PHENIX Beam Use Proposal for Runs 11 & 12

- PHENIX productivity
- Accomplishments in Run-10
- Upgrades for Run-11

  Big drivers of our beam use proposal!
- Beam Use Proposal

  Run-11

  W asymmetry, heavy flavor in medium

  Flow/jet quenching excitation function

  U+U "engineering run" for event selection

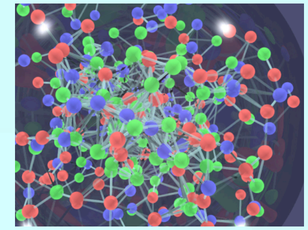
  Run-12

Barbara Jacak for the PHENIX Collaboration

Special thanks to Stefan Bathe (Run-10 Coordinator)

http://www.phenix.bnl.gov/WWW/publish/jacak/sp/presentations/BeamUse10/BUP10.pdf

What does PHENIX do?



Our key physics goals

Establish nature of RHIC's new state of matter

sensitive, rare probes: di-leptons, heavy flavor, jets

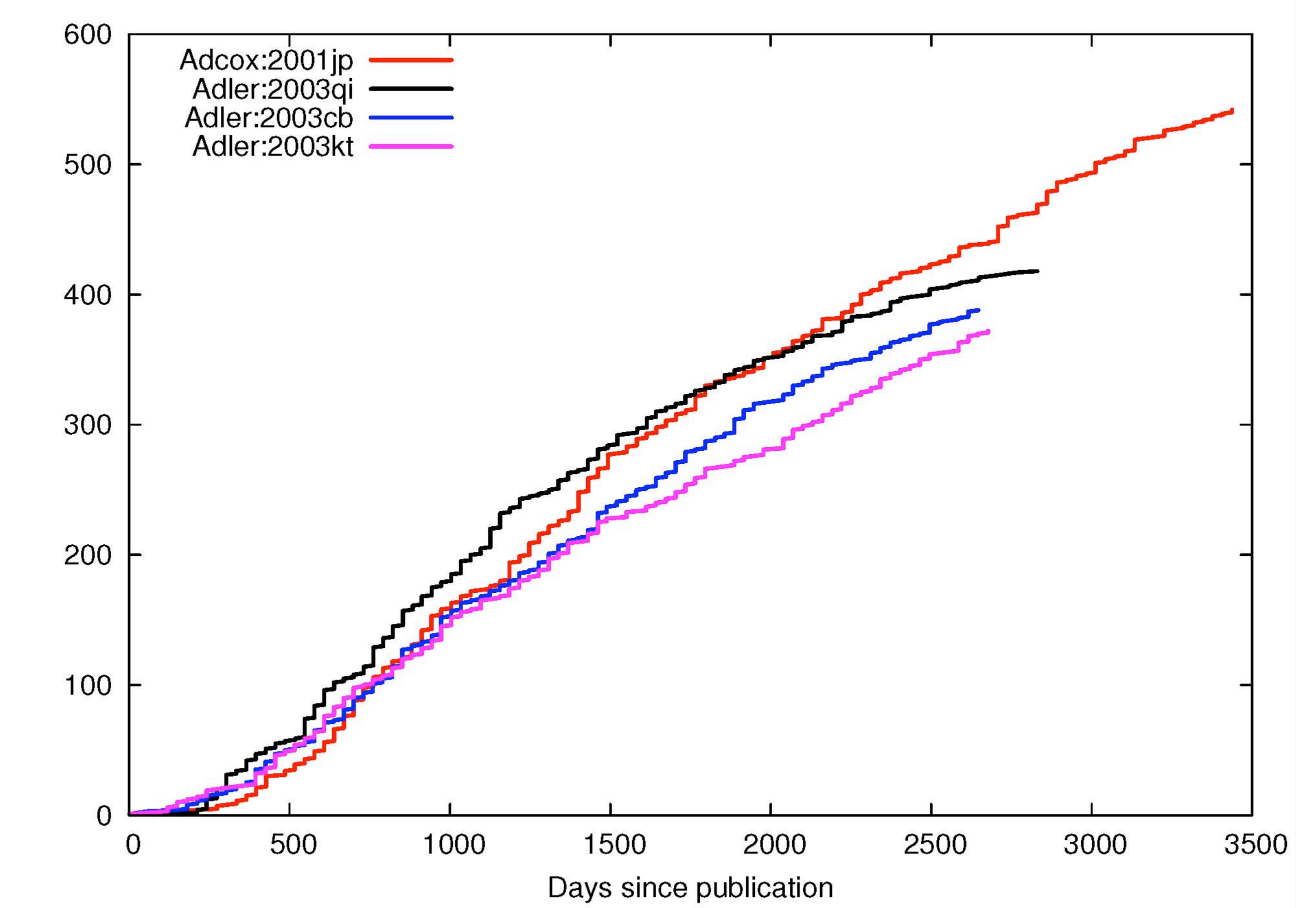
Spin of the proton:

g, $\bar{q}$ polarization & parton/nucleon spin correlation

- **PHENIX philosophy**
  - **Rare process sensitivity**
  - **High rate capability + selective triggers**
  - **Precision measurement in multiple channels**
  - **Incremental upgrades of capabilities**
- ***Keep up with data analysis in parallel with:***
  - ***taking data***
  - ***constructing upgrades***
  - ***writing high impact papers (27 topcite 100+, 29 topcite 50+, and 3 with 49 citations)***

How well do we do it?

- 88 papers published, 51 of them PRL's
- + one in proof, 6 in referee process
- 3 major archival papers within the last 12 months!



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Recent scientific accomplishments

- **Thermal radiation at RHIC** *PRL 104, 132301 (2009)*
- **Di-electrons in Au+Au & p+p** *PRC81, 034911 (2010)*
- **heavy flavor R_{AA} and v_2** *1005.1627*
- **γ-h and h-h correlations** *1006.1347, 1002.1077*
- **J/ψ polarization** *0912.2082*
- **η, ϕ suppression** *1005.4916, 1004.3532*
- **high p_T π^0 v_2** *PRC80, 054907 (2009), 1006.3740*
- **Meson systematics in p+p** *1005.3674*
- **Charged hadron v_4, v_2** *1003.5586*
- **Helicity sorted jet k_T** *PRD81, 012002 (2010)*

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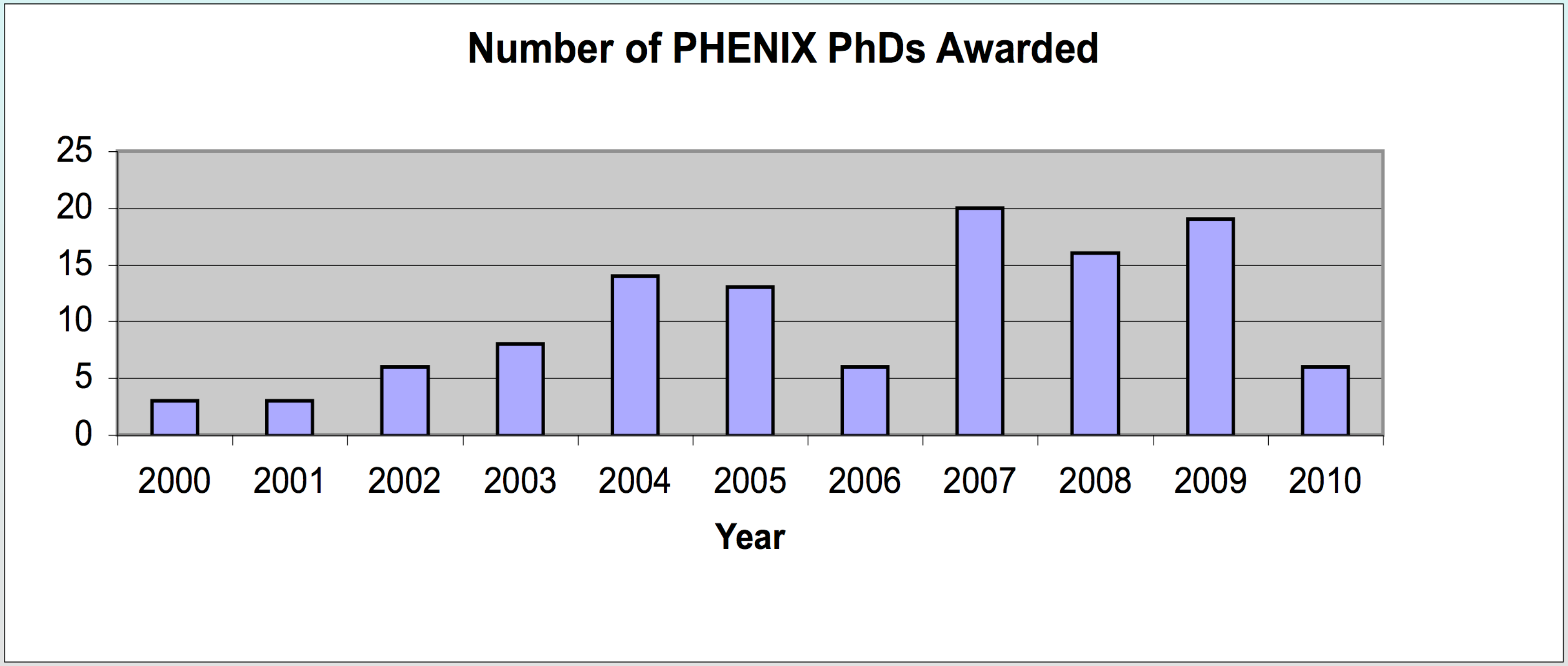
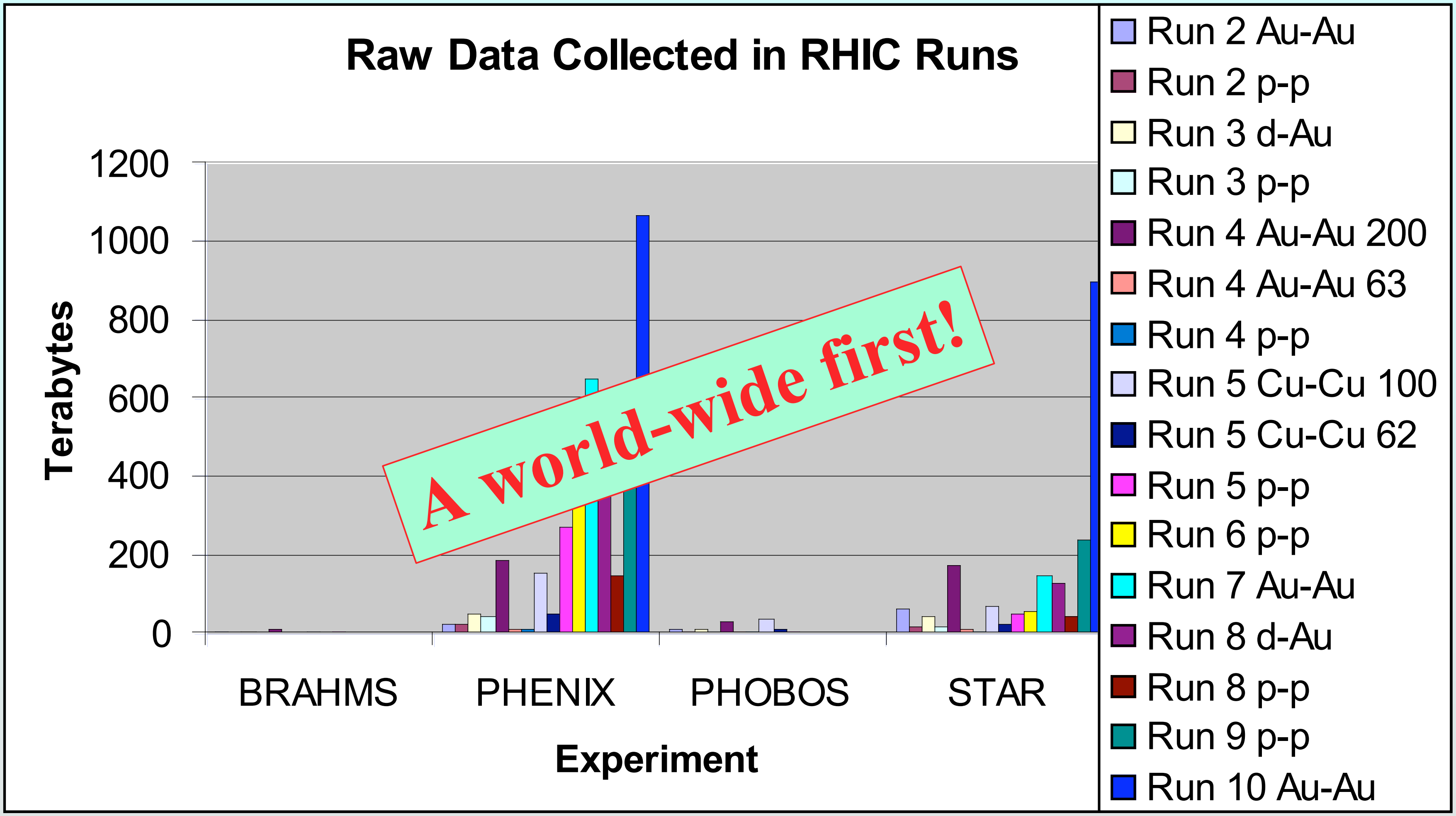
PHENIX is productive & educational

- 104 Ph.D's granted, to date
- 24 Masters' degrees
- >90 students currently working on PHENIX



Milestone! PHENIX data rate >1 PB/year



- **Production teams drawn from collaboration**

Run-10: Jeff Mitchell, Nathan Grau

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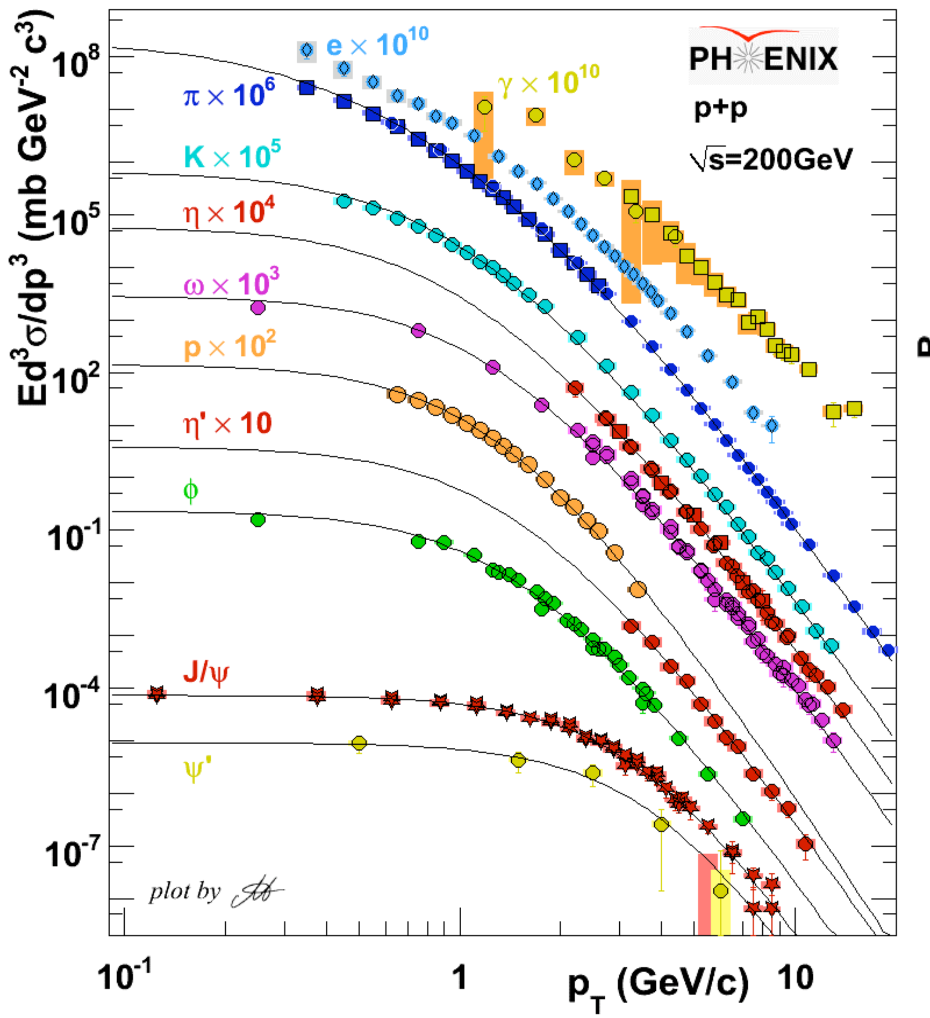
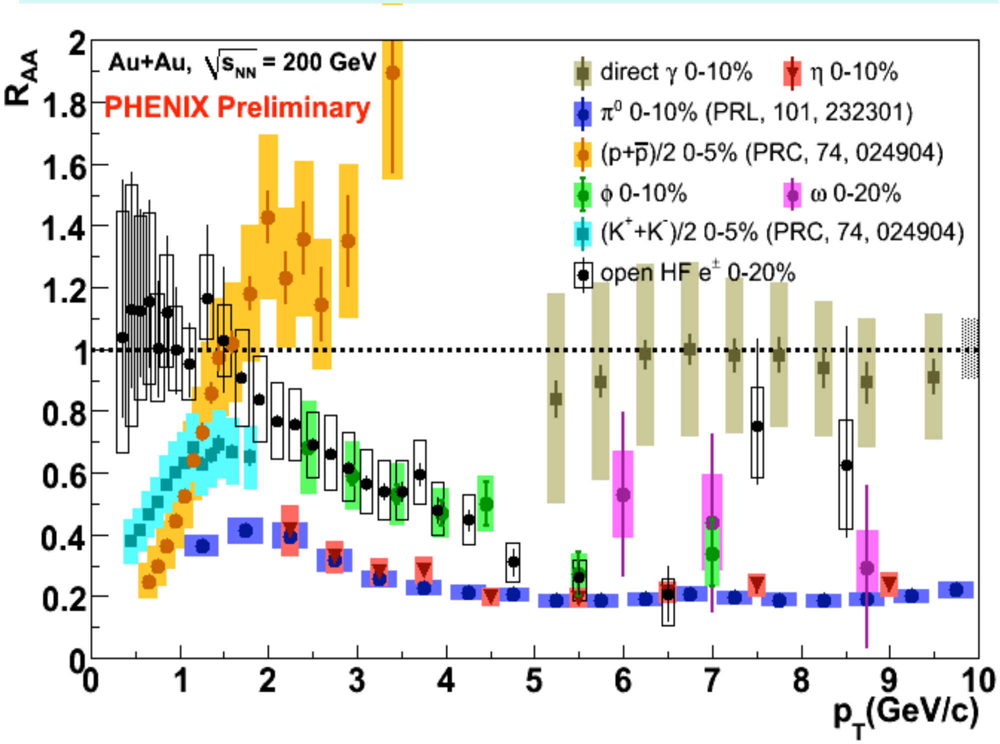
Unprecedented data range & precision



In p+p

Central Au+Au



So, how are we doing?

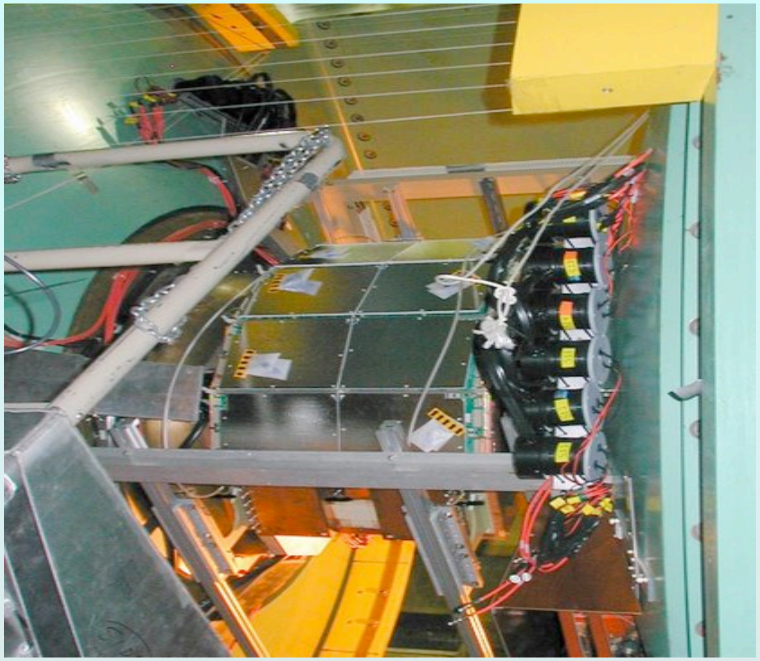
NB: Run 10 *just* ended,
have *unprecedented >1 PB* in the "can"!

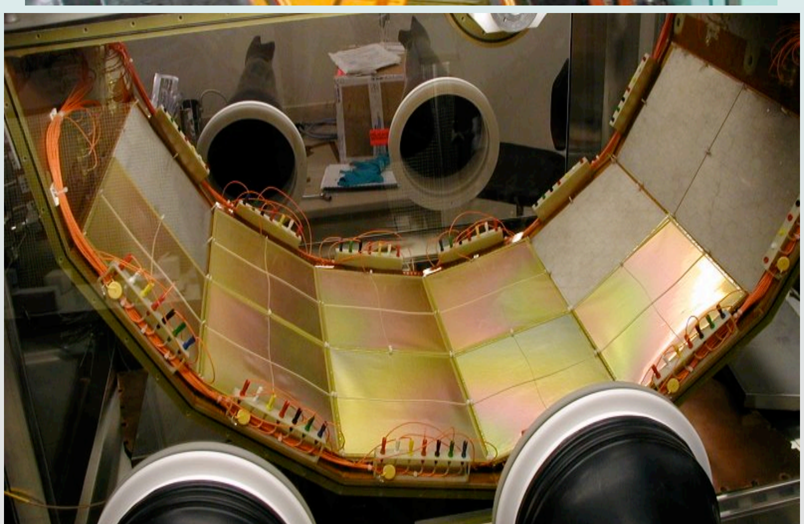
PHENIX physics in Run-10 :

- **low mass dilepton excess**
- **J/ψ suppression**
- **excitation function for flow and jet quenching**

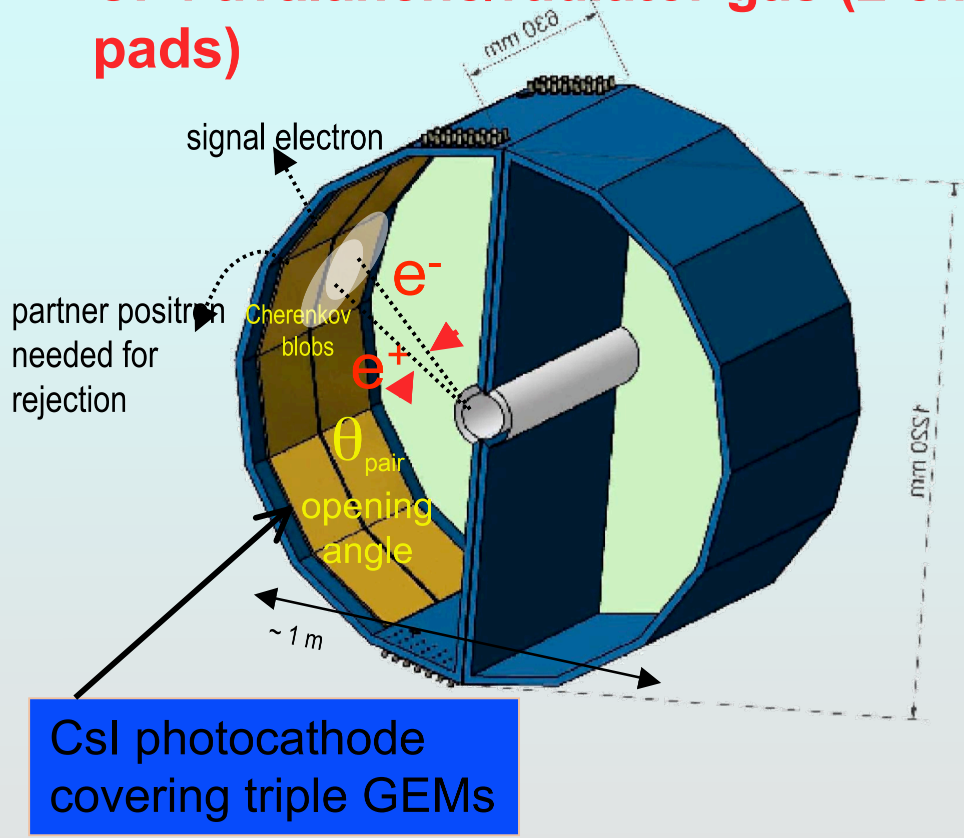
But, we have analyzed Run-9…

Run-10 focus: Hadron Blind Detector





Windowless Cerenkov detector with CF4 avalanche/radiator gas (2 cm pads)



Removes Dalitz & conversion pairs (small opening angle)

HBD response in Au+Au same as Run-9

From initial analysis of peripheral Au+Au events

10

Expect good separation of signal & background!

Background suppression: effective statistics up by 6-16

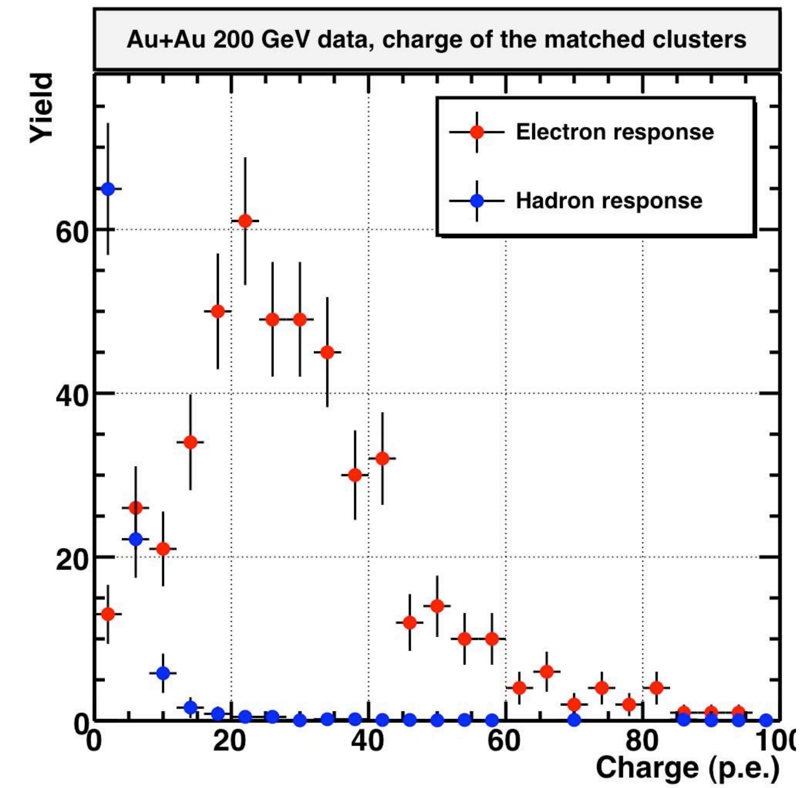
Signal (separated electrons):

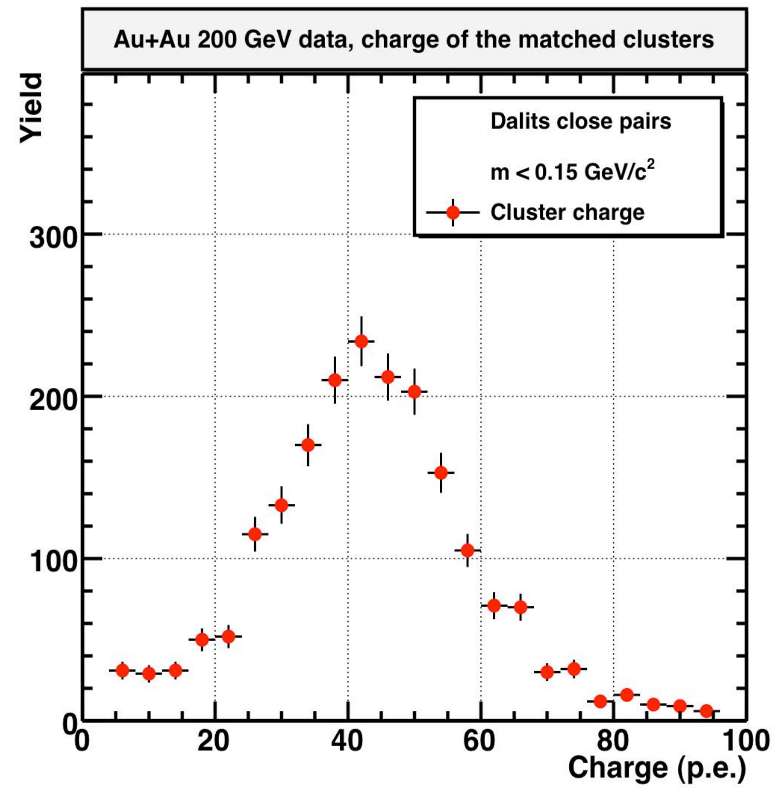
~ 20 photo-electrons

2 e backgrd (Dalitz, conversion):

40 photo-electrons

hadron: few pe





Excellent Collider performance!

Table 1: PHENIX Data Sets in Run-10

SPECIES	$\sqrt{s_{NN}}$	Requested	Recorded	Recorded (events)
Au+Au	200	1.4 nb^{-1}	1.3 nb^{-1}	8.2G
Au+Au	62.4	350M events	0.11 nb^{-1}	700M
Au+Au	39	50M events	40 μb^{-1}	250M
Au+Au	7.7		0.26 μb^{-1}	1.6M

So, what do the larger than expected data sets allow?

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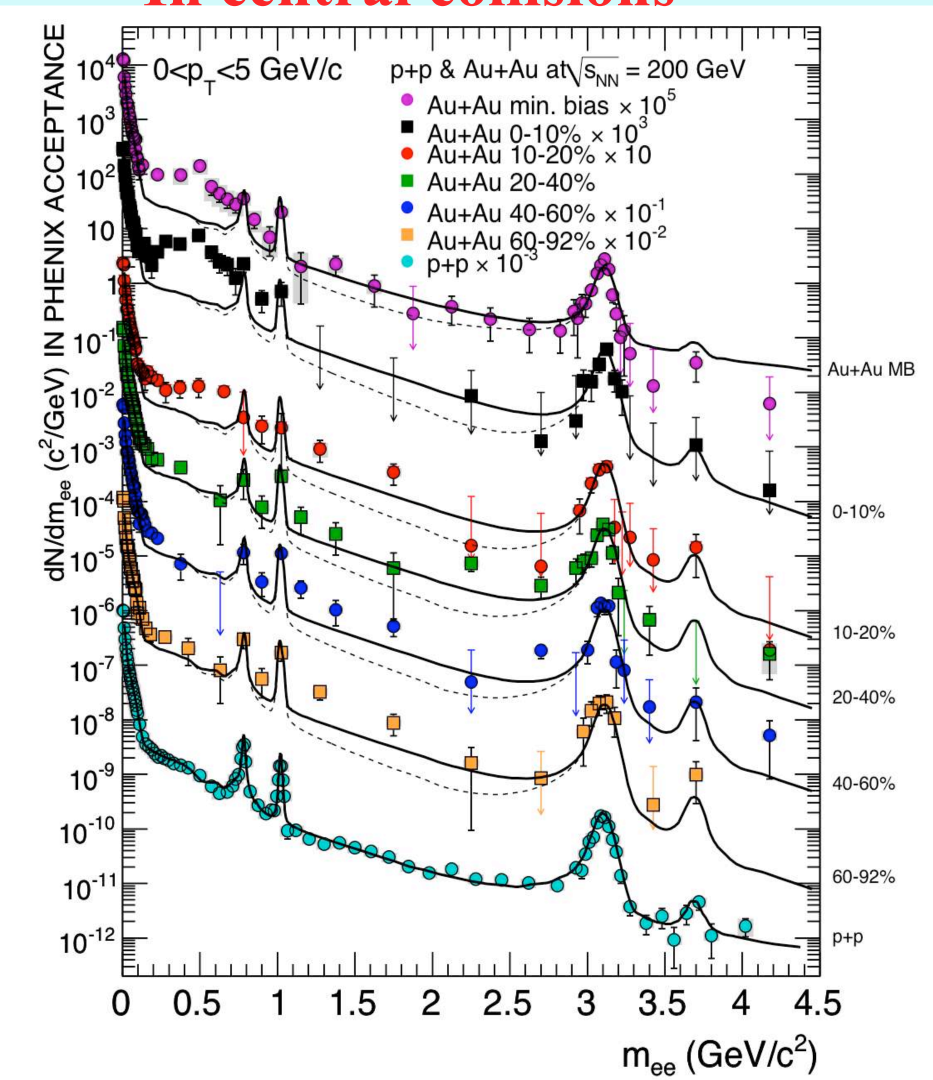
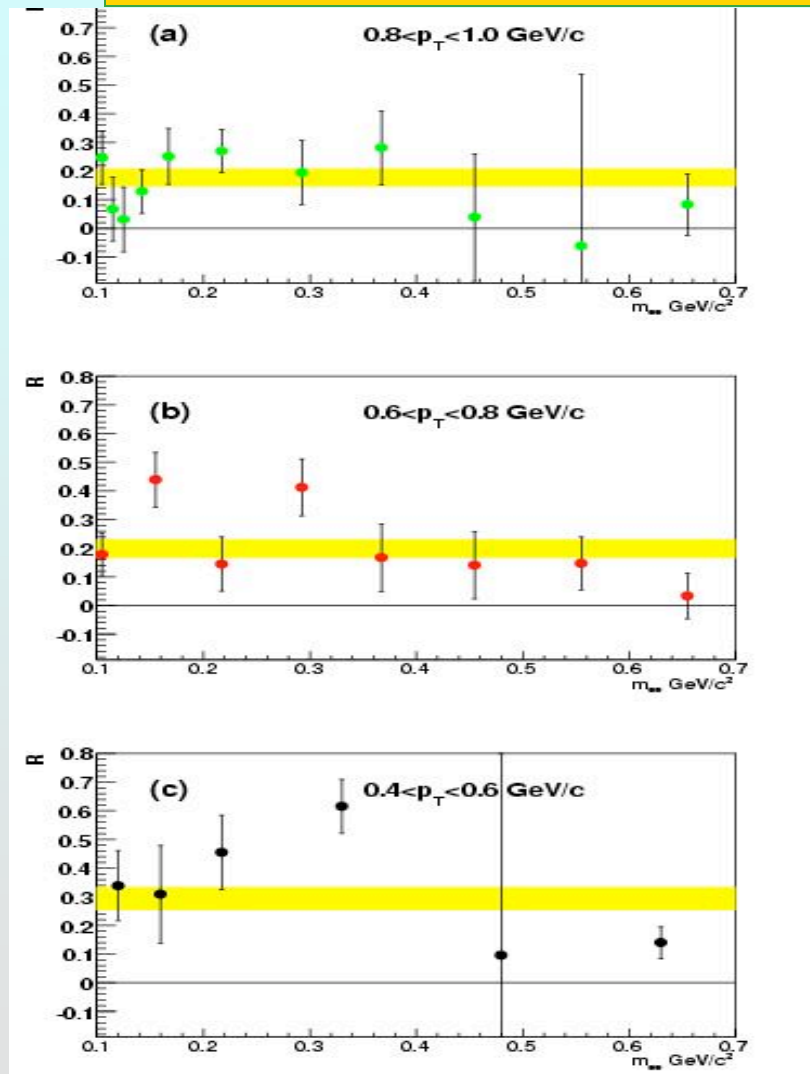
Q1: low mass di-electron excess?

Run-4 *PRC81, 034911 (2010)*

In central collisions





and low p_T

Source of low mass, low p_T excess?

