

# J/ψ production at high p<sub>T</sub> in d+Au collisions at STAR

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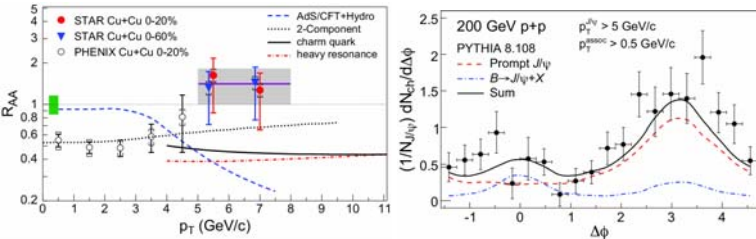


## Abstract

The high-p<sub>T</sub> J/ψ (p<sub>T</sub>>5 GeV/c) production provide a unique probe to study heavy quarkonia production mechanism and hadronization. The previous high-p<sub>T</sub> J/ψ measurements in p+p and Cu+Cu collisions at RHIC-STAR found several interesting things, such as: 1) The nuclear modification factor in Cu+Cu collisions at p<sub>T</sub> 5 GeV/c is close to 1. This is consistent with no J/ψ suppression, and is about 2σ above the values at low p<sub>T</sub>. 2) An absence of charged hadrons accompanying high-p<sub>T</sub> J/ψ on the near side was observed, in contrast to the strong correlation peak in the di-hadron correlations. This constrains the B-meson contribution and jet fragmentation to inclusive J/ψ.

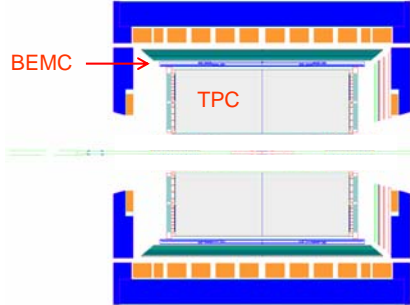
In this poster, we present our analysis of mid-rapidity (|y|<1) J/ψ→e<sup>+</sup>e<sup>-</sup> production at p<sub>T</sub>>2.5 GeV/c in d+Au collisions at  $\sqrt{s_{NN}} = 200$  GeV. The dataset are from RHIC year 2008 runs with significantly reduced material (~1/10), sampling ~10 (nb)<sup>-1</sup> of d+Au collisions in several EMC triggers with different thresholds. The differential cross section compared with that from p+p collisions and the rapidity asymmetry can be used to understand the Cold Nuclear Matter (CNM) effect on J/ψ production which is of importance to interpretations of J/ψ suppression in heavy ion collisions. The J/ψ-hadron azimuthal angle correlation will also be presented to study the J/ψ production mechanism and hadronization.

## Previous Measurements



- Consistent with no suppression at high p<sub>T</sub>
- Indication of increase R<sub>AA</sub>
- Different with open charm
- Any anti-shadowing effect?
- No significant near side correlation
- In contrast to the di-hadron correlations
- (B→J/ψ) / inclusive = (13 ± 5)%
- In d+Au collisions?

## STAR Detector



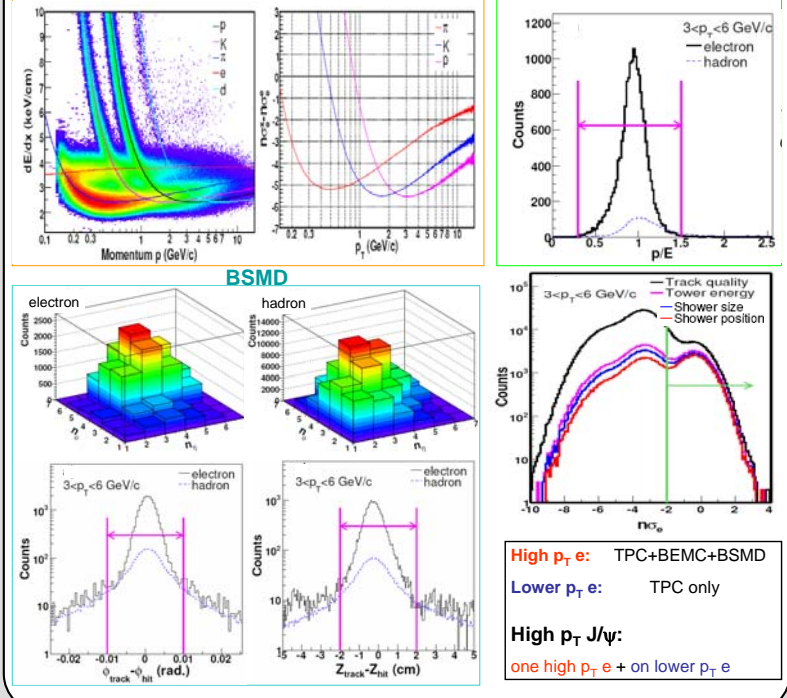
**Time Projection Chamber:**  
-1<η<1, 2π in azimuthal

**Barrel Electromagnetic Calorimeter:**  
-1<η<1, 2π in azimuthal  
fast trigger to enrich high p<sub>T</sub> electron sample

**Barrel Shower Maximum Detector:**  
Embedded in BEMC  
At ~5 X0 depth  
electron / hadron separation

Removed inner trackers (SVT and SSD)  
Reduce material by a factor of 10

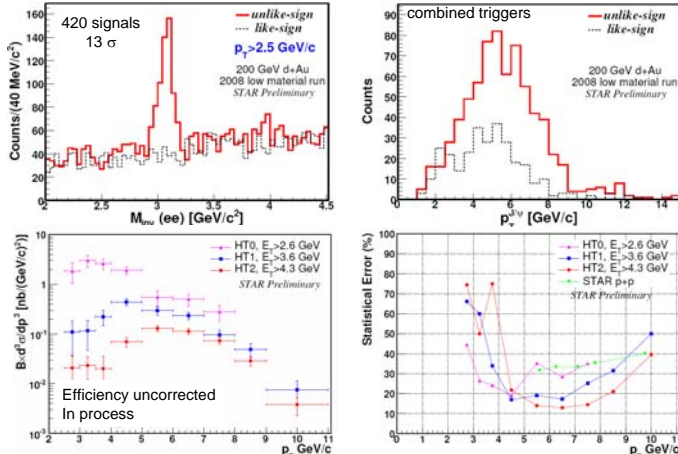
## Electron Identification



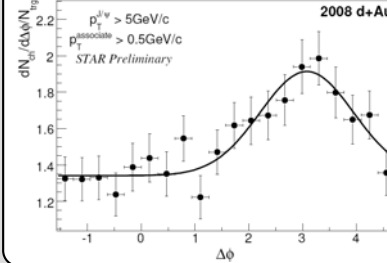
High p<sub>T</sub> e: TPC+BEMC+BSMD  
Lower p<sub>T</sub> e: TPC only  
High p<sub>T</sub> J/ψ:  
one high p<sub>T</sub> e + on lower p<sub>T</sub> e

## High p<sub>T</sub> J/ψ Signal and Spectra

Trigger	Threshold	# Events (M)	Luminosity (nb <sup>-1</sup> )	pp-equivalent Lum. (pb <sup>-1</sup> )	J/ψ Counts	Significance
BEMC-HT0	E <sub>T</sub> >2.6 GeV	4.6	0.34	0.14	71 ± 15	4.3
BEMC-HT1	E <sub>T</sub> > 3.6 GeV	4.5	2.1	0.8	120 ± 16	7.3
BEMC-HT2	E <sub>T</sub> > 4.3 GeV	5.9	8.4	3.3	194 ± 20	9.5



## High p<sub>T</sub> J/ψ - hadron Correlation



Constant + Gaussian function Fit  
No significant near side correlation  
Constraint on B→J/ψ is in progress

## Conclusion and Outlook

We measured high p<sub>T</sub> J/ψ in 2008 d+Au collisions at 200 GeV at STAR  
Good significance, 13σ  
Low background, S/B ~ 2

**Spectra is in progress**  
Production mechanism  
Cold Nuclear Matter Effect (R<sub>dAu</sub>, rapidity distribution)

**No near side correlation**  
Confirmed previous p+p results  
Constraint on B→J/ψ is in progress

