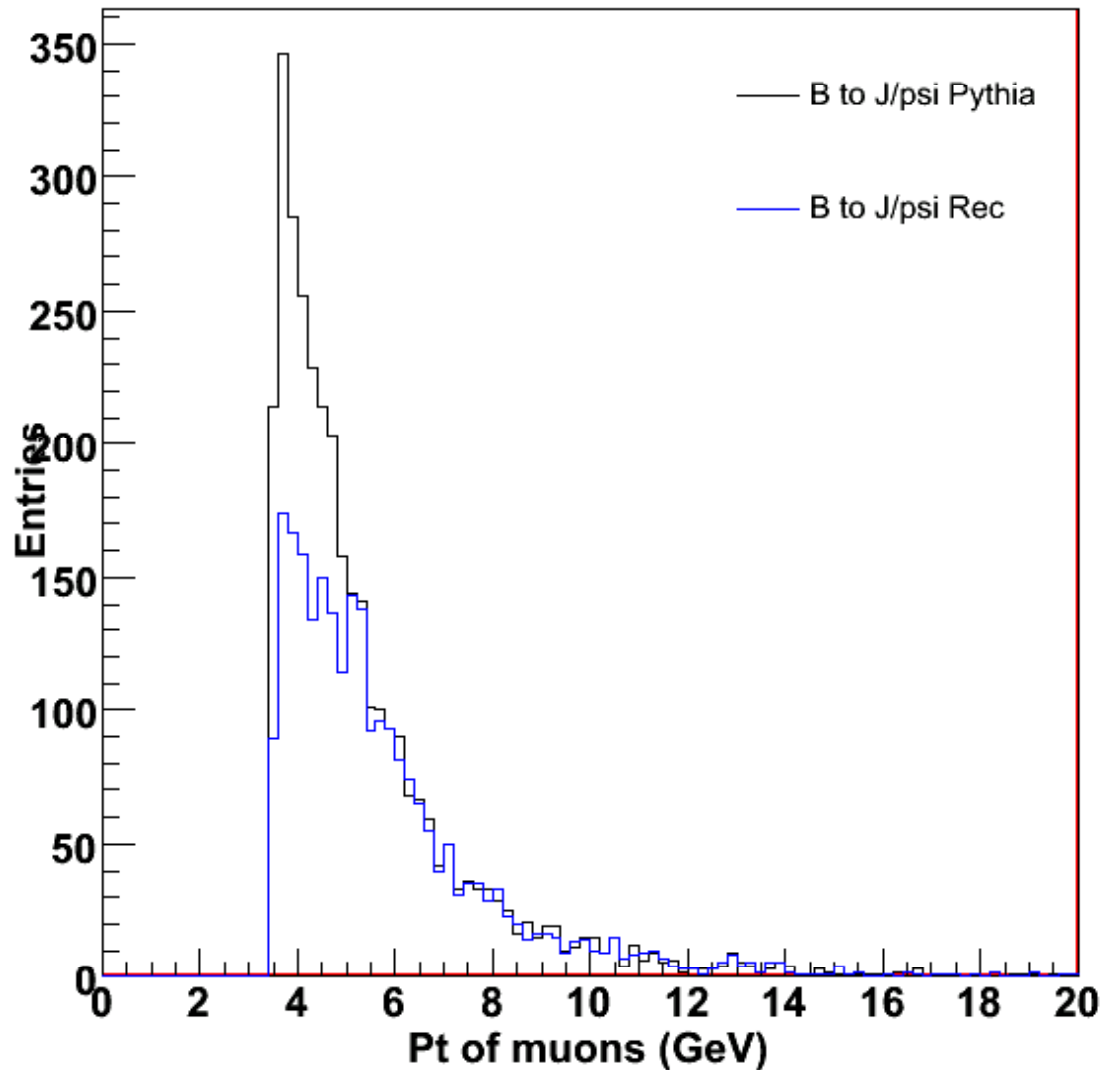
Generated Muons 3341
Reconstructed Muons 2515
Recons Eff = 75.27 %



