

Study of $J/\psi \rightarrow e^+e^-$ in d-Au Collision with Electron Triggers in PHENIX

W. Xie

(UC. Riverside)

PHENIX Collaboration

April APS in 2003

Outline

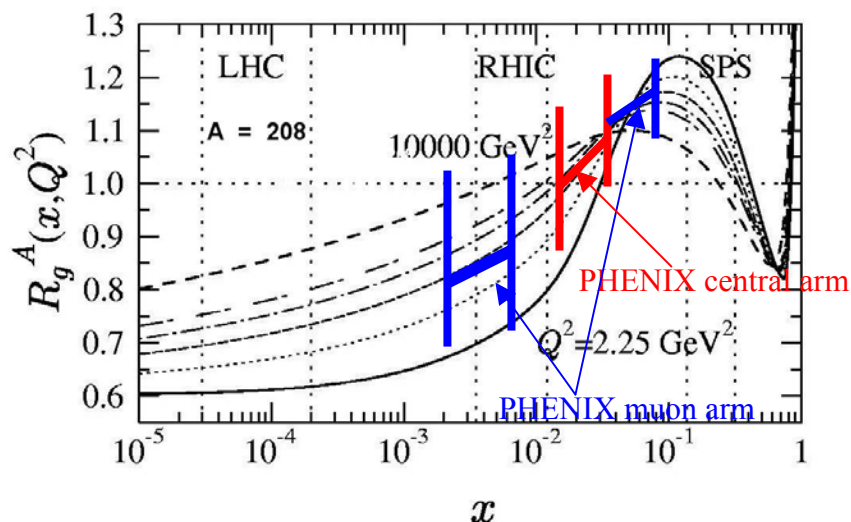
- Motivation
- Electron Measurements in PHENIX
- Central Arm Level-1 Electron Trigger
- Electron Trigger Performance Evaluation
- $J/\psi \rightarrow e^+e^-$ Signal in dAu collisions
- Summary

J/ ψ Suppression or Enhancement:

--Signal of QGP Formation

- The charm and anti-charm quark pair are predicted to disassociate due to color screening in QGP leading to J/ ψ suppression (*Phys. Lett. B* 63(1986)416)
- More recent model (*hep-ph/0009090*) predict J/ ψ enhancement when QGP is formed.

Eskola, Kolhinen, Vogt hep-ph/0104124

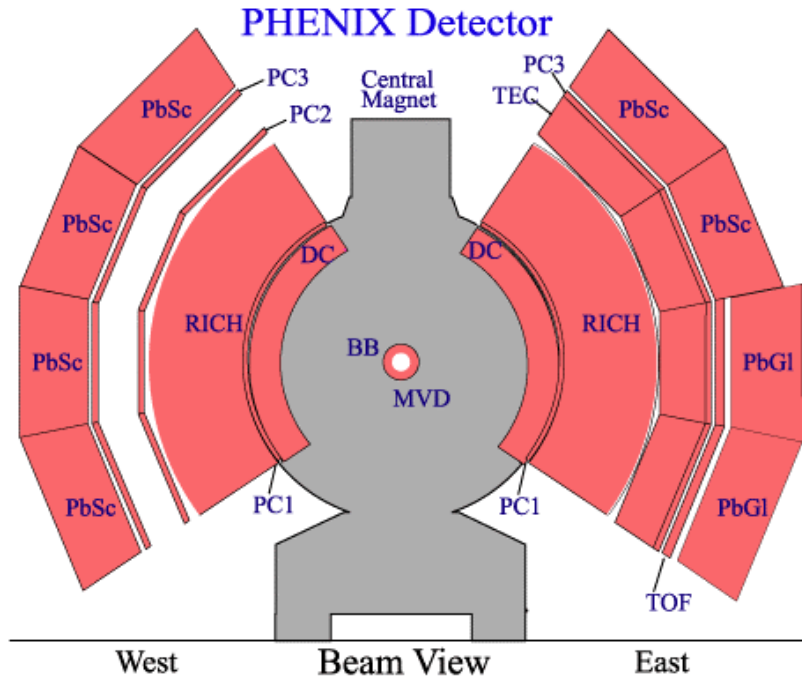


There're also suppression or enhancement due to normal nuclear effect:

- Gluon shadowing
- Nuclear absorption.

Nuclear effect can be understood through p-A collisions.