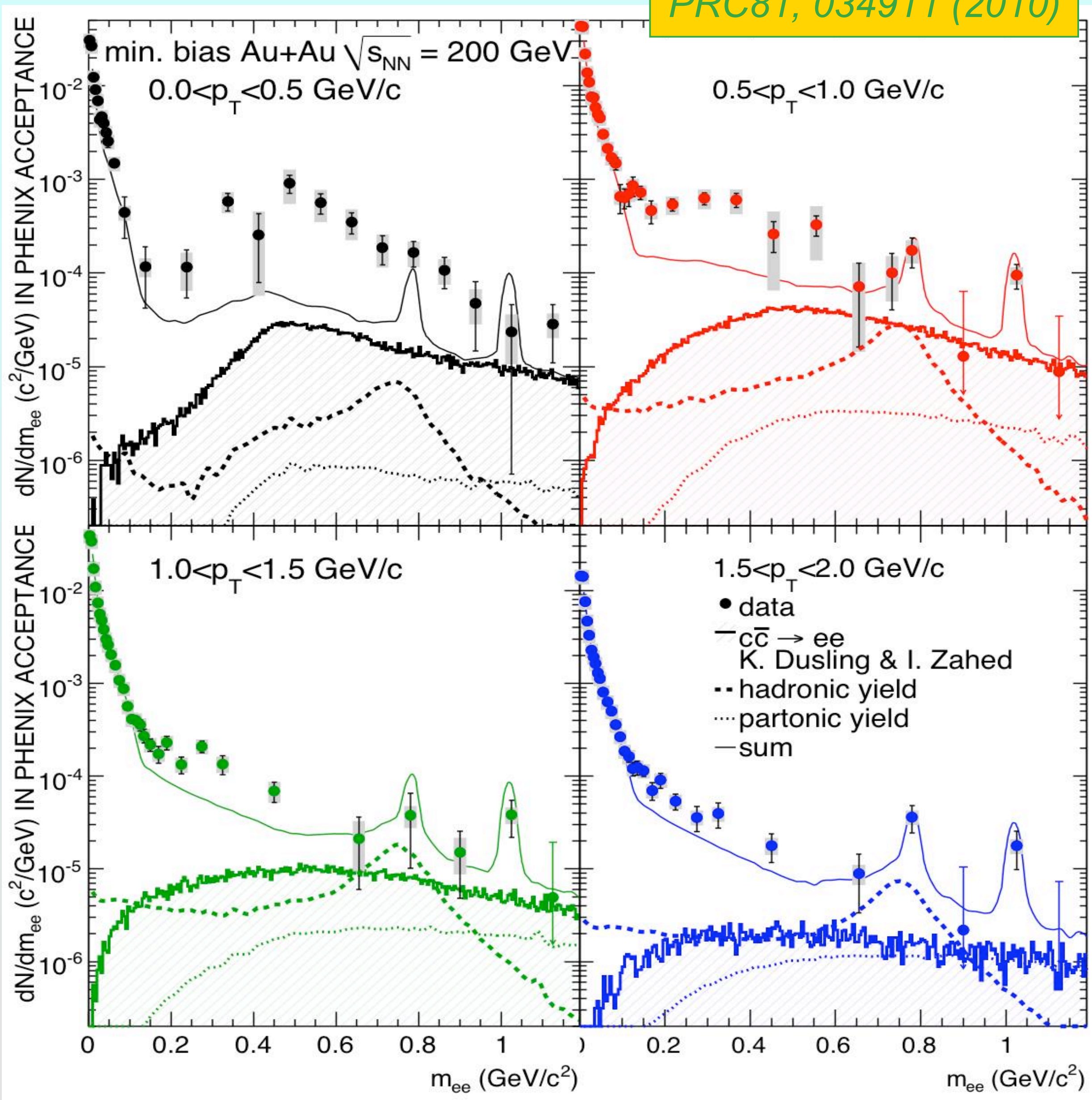
PRC81, 034911 (2010)

Not hadronic

Not q-qbar

Not charm…

Speculate (bvj): pre-equilibrium emission?



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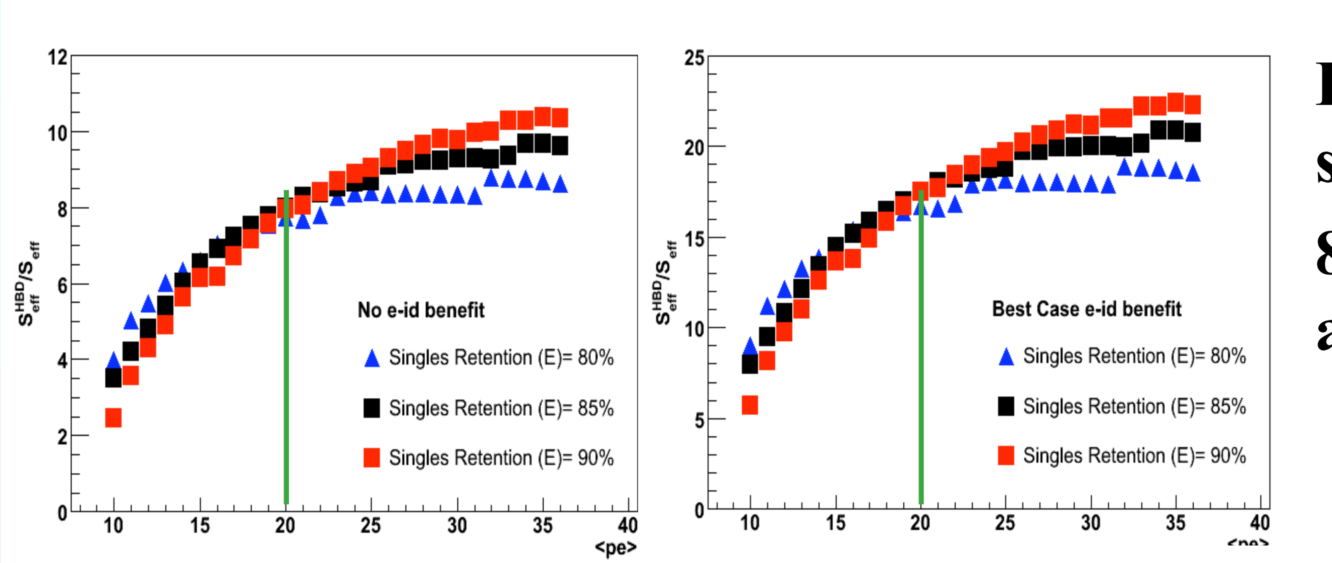
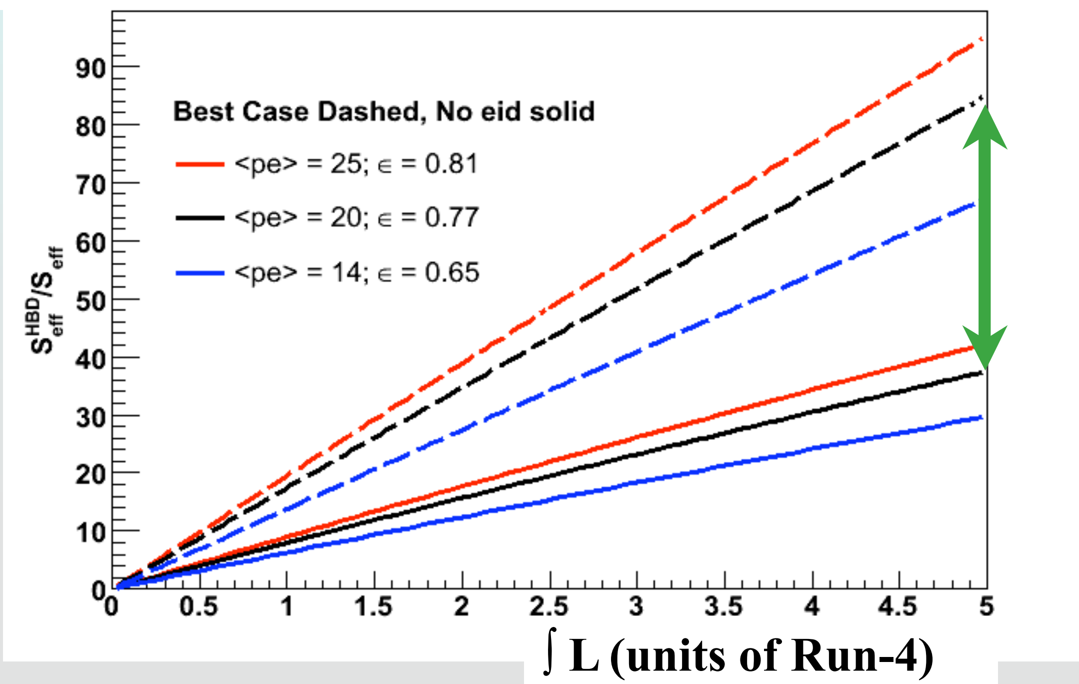
HBD impact in Run-10 200 GeV Au+Au



Improves effective signal by factor of 8-16 (w/o and w/ added e ID effect)

1.4 /nb recorded improves effective statistics by ≥ 35 vs. old Run-4 result



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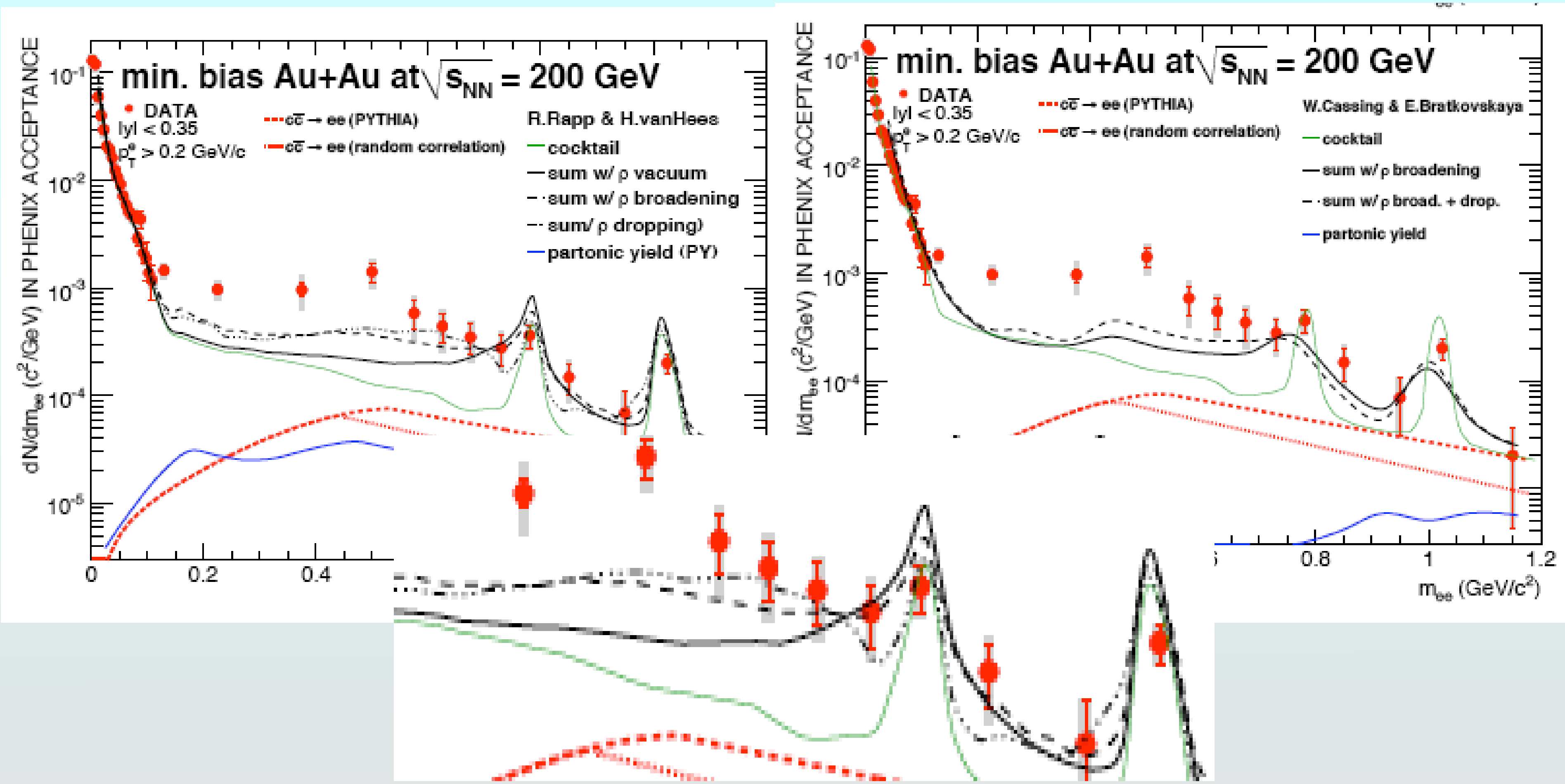
Constraints on in-medium ρ?



Run-10: decrease σ_{stat} by ~ √ 3 5 ~ 6, σ_{syst} also?

Modified ρ? 1.5σ effect → 6σ effect??

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62 GeV goal: Dilepton physics

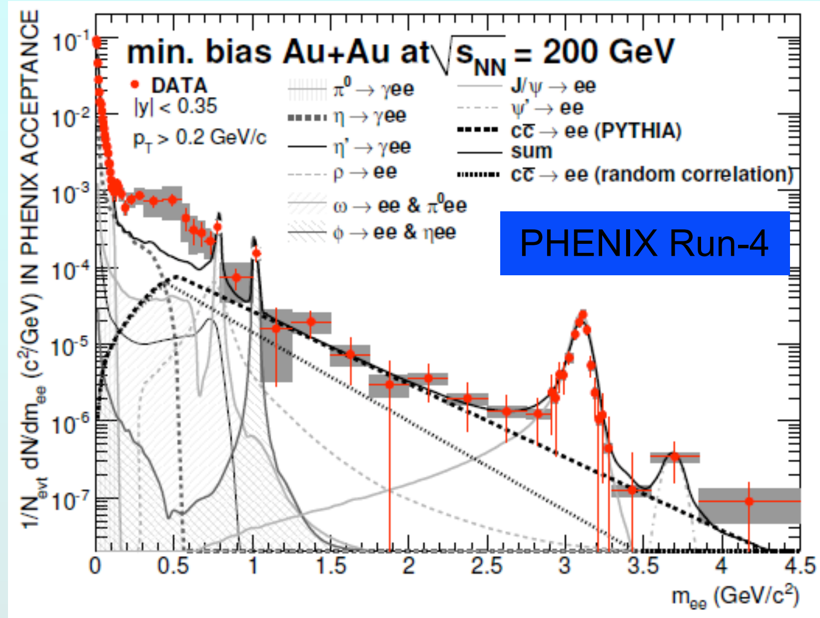
With ~400 million recorded in ± 20cm minimum bias events and

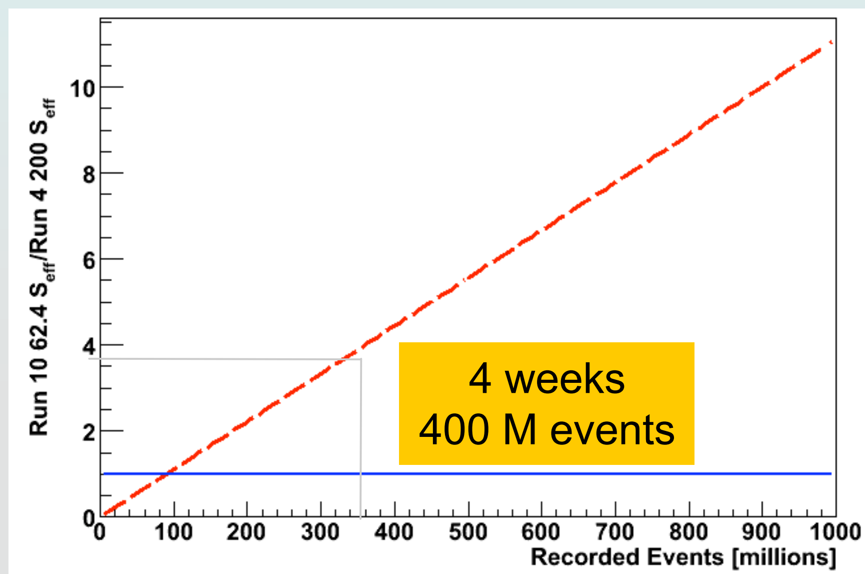
1) **a similar low mass enhancement to our published Run-04 AuAu @ 200 GeV result**
2) **predicted background rejection**

increase statistical significance x 2.

The Run-04 @ 200 GeV low mass enhancement is 2.6 σ effect.

Thus, the Run-10 @ 62 GeV result would be a 5.2 sigma effect.

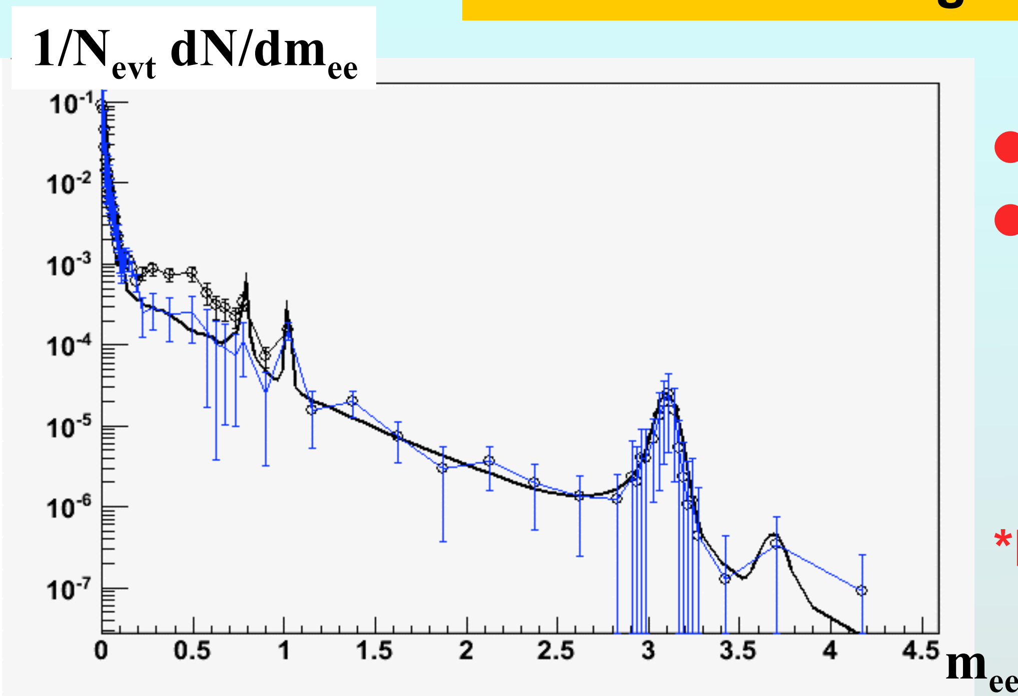




62.4 GeV improvement factor w.r.t. Run-4@200GeV as function of # of events

Dilepton Measurement at 39 GeV

How do dilepton excess and ρ modification at SPS evolve into the large low-mass excess at RHIC?



- 200M events in ± 20cm vertex
- If excess same at 39 GeV as 200
  Measure x4.7 ± 0.77(total);
  6 σ result
  If excess is 1/3 that at 200 GeV:
  Measure x1.57 ± 0.77(total)

*NB: BUP request was 400M

NB: study is tricky, no *simple* scaling rules

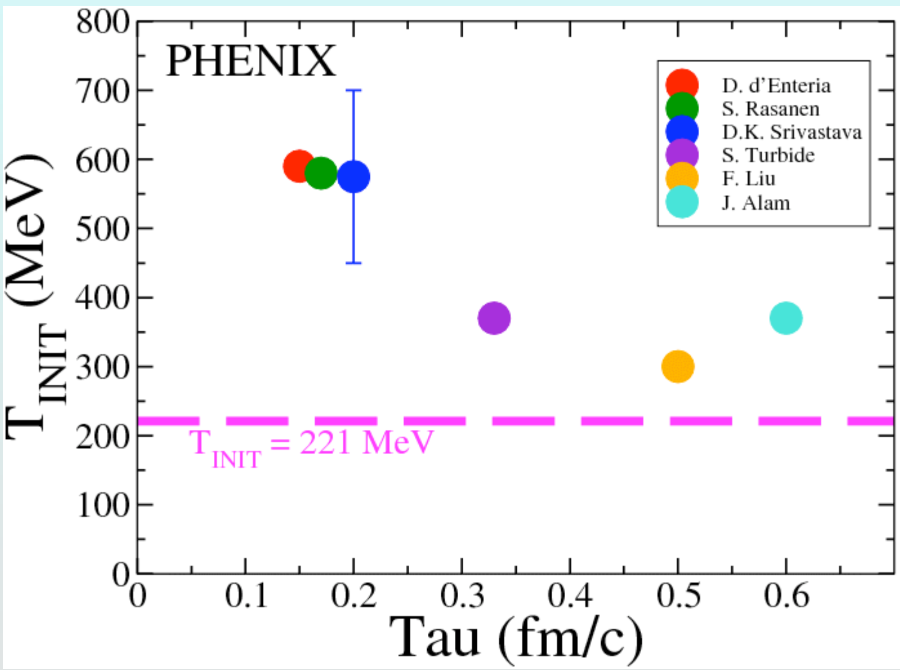
combinatorial background ↓ N_{ch}^2 and ↓ ~ 8-16 (HBD)

foreground: inclusive - remaining background (S/B~1/10-1/20)

physics signal is ?

Q2: Initial temperature at 62.4 GeV?

- **Hard to measure, quality of result hard to predict!**
  Extraction requires constraining hydro with data
- **Simulation efforts were focused on Run-11 physics!**



Fact: recorded 700M events at 62.4 GeV

Fact: Run-4 analysis used 800M events

Fact: in Run-4 S/B is
~1:1 p_T > 2 GeV/c
~0.05-0.2 1-2 GeV/c

T_{init} = 300-600 MeV at 200 GeV

= 170-190 MeV at 17 GeV

<u>What can I guess?</u>

Both S and B differ from 200 GeV case!

- Signal scales as T^4
  - T goes as $dE_T/d\eta$ and $1/\tau_0$
    - τ_0 ~0.5 fm/c at $\sqrt{s}$=200 GeV, 1 fm/c at 62, 2 at 17 GeV
    - E_T ratio to 200 GeV ~ 0.4 at 17, 0.7 at 62.4 GeV
  - Expect T_{init} ~170 MeV $\sqrt{s}$=17 and ~230 MeV at $\sqrt{s}$=62
  - Steeper spectrum & fewer measurable points
- Combinatorial background reduced by factor ~6-16 based upon data sample size and HBD rejection
  - Being conservative: γ statistical significance x2
- But, PHYSICS background: $\gamma_{th}/\gamma_{decay}$ ~ 0.1 for $\int p_T$ (according to hydro calculations at RHIC, SPS)
  - Virtual photon method yields $\gamma^*_{th}/\gamma_{cocktail}$ ~ 0.5
  - $\therefore$ S/B goes from 1/10 to 1/2

$\therefore$ should be able to measure slope to ~3 GeV/c

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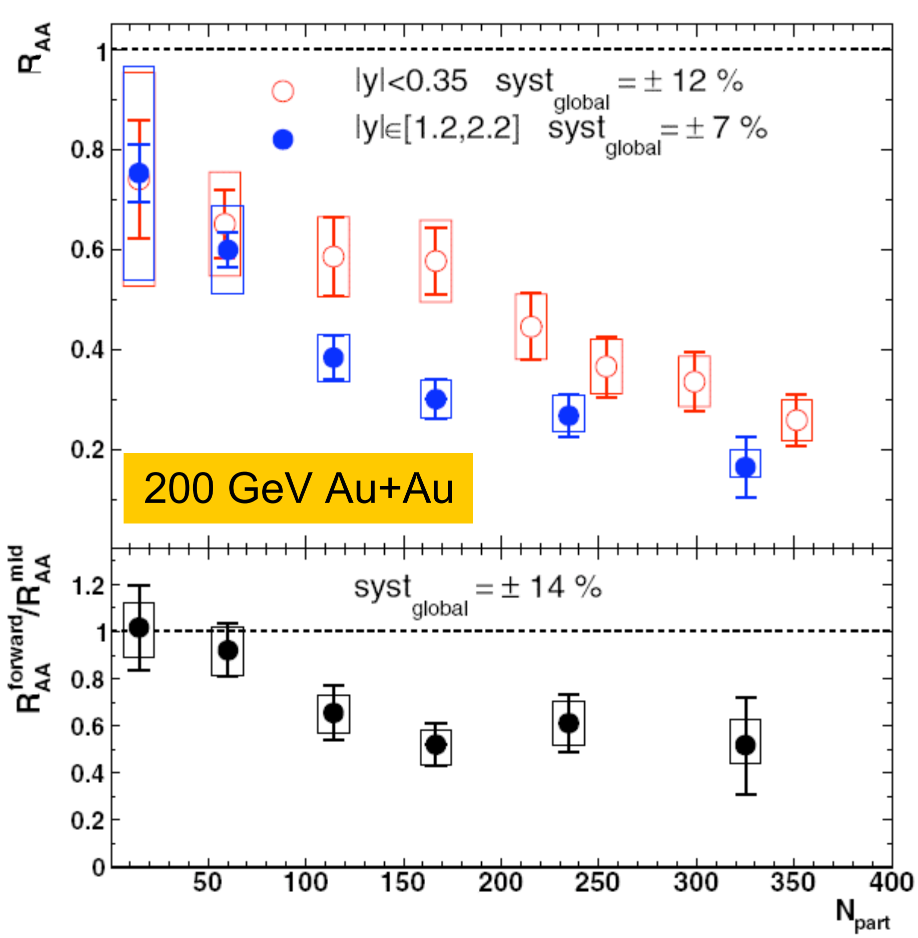
Q3: What's going on with the J/ψ?



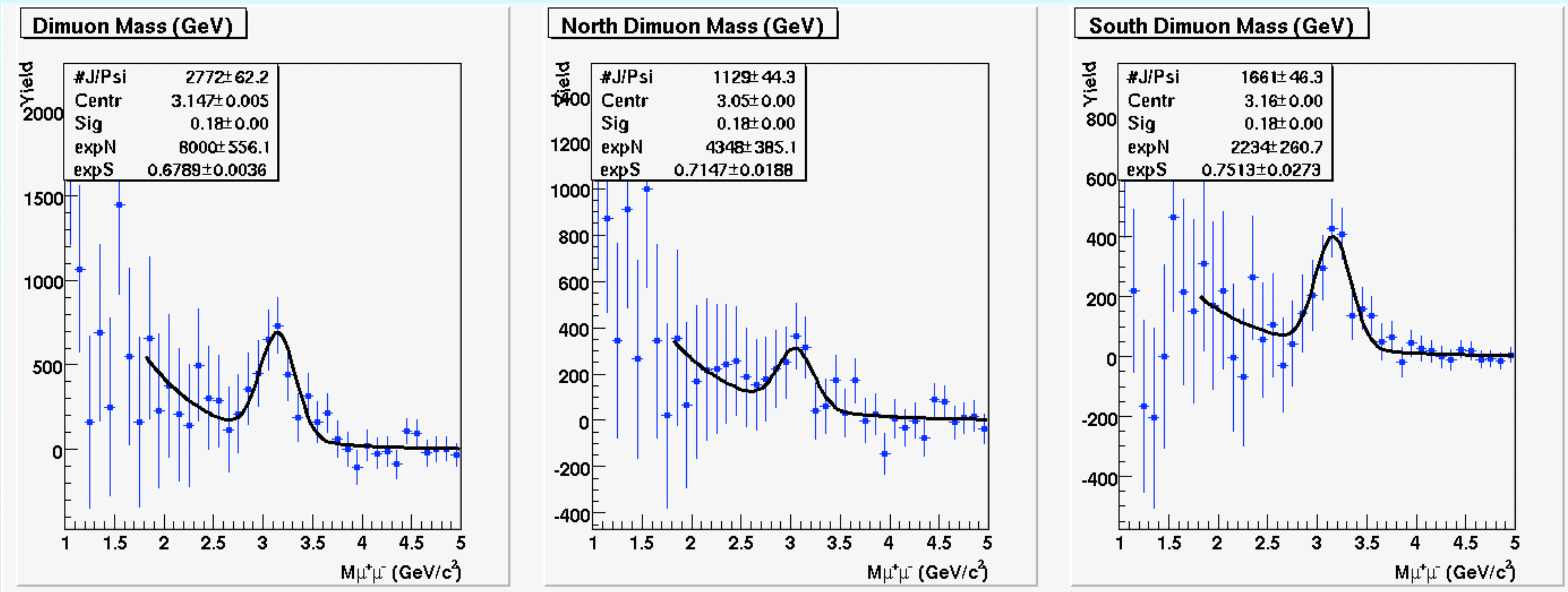
Phys. Rev. Lett. 98, 232301 (2007)

Suppression larger at forward rapidity!

Doesn't track maximum energy density!

Final state $c\bar{c}$ coalescence (aka recombination)?

J/ψ in Muon Arms in Run-10 @ 200 GeV



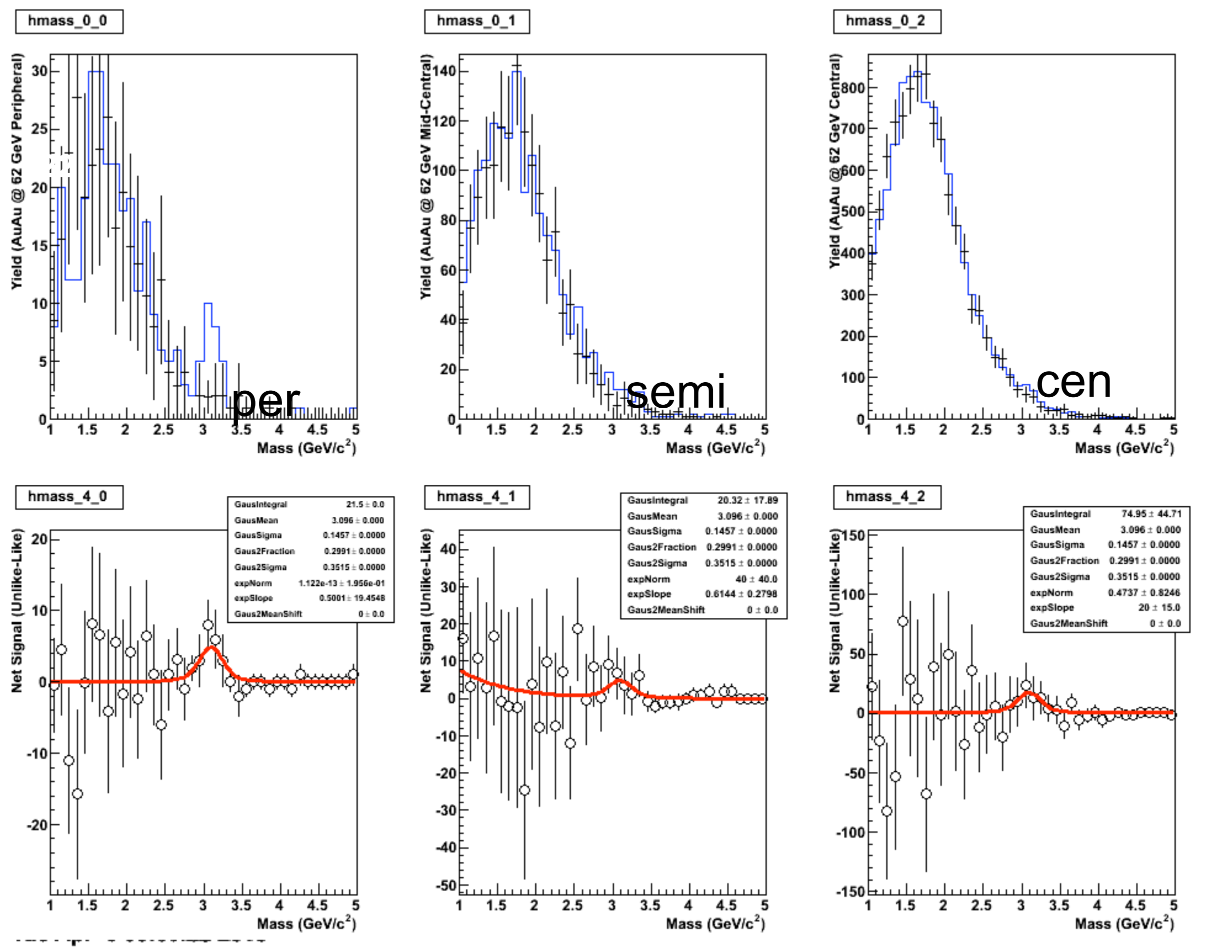
J/ψ yield as expected

Analyzed Luminosity (for mass plots):

147.7 μb^{-1} gives 18.8 +- 0.4 (stat) J/Ψ per μb^{-1}

Compared to Run7 Au+Au which had about 18.2 J/Ψ per μb^{-1}

J/ψ: analyzed 25% of 62 GeV statistics



- **Recombination**
  (e.g. Rapp et al.)
  J/ψ yield at 200 GeV is dominantly from recombination

- **Predict suppression greater at 62 GeV**
  J/ψ yield down by 1/3
  Recombination down 1/10

600 M min. bias events → 500 J/ψ ∴ measure J/ψ suppression

Key test of recombination!

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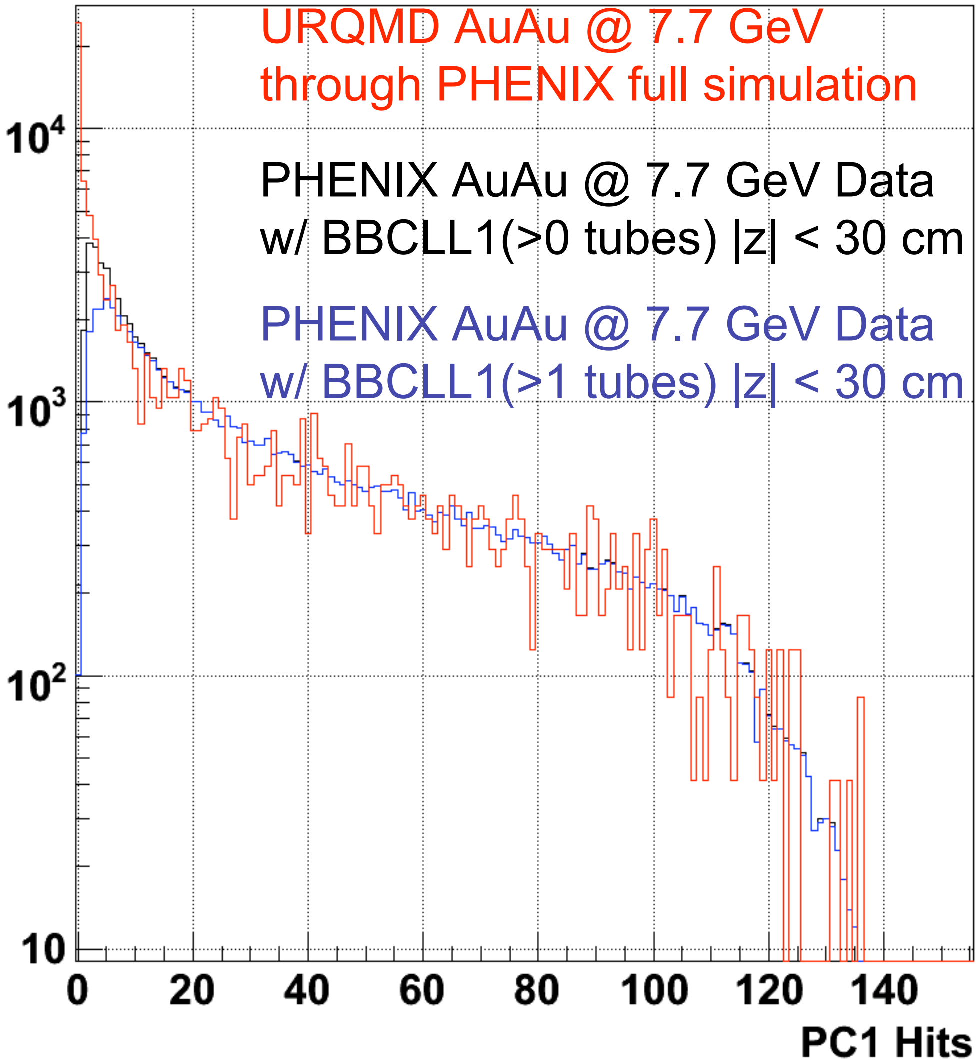
Success at 7.7 GeV Au+Au!

The trick?

Tight timing cut on BBC N vs. S!



URQMD normalized to match real data integral for PC1 hits > 40.

URQMD not matched to z distribution in real data. **However, note that there is no rescaling of the x-axis.**

Then comparing the integrals implies (as a first look) that the BBCLL1(>0 tubes) fires on 77% of the cross section and the BBCLL1(> 1 tubes) fires on 70% of the cross section.

No indication of deviation at low PC1 hits from background (at least by this particular check).

Looking ahead to Runs 11 and 12

How’s the detector doing?

PHENIX Detector

Central Arm Tracking
- Drift Chamber
- Pad Chambers
- Time Expansion Ch

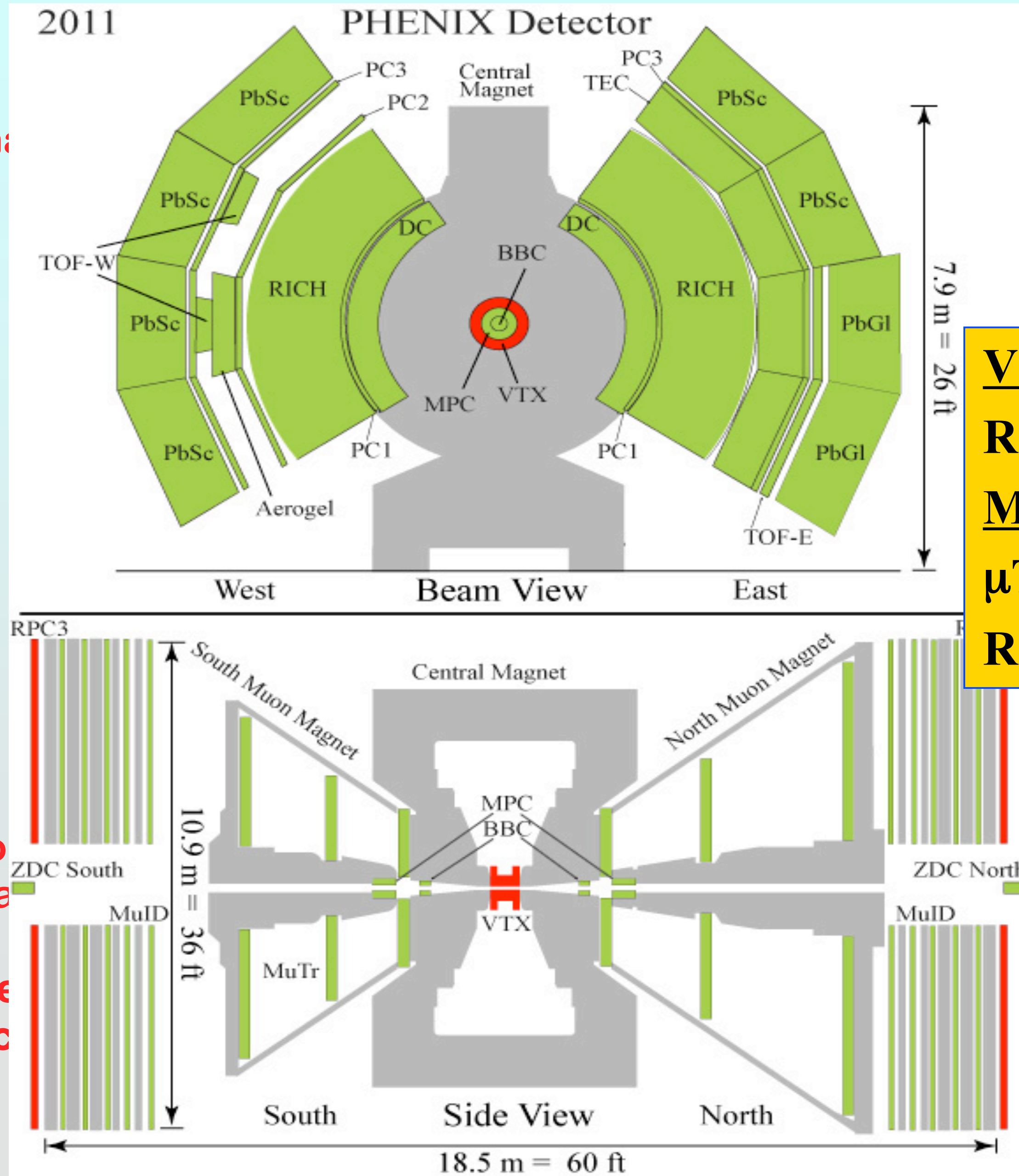
Muon Arm Tracking
- Muon Tracker

Calorimetry
- PbGl
- PbSc
- MPC

Particle Id
- Muon Identifier
- RICH, HBD
- TOF E & W
- Aerogel
- TEC

Global Detectors
- BBC
- ZDC/SMD Local Po
- Forward Hadron Ca
- RXNP

DAQ and Trigger Syste
Online Calib. & Produc



<u>VTX</u>

Replaces HBD

<u>Muon Trigger:</u>

μTr FEE

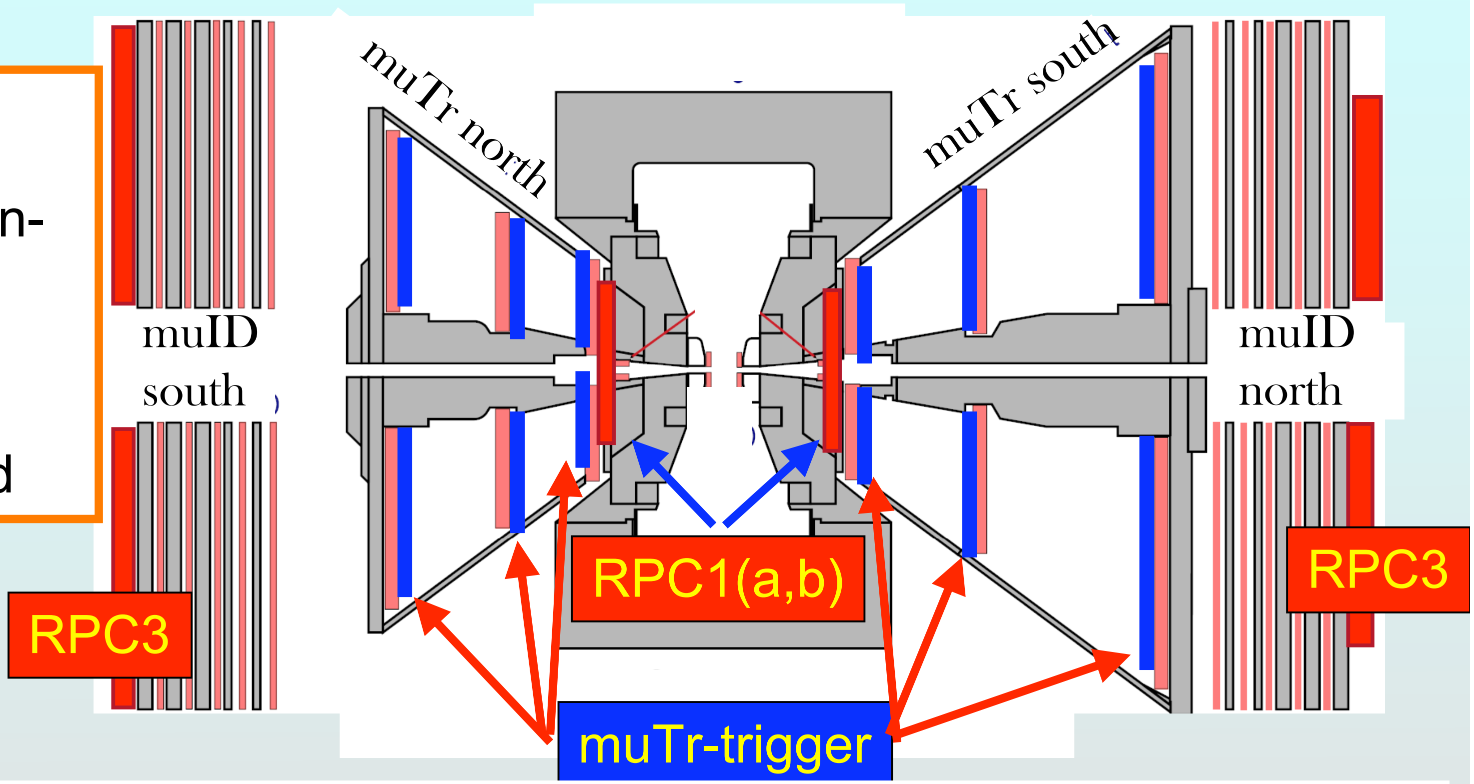
RPC station 3

Muon Trigger Upgrade

Trigger idea:

Reject low momentum muons

Cut out-of-time beam background



Upgrade:

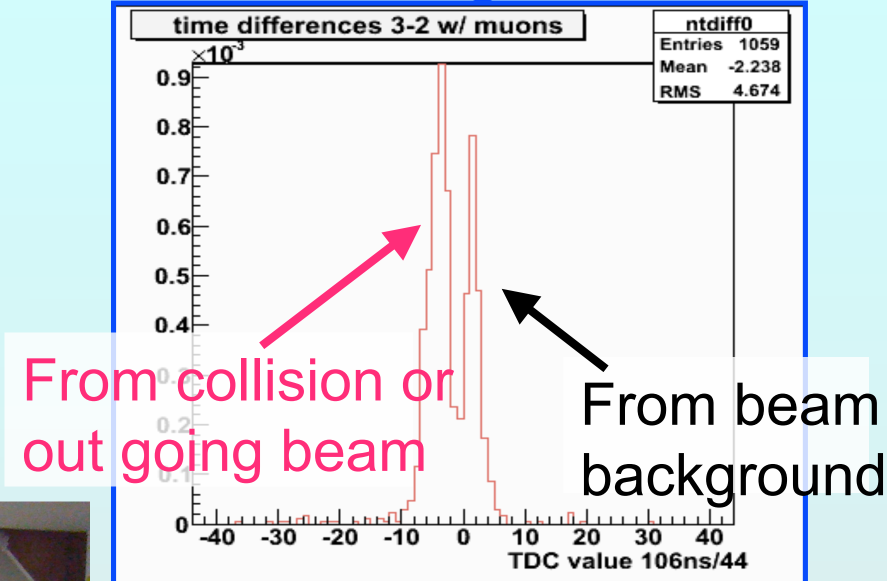
o muTr trigger electronics: muTr 1-3 ➔ send tracking info to level-1 trigger

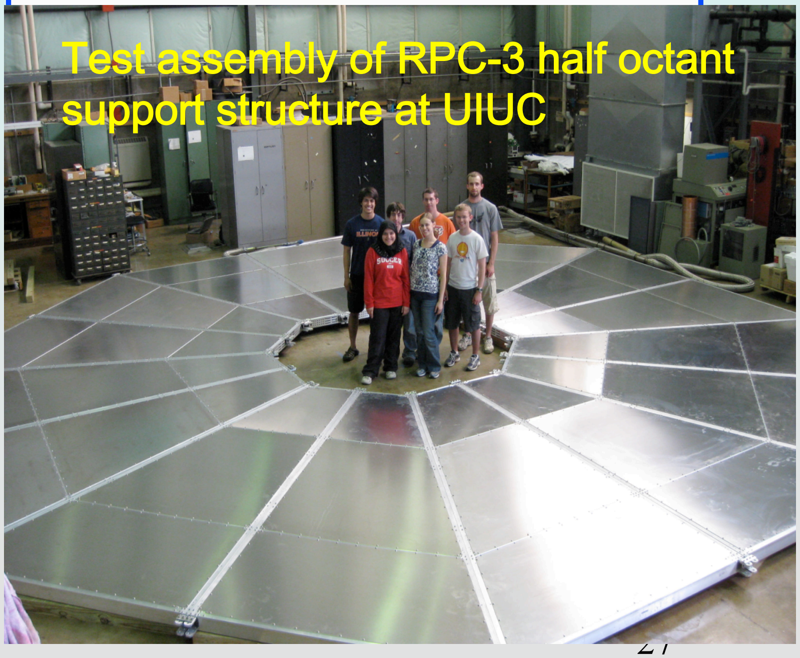
o RPC stations: RPC 1+3 ➔ tracking + timing info to level-1 trigger

note: RPC1 has larger acceptance than RPC3 at large radii,
RPC1+ RPC3 give best coverage for timing needed for background rejection.

RPCs: trigger level timing

- Timing used in Run-9 to characterize background
- RPC3-N installed for Run-10
- Commissioned & ready



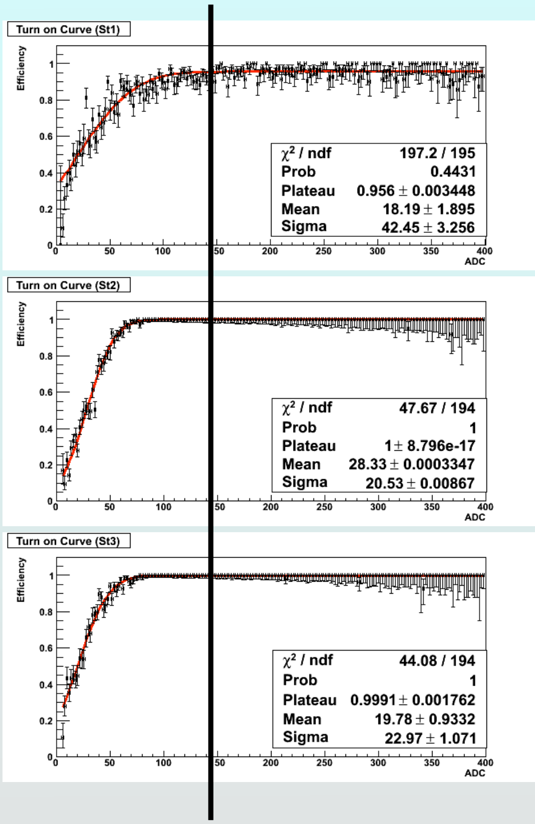


MUTRIG ready for physics in Run-11

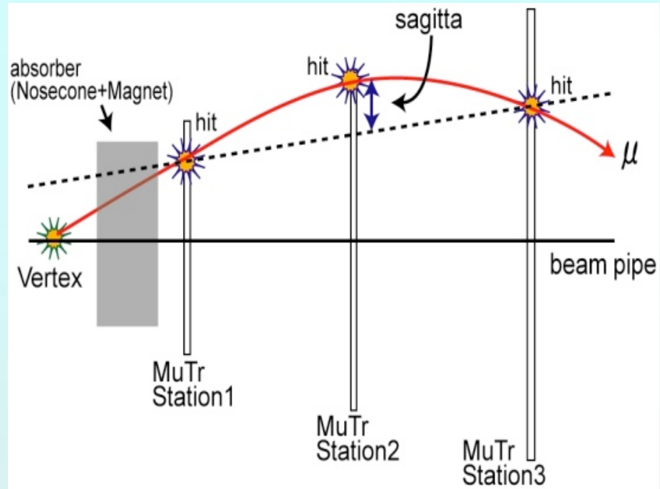
Station 1

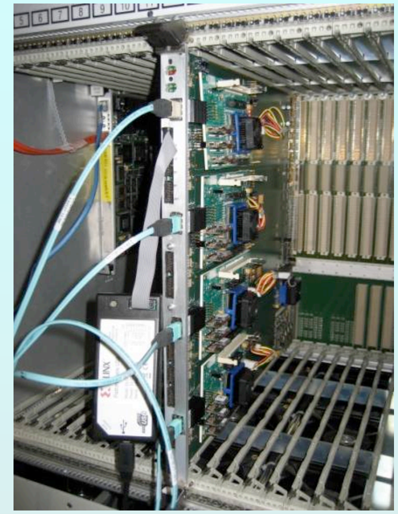
Station 2

Station 3



Minimum Ionizing Particle



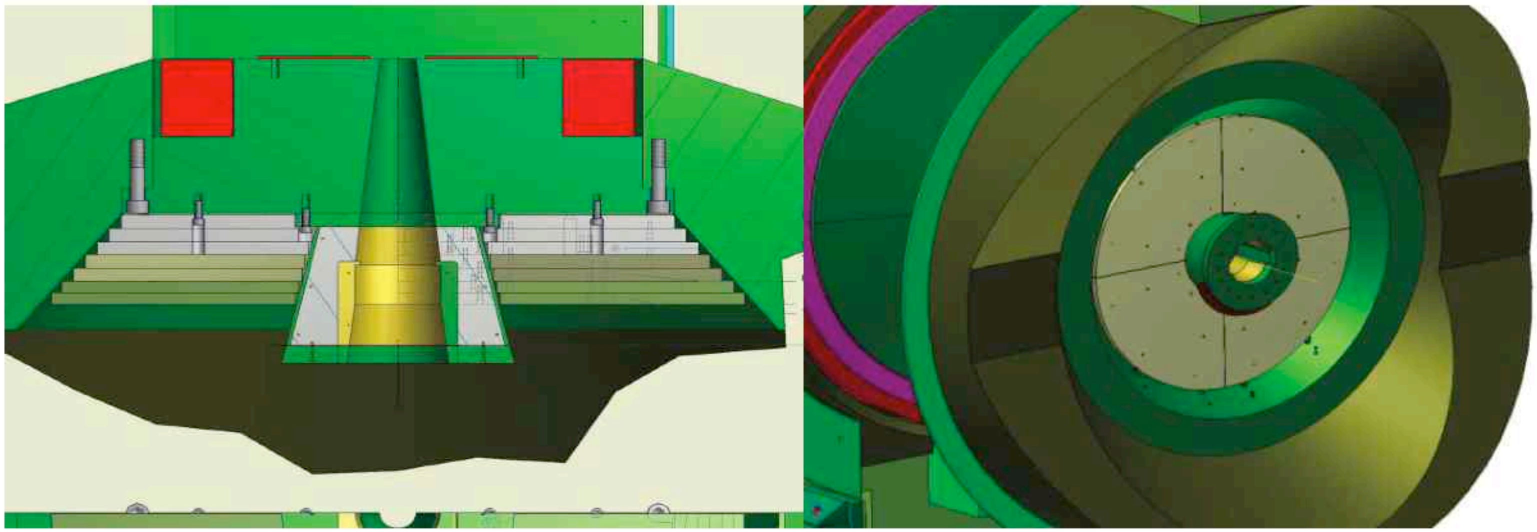


- Good efficiency for MIPs
- MUTR.N installed for Run-9
- MUTR.s installed for Run-10
- ready to go

Muon arm background reduction

Stainless steel SS-130 absorber

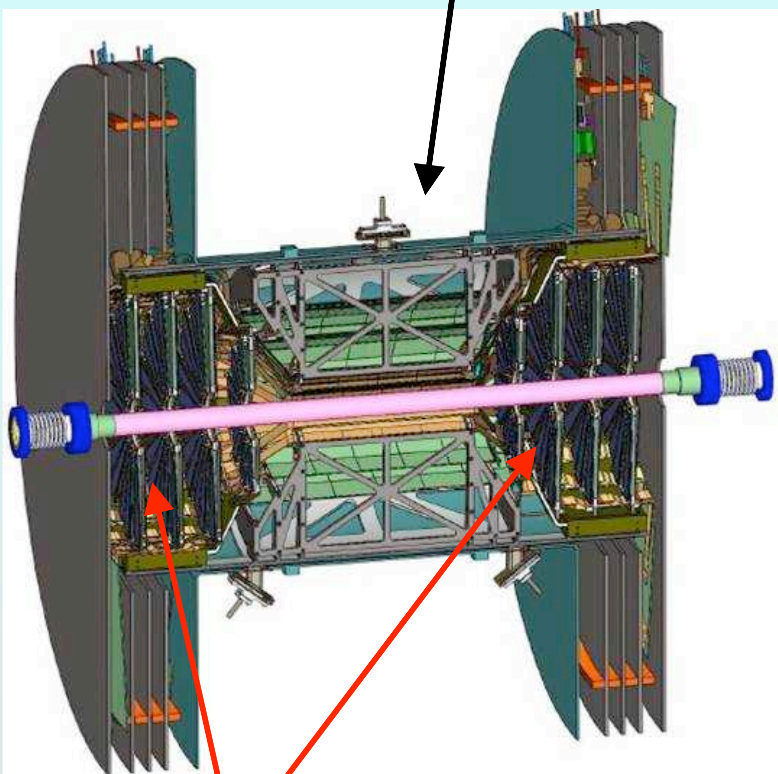
2 interaction lengths, based upon simulations



Install on muon arms during shutdown

Parts are ordered.

Silicon Vertex (VTX & FVTX)



VTX: silicon Vertex barrel tracker

- **Fine granularity, low occupancy**
  - **50μm×425μm pixels for L1 and L2**
  - **R1=2.5cm and R2=5cm**
- **Stripixel detector for L3 and L4**
  - **80μm×1000μm pixel pitch**
  - **R3=10cm and R4=14cm**
- **Large acceptance**
  - **|η|<1.2, almost 2π in φ plane**
- **Standalone tracking**

Install for Run-11

FVTX: Forward silicon VerTeX tracker

- **2 endcaps with 4 disks each**
- **pixel pad structure (75μm x 2.8 to 11.2 mm)**

Install for Run-12

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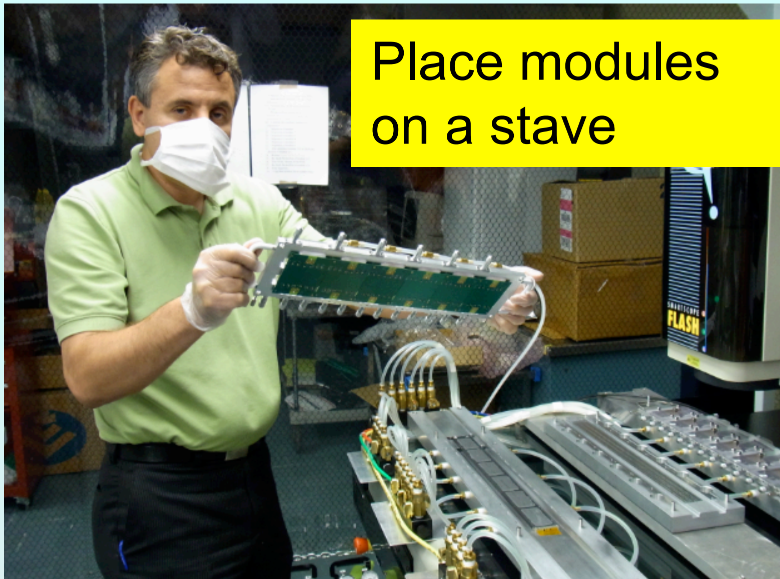
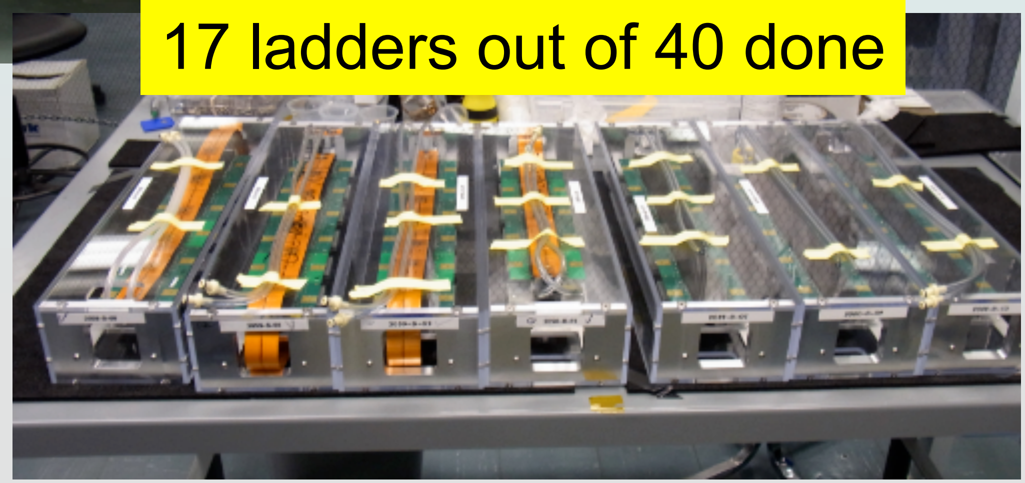
VTX : Strips on track to complete by RUN11



Place modules on a stave

Align the modules

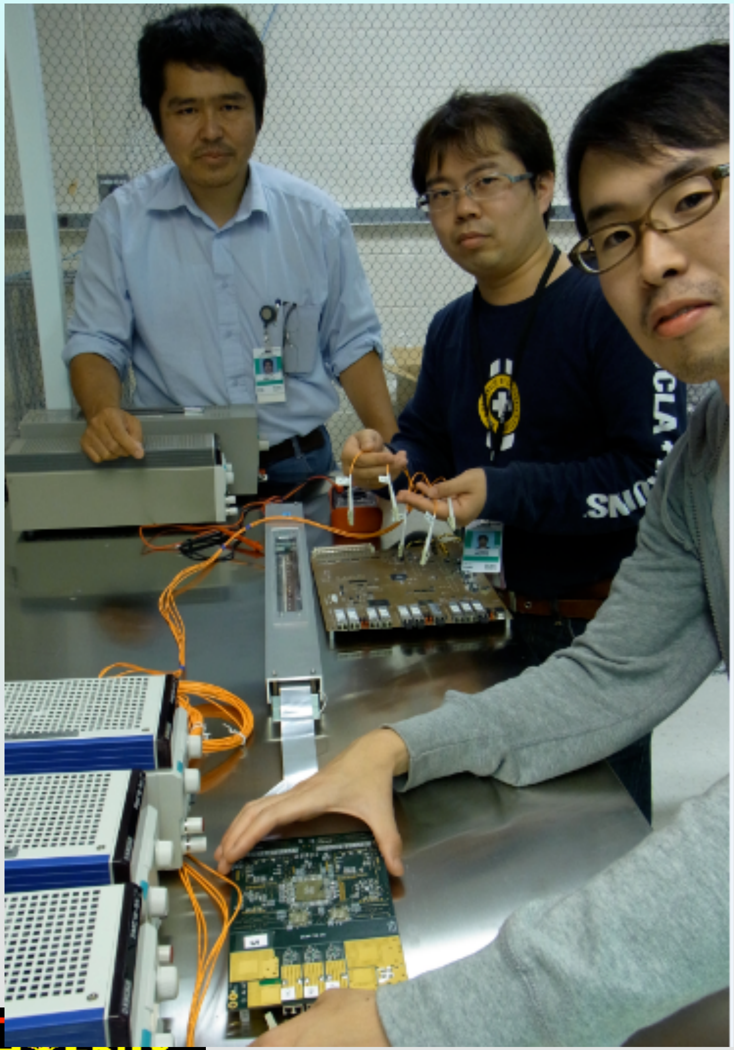
Testing a new ladder



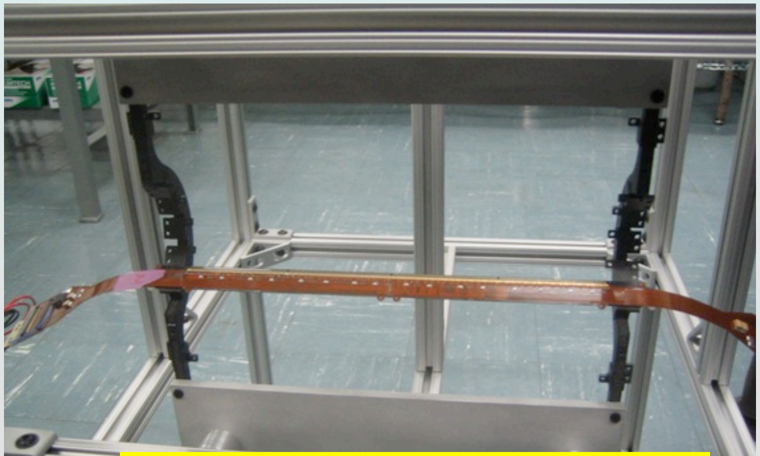
17 ladders out of 40 done

VTX Pixels: Preparing for barrel assembly

16 ladders out of 30 assembled at RIKEN. They will start arriving at BNL soon



Test fit a ladder on the mounts



A ladder on the mounts

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What do we want?

Physics goals:

W asymmetry $\rightarrow$ q, $\bar{q}$ spin contributions

Heavy flavor suppression

Excitation function for

constituent quark flow

jet suppression

First look at U+U

how to select the geometry?

PHENIX beam use proposal

RUN	SPECIES	$\sqrt{s_{NN}}$ (GeV)	PHYSICS WEEKS	$\int \mathcal{L}dt$ (recorded)	p+p Equivalent	Polarization
11	p+p	500	10	50 pb^{-1}	50 pb^{-1}	50%
	Au+Au	200	8	0.7 nb^{-1}	28 pb^{-1}	
	Au+Au	27	1	35M events		
	Au+Au	18	1.5	37M events		
	U+U	192.8	1.5	150-200M events		
12	p+p	500	8	100 pb^{-1}	100 pb^{-1}	50%
	Au+Au	200	7	0.7-0.9 nb^{-1}	28-36 pb^{-1}	
	p+p	62.4, 22.4	2.5	1.0, 0.01 pb^{-1}		0%

If less than 30 cryo weeks:

- Shorten U+U from 1.5 weeks to 0.5 weeks
- Shorten 500 GeV p+p from 10 weeks to 8.5 weeks
- Remove Au+Au at 18 GeV.
- Shorten 200 GeV Au+Au from 8 weeks to 7 weeks.

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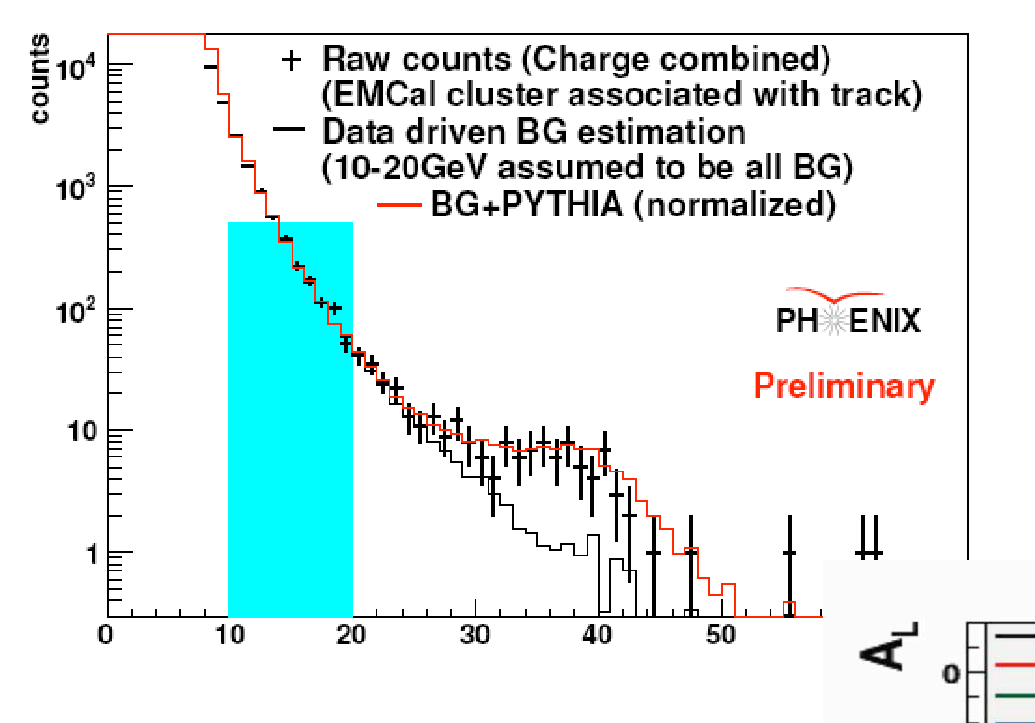
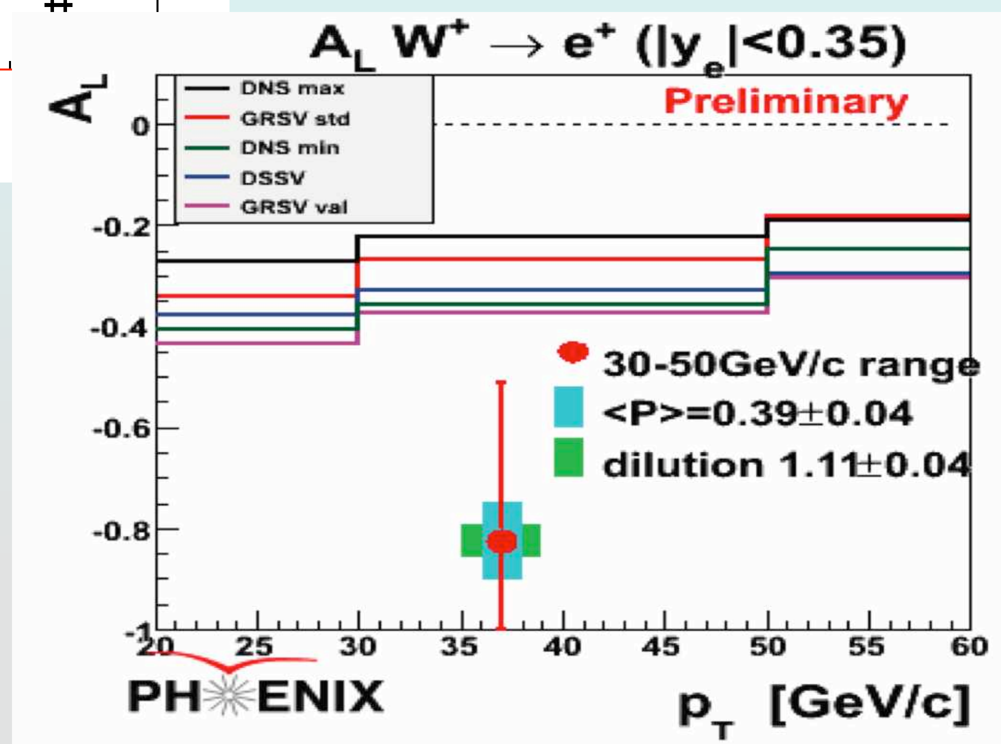
So, what are we going to measure?

And how well are we going to do it?

Q.4: W cross section & asymmetry?

Run-9 preliminary





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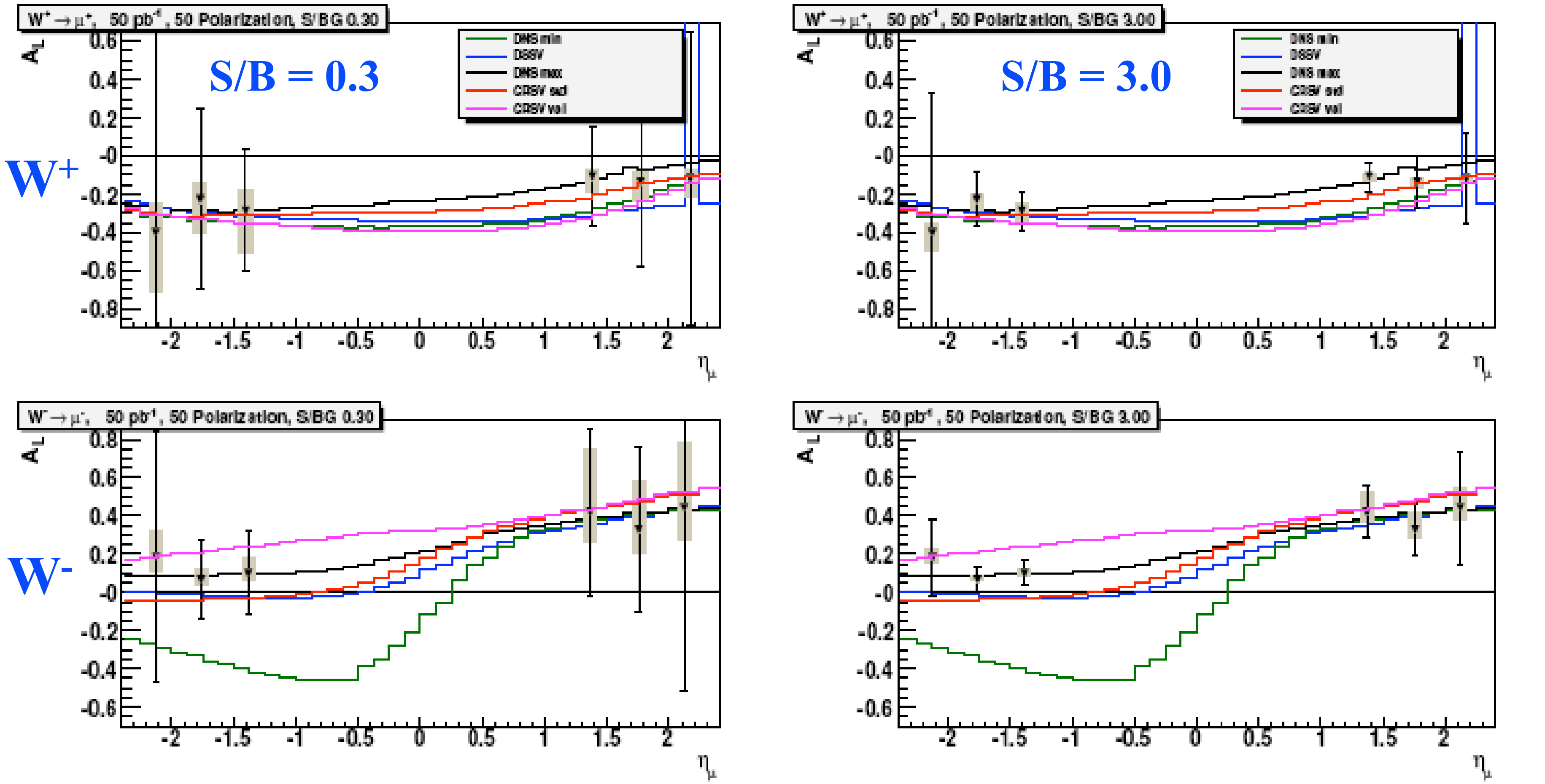
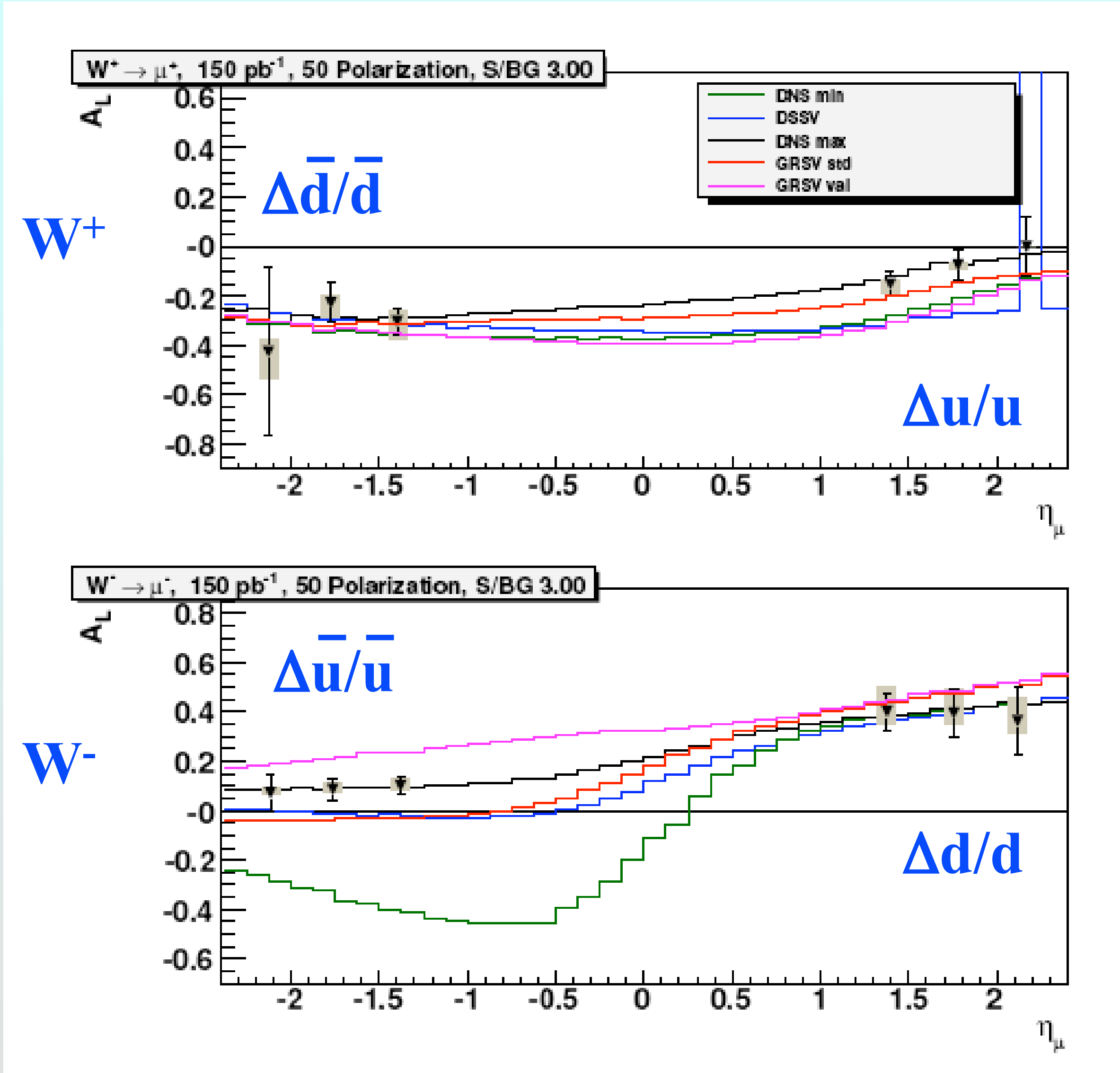
150 pb^{-1}* 500 GeV p+p, 50% polarization



$A_L(\text{forward } W^- \to \mu^-) \approx \Delta d/d.$ $A_L(\text{backward } W^- \to \mu^-) \approx \Delta \bar{u}/\bar{u}.$

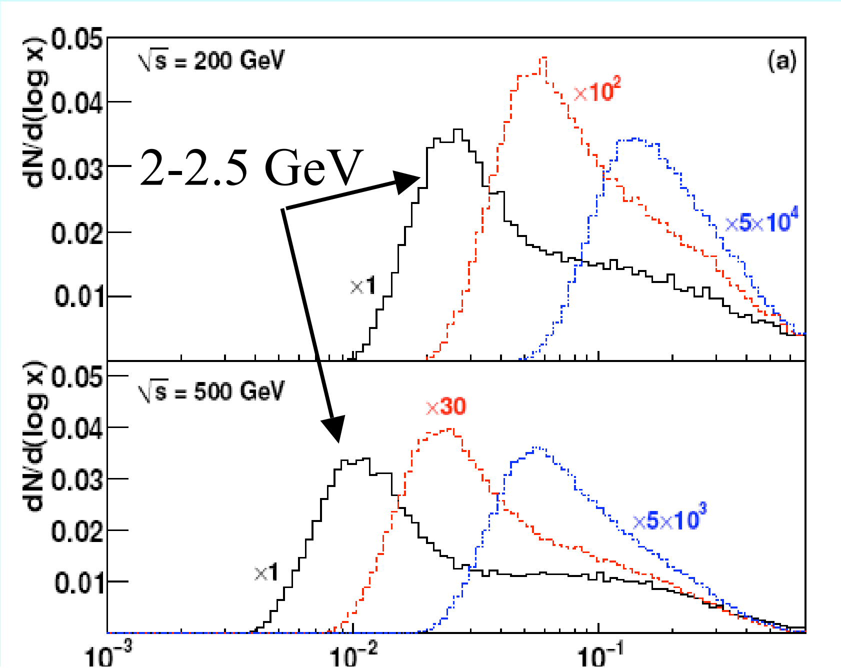
* $(\text{PHENIXlive} = 0.97) \times (\text{PHENIXup} = 0.65) \times (\text{vertex} = 0.55) = 0.35\%$

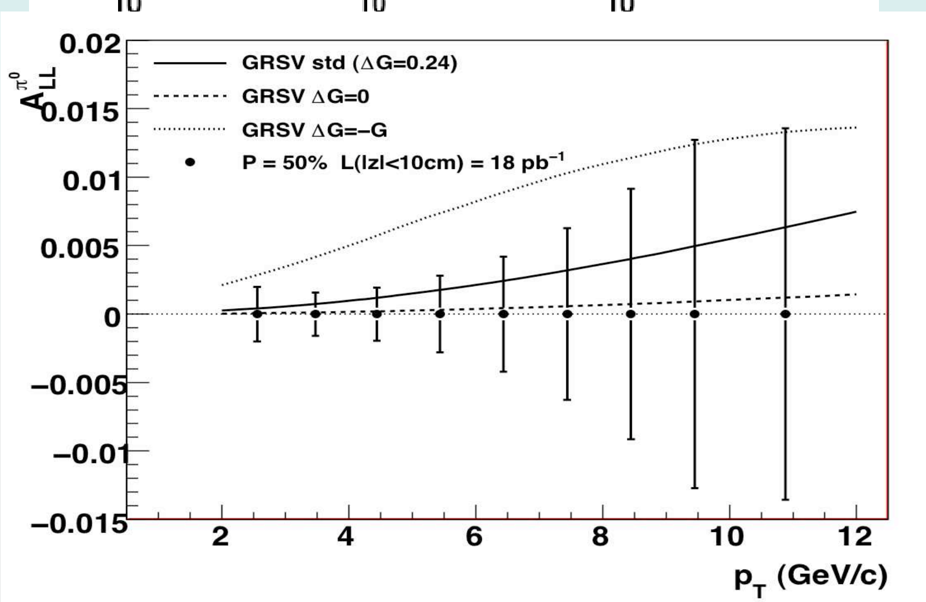
Run-11 + Run-12: 150 pb^{-1} *sampled*



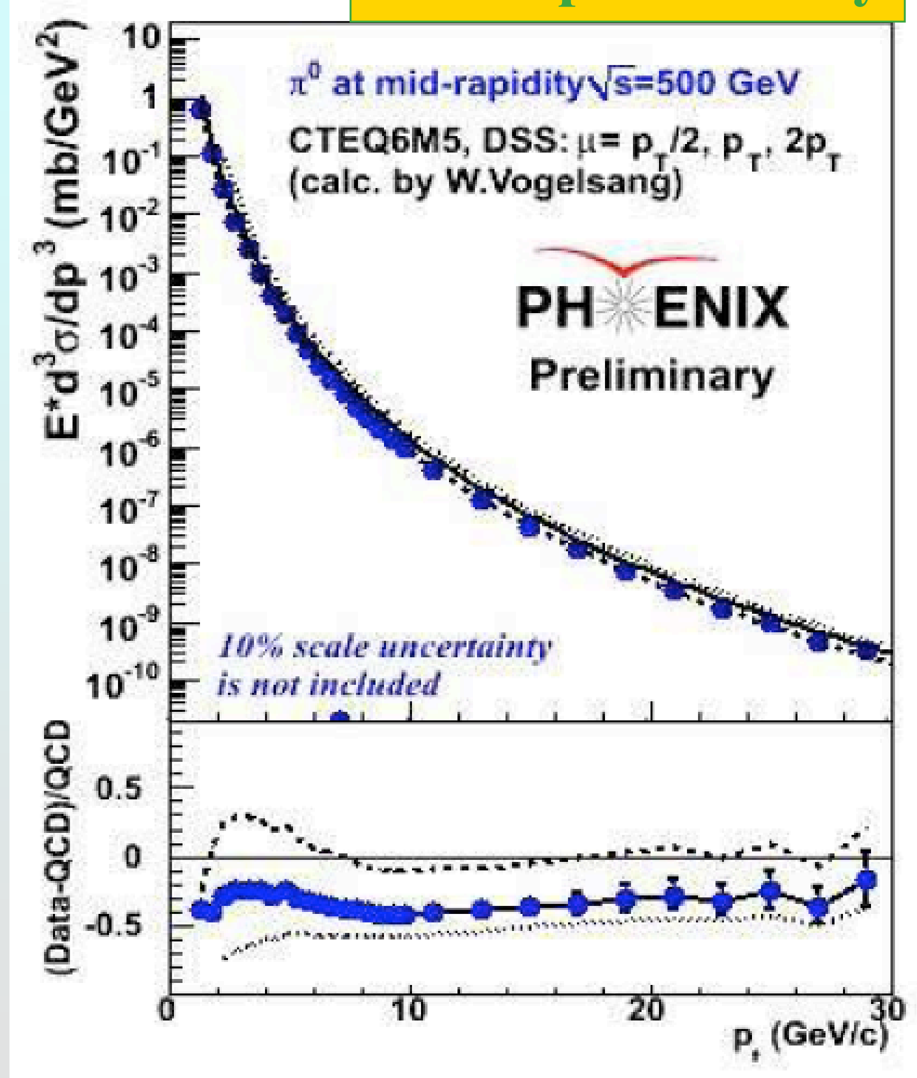
Significant improvement on sea quark polarizations!

Q5: what's ΔG? (π^0 A_{LL} at 500 GeV)





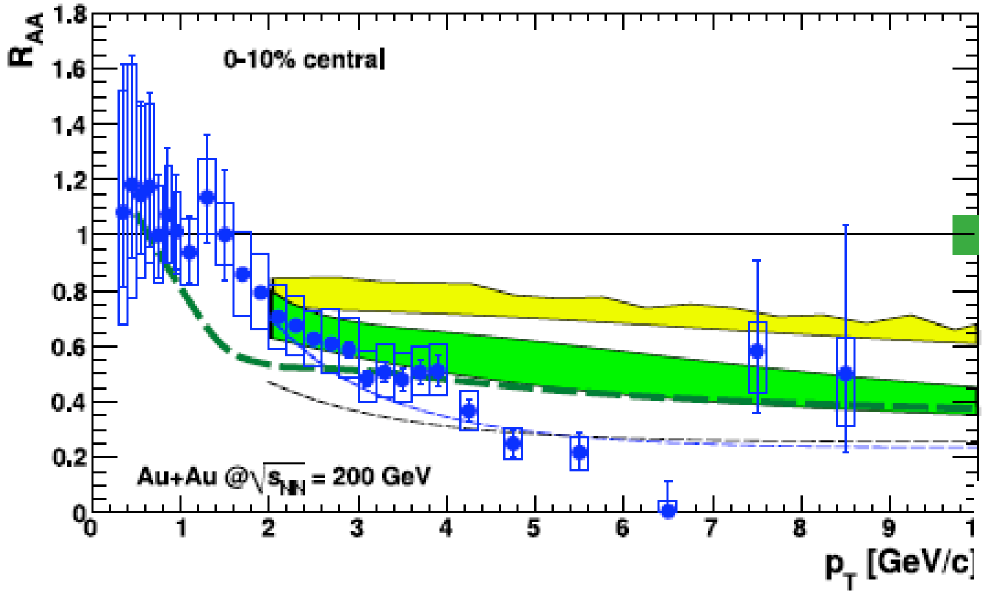
Run-9 preliminary



Q6: heavy quark suppression & flow?

PRL.98: 172301,2007

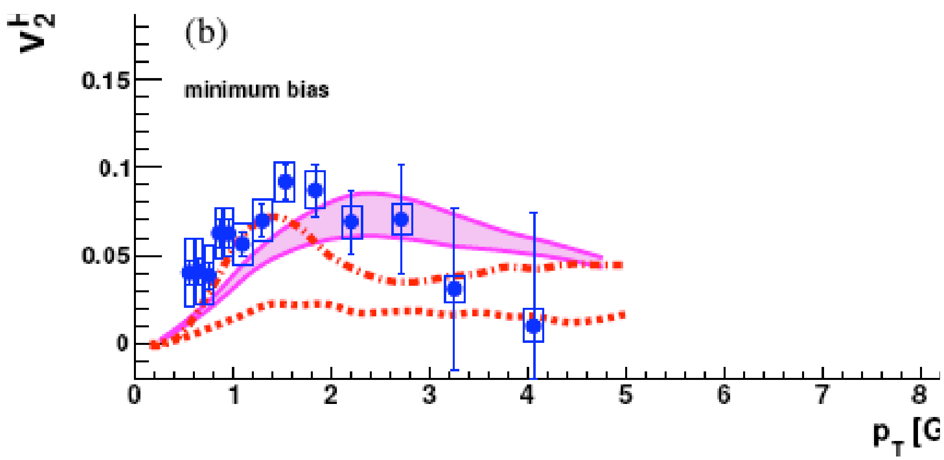
arXiV: 1005.1627

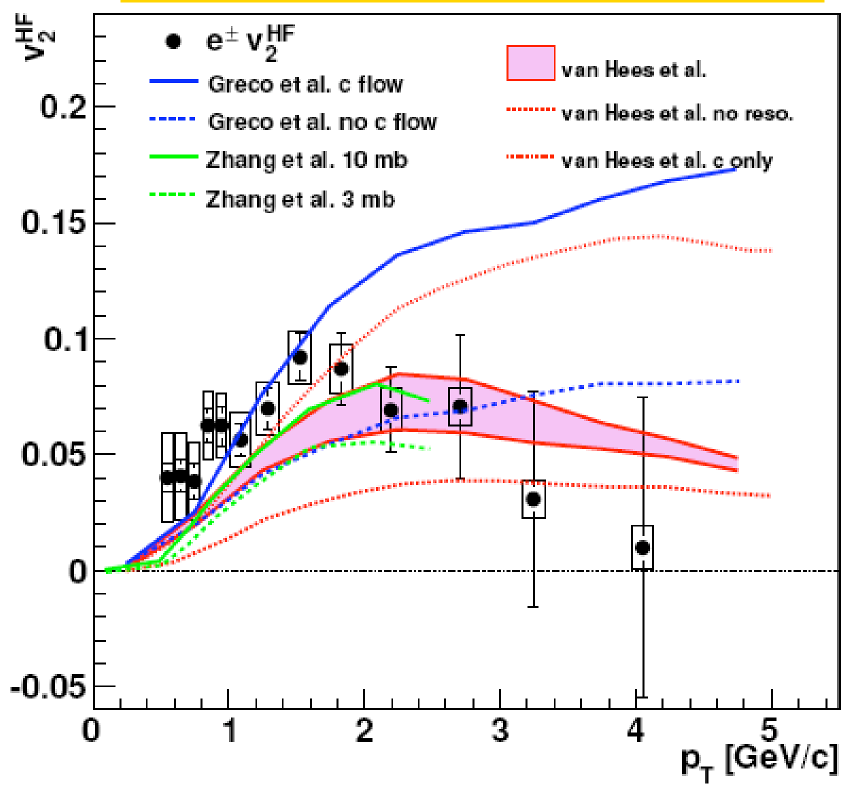


Collisional energy loss?

v_2 decrease with p_T?

role of b quarks?





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VTX to tag displaced vertex

- **Commission and take first data in Run-11!**
- **Commissioning plan**

  Run p+p first, commission with low multiplicity

    Longest running period → max time to study VTX

  Then switch to full energy Au+Au

    Respect CA-D guidance of max energy first

    Commission at high multiplicity & data rate

  Collect data at 200 GeV Au+Au

      serves both commissioning & physics

- **Physics goals**

  Demonstrate the electrons are from heavy flavor

  First direct look at separated b and c in Au+Au

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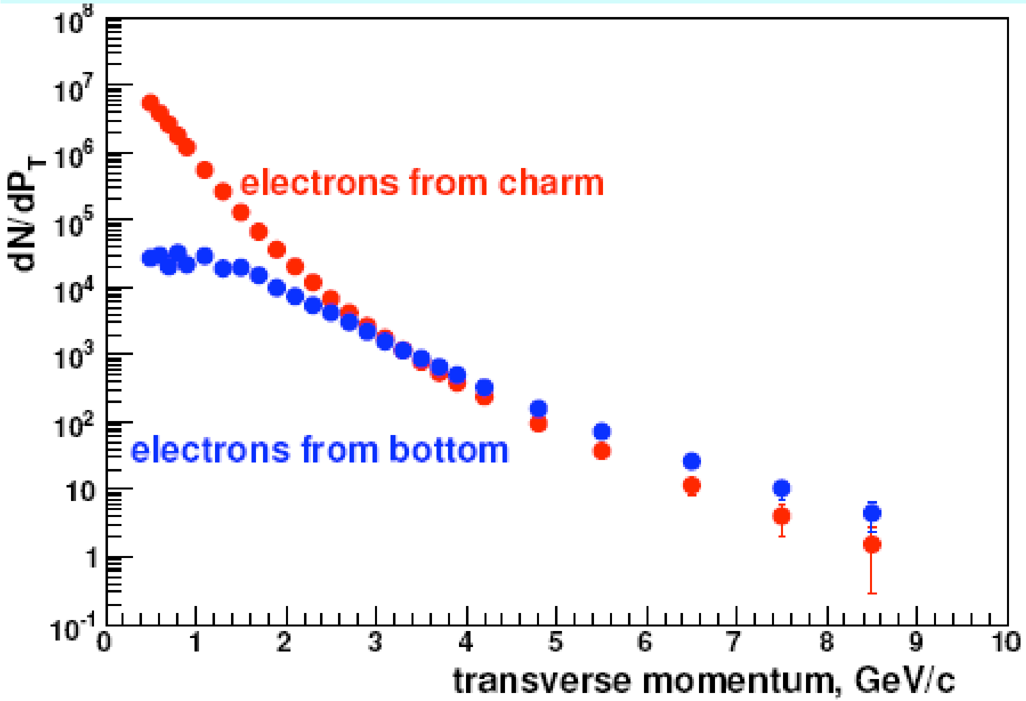
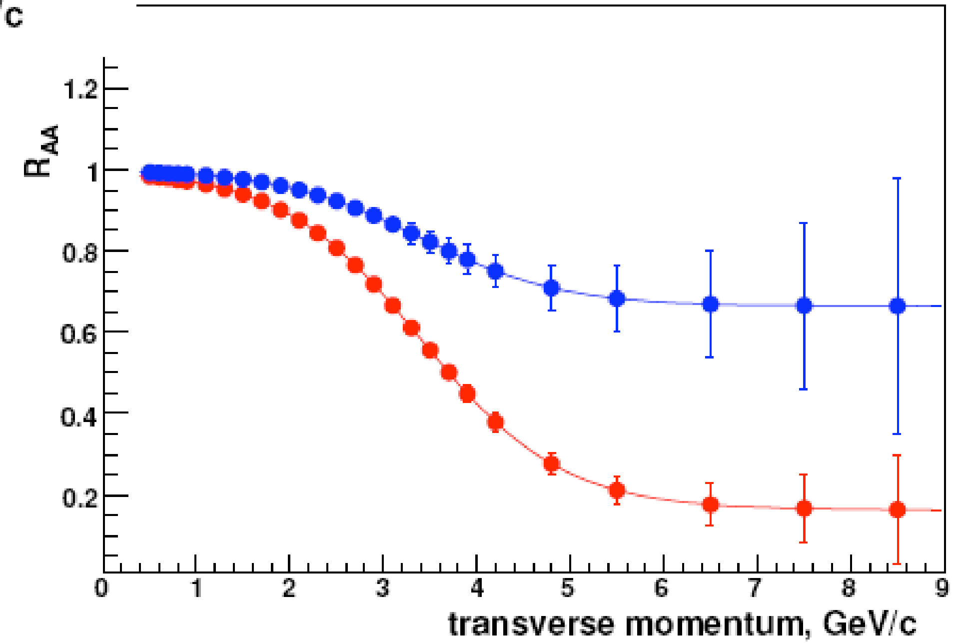
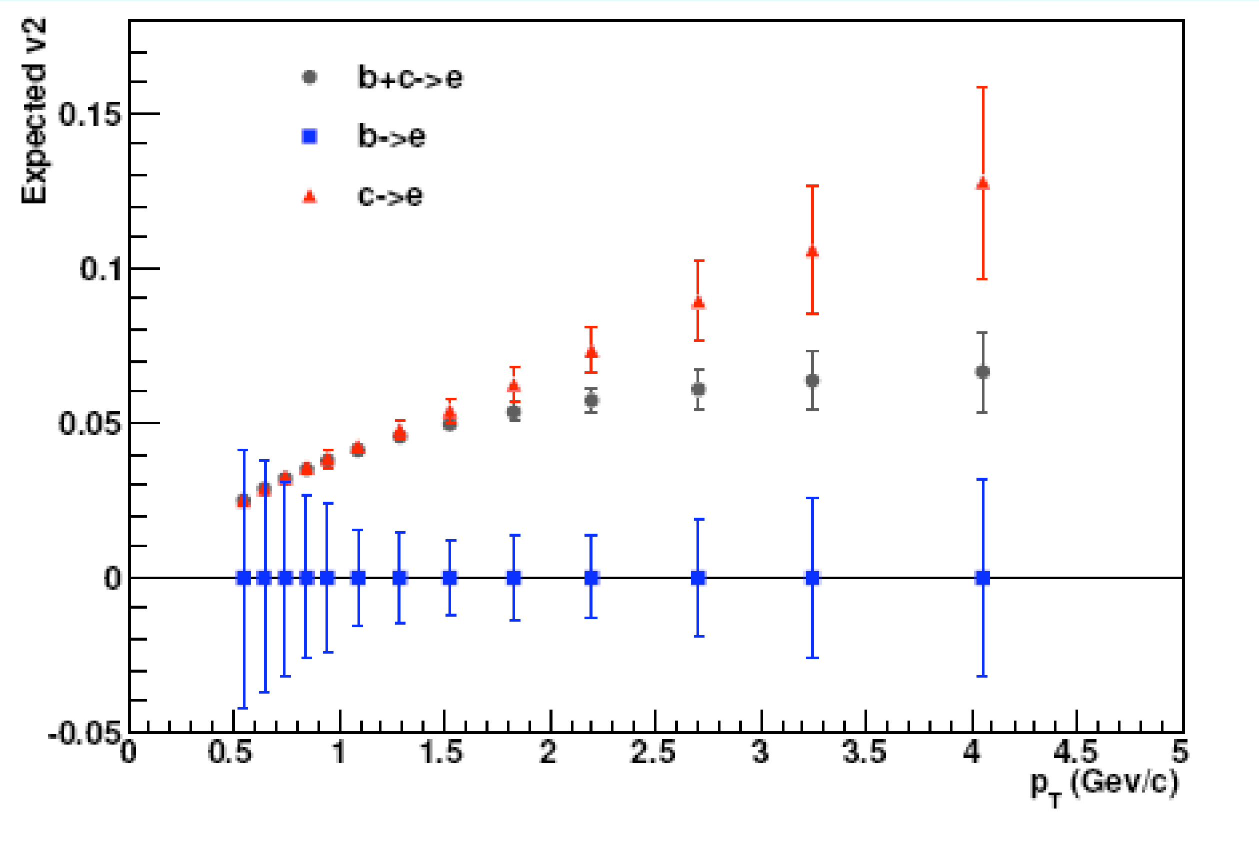
With 8 weeks Au+Au at √ s = 200 GeV



Assumption here:
Full 8 weeks used for data taking



Heavy quark flow in Run-11



Assumption:

Full 8 weeks data taking

NB: simulated limited p_T range.

Good sensitivity for v_2 decrease at high p_T

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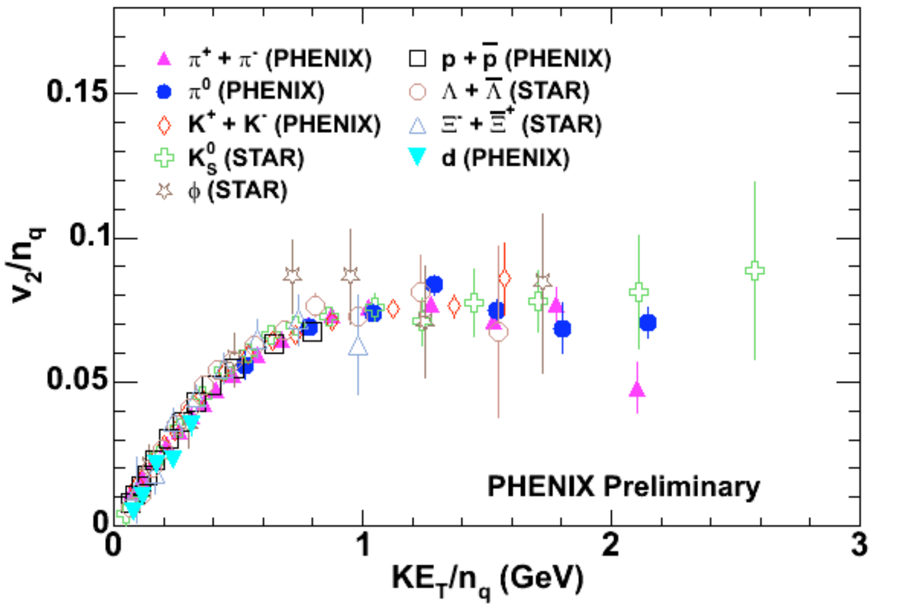
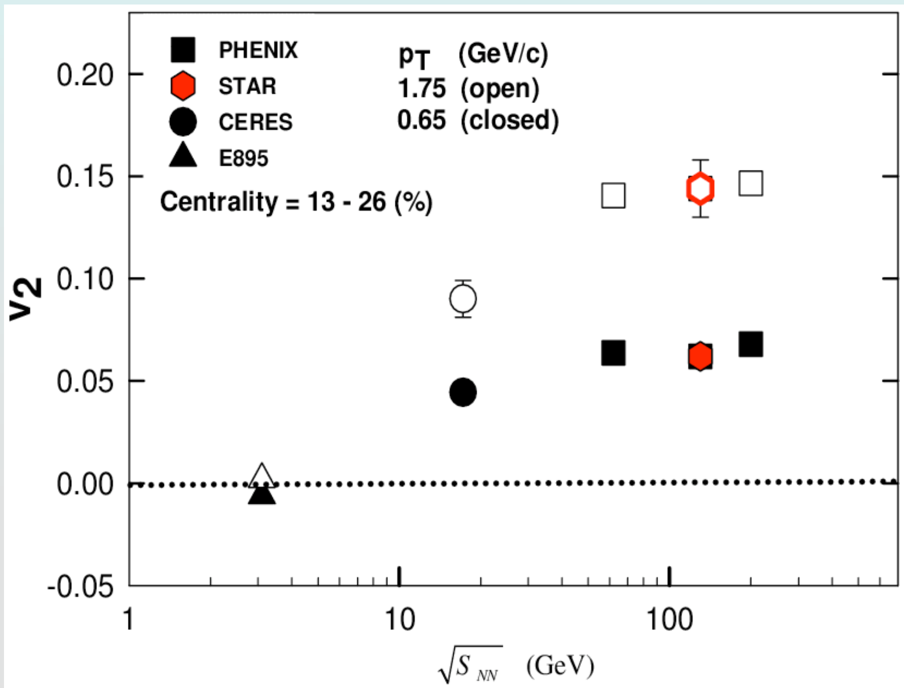
Q7: Quark number scaling of v_2

- v_2/n_q vs. p_T/n_q or KE_T/n_q follows a universal curve
  Reproduced by hydrodynamics
  Evidence for collective flow developed in QGP phase



Does scaling break at same √ s where v_2 saturates?



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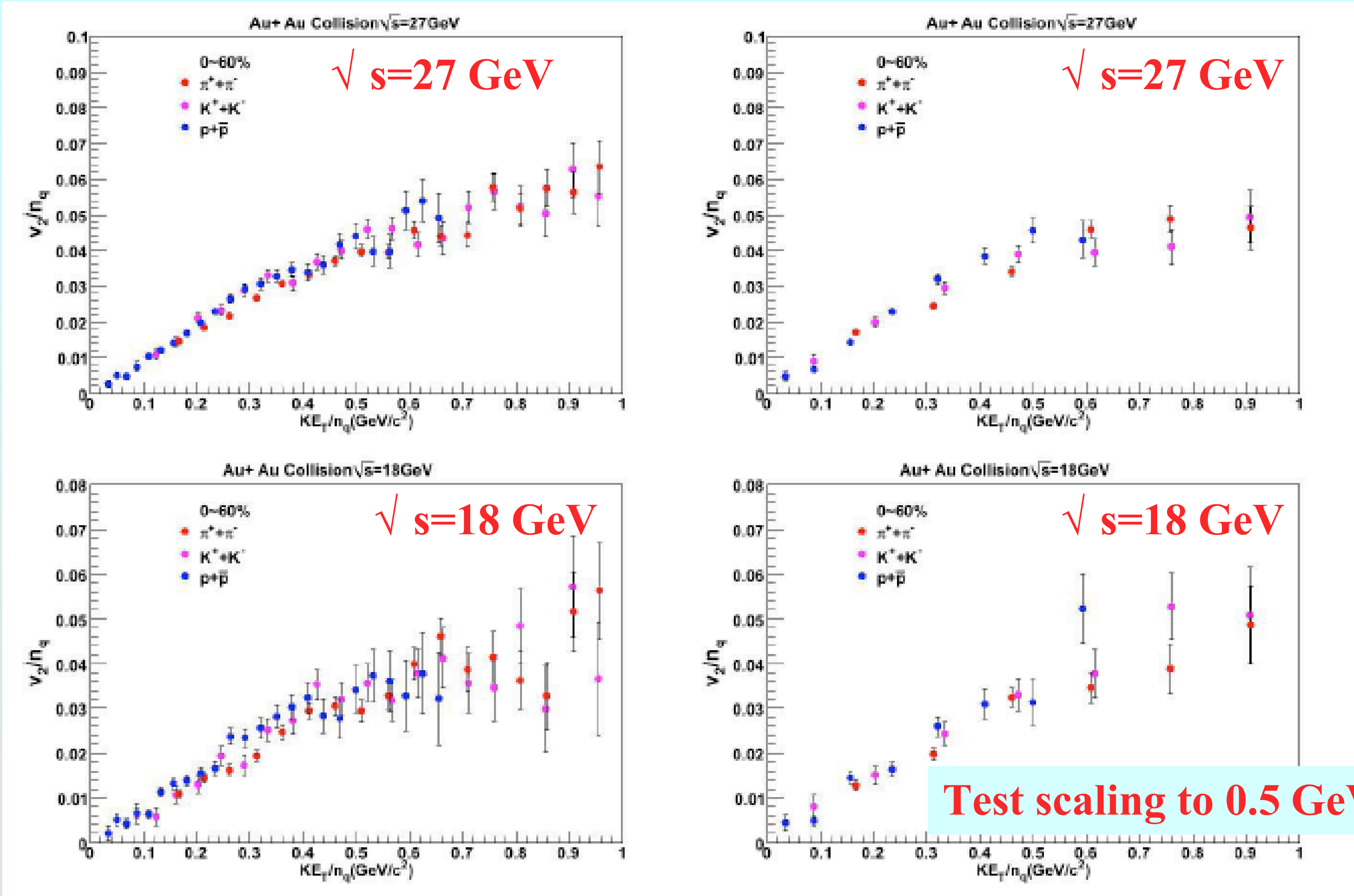
Error bars in Run-11



Test scaling to 0.5 GeV

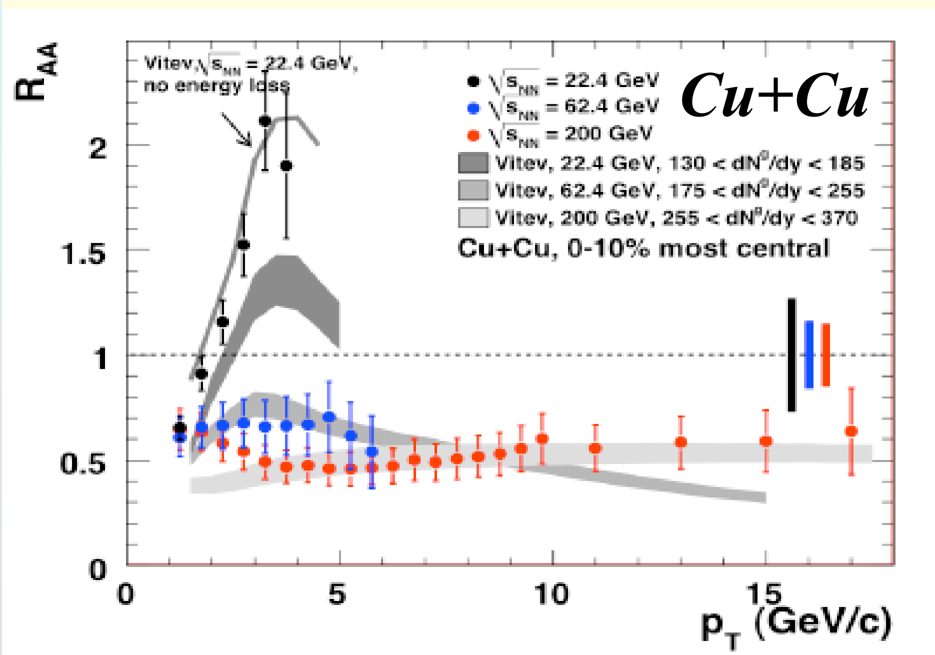
vertex in ± 30cm

vertex in ± 10cm

Q8: Jet suppression √s dependence?

- Where between 22.4 and 62.4 GeV does R_{AA} become less than 1?

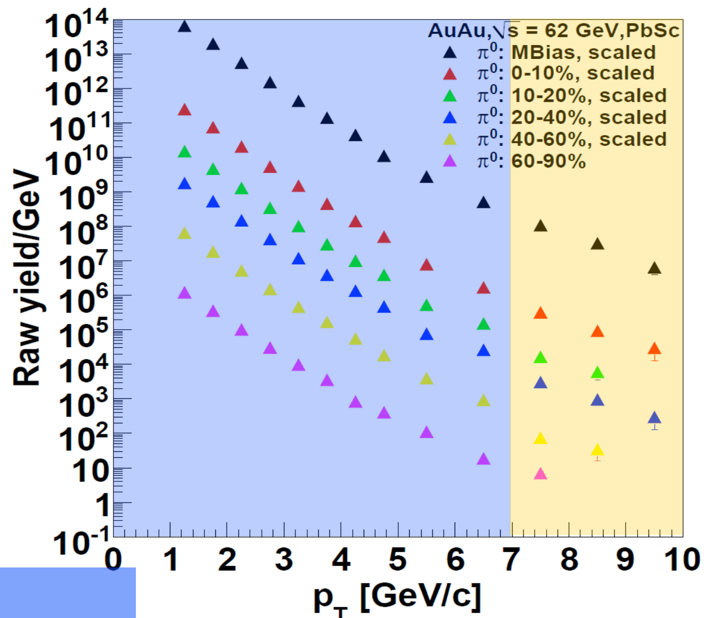
  NB: firm conclusion on jet quenching will also require control of Cronin effect

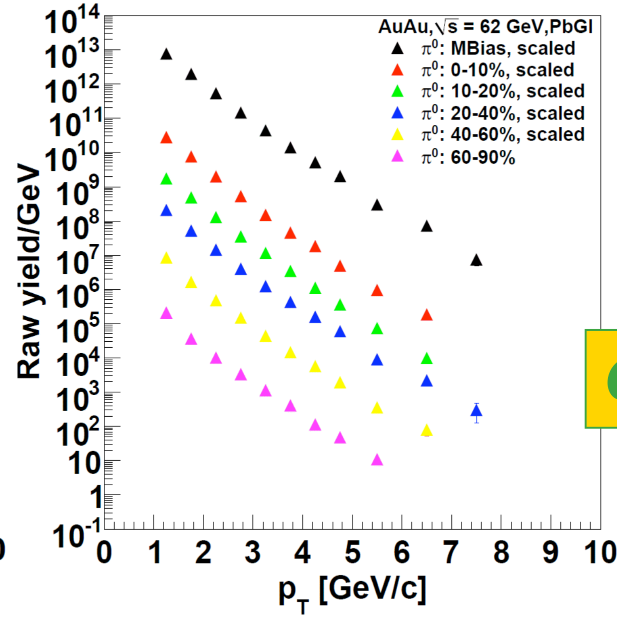


PHENIX, arXiv:0801.4555 [nucl-ex]

Jet suppression in Run-10

Run-10
Raw π^0 yields

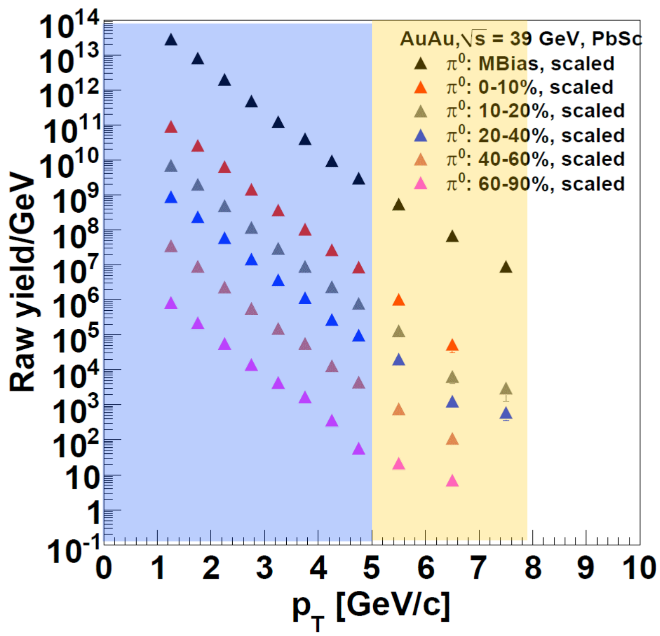