Reconstructed Muons from B->J/psi

PP at 5.5 TeV, CMSSW_1_6_6

for 3586 events in $|\text{Eta}| < 2.4$, $\text{Pt} > 2 \text{ GeV}$



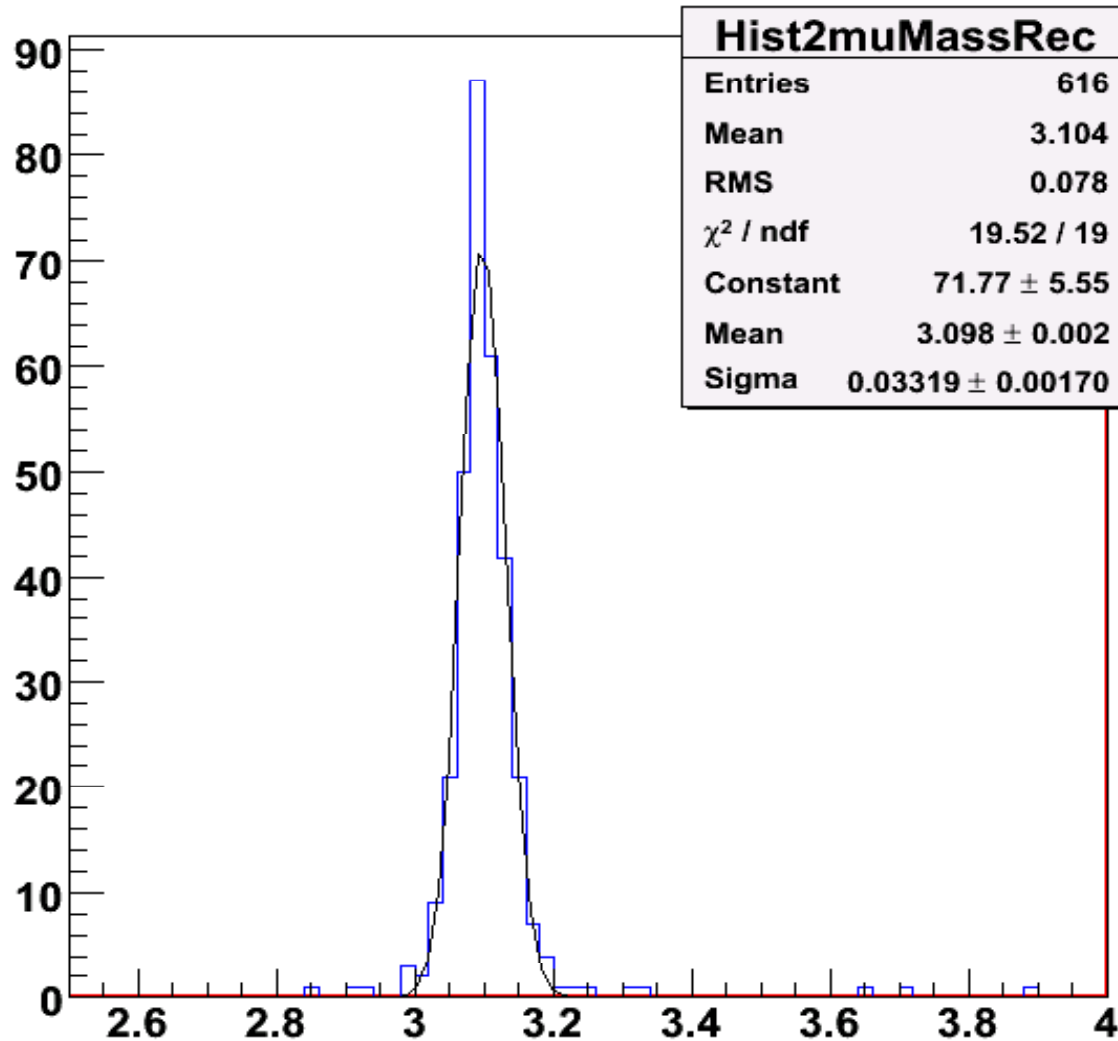
$|\text{Eta}| < 2.5$, $\text{Pt} > 3.5 \text{ GeV}$

Generated Muons 3341
Reconstructed Muons 2515
Recons Eff = 75.27 %



Reconstructed Jpsi from B->J/psi

PP at 5.5 TeV, CMSSW_1_6_6
for 3586 events in $|\text{Eta}| < 2.4$, $\text{Pt} > 2 \text{ GeV}$



$|\text{Eta}| < 2.4$, $\text{Pt} > 3.5 \text{ GeV}$

Generated J/psi 1024
Reconstructed J/psi 616
Recons Eff = 60.1 %



Future Plans

1. **Secondary Vertex reconstruction for pp HeavyFlavourAnalysis/Bs2MuMu (Ongoing)**
2. **L1/L2 trigger efficiency (Ji Hyun)**
 - * **J/Psi reconstruction from dimuon in CMSSW_1_6_6 (complete almost)**
 - * **Getting J/Psi trigger efficiency using L1/L2 information (near future)**
3. **Reconstruction Heavy Ions:**
 - * **CMSSW_1_6_6 + Min Bias HI Tracking Code
CMS/MinimumBiasTracking**
 - * **Tracking (Signal + HydJet events)**
Hydjet events from Inventory: /castor/cern.ch/user/y/yilmaz/mc/
 - * **Secondary Vertex (??)**