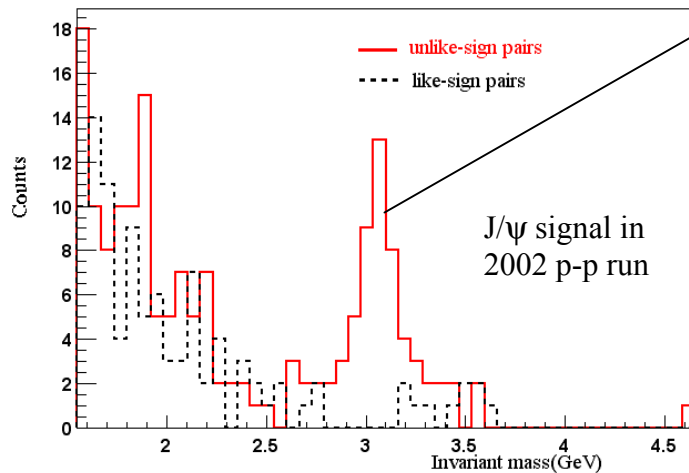
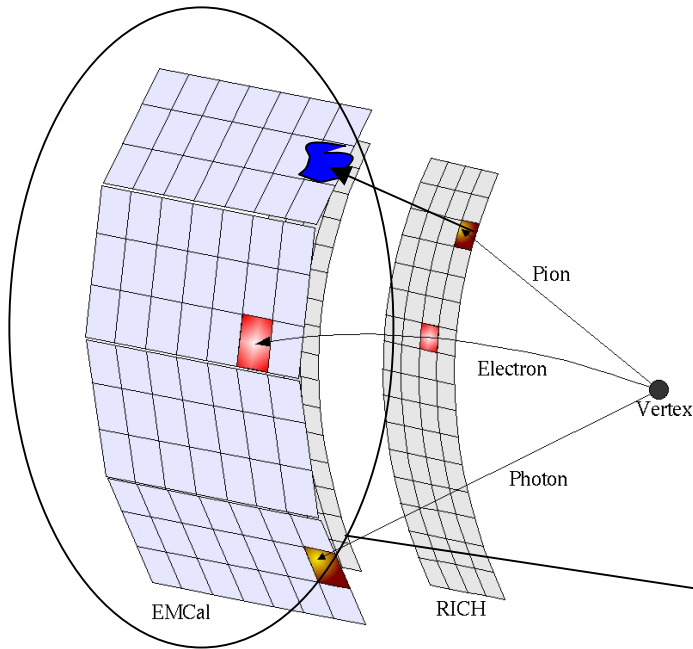
Electron Measurement in PHENIX



Measure electron between
 $|\eta| \leq 0.35$ and $\text{mom} > 0.2 \text{ GeV}$

- ✓ High resolution tracking and momentum measurement from Drift chamber.
- ✓ Good electron identification from Ring Imaging Cherenkov detector (RICH) and Electromagnetic Calorimeter (EMCal).
- ✓ High performance Level-1/Level-2 trigger

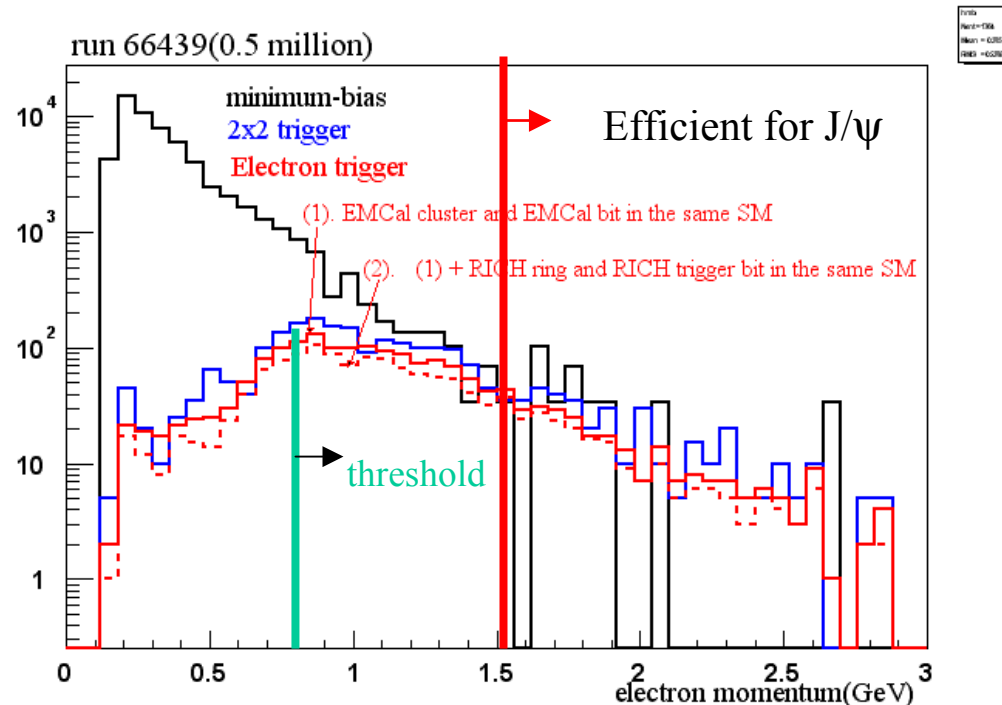
Central Arm Level-1 Electron Trigger



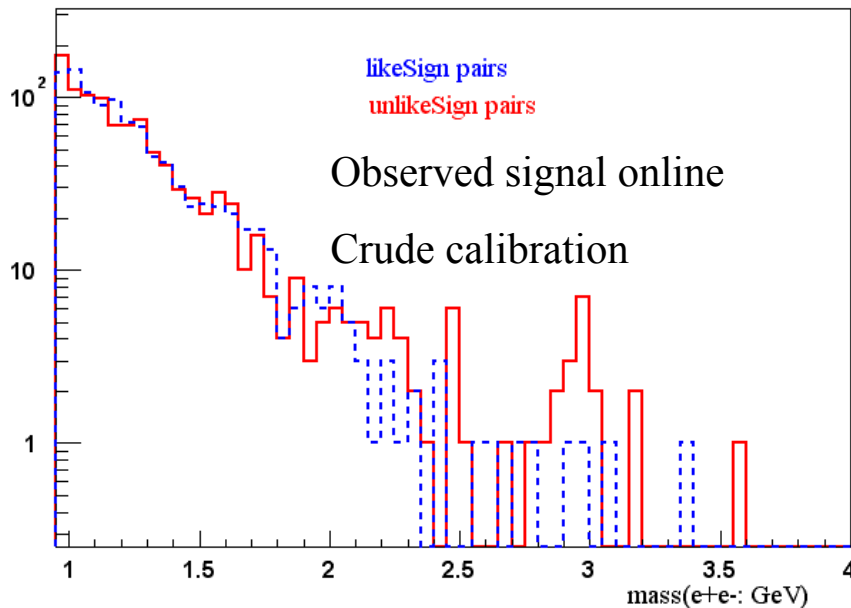
- The correlation between specific region in EMCal and RICH are designed to trigger on electrons.
- In year 2002 p-p run, electron trigger with EMCal only is used successfully to trigger on J/ψ with 90% efficiency.
- In year 2003 d-Au run, RICH is combined with EMCal to select much clean electron sample

Electron Trigger Performance Evaluation

We implemented framework to do online calibration for all subsystem and evaluation for triggers. The trigger performance can be directly checked. The rejection is about 100 and efficiency for J/ψ is above 90%.



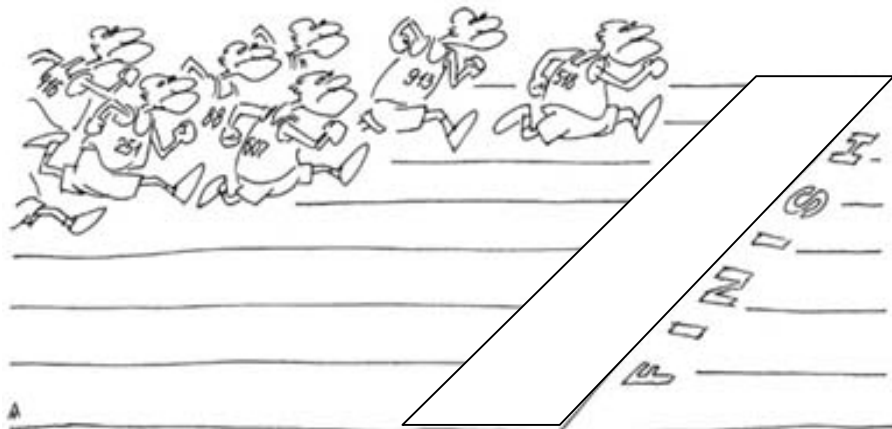
$J/\psi \rightarrow e^+e^-$ Signal in dAu Collision



- With online calibration, we observed $J/\psi \rightarrow e^+e^-$ signal.
- The width of J/ψ is expected to be 60 MeV after good calibration.
- We expect to get a few hundreds of $J/\psi \rightarrow e^+e^-$ in the 2003 dAu run.

Ongoing Activities and Summary

- First version of calibration/alignment is at hand and the quality will be further improved by afterburner calibration.
- Reconstruction Production is underway.
- Machinery for J/ψ analysis including trigger efficiency analysis is available and need to be tuned with good calibration.



We have observed J/ψ signal from electron trigger event with crude calibration and running very hard to achieve the final results for dAu collisions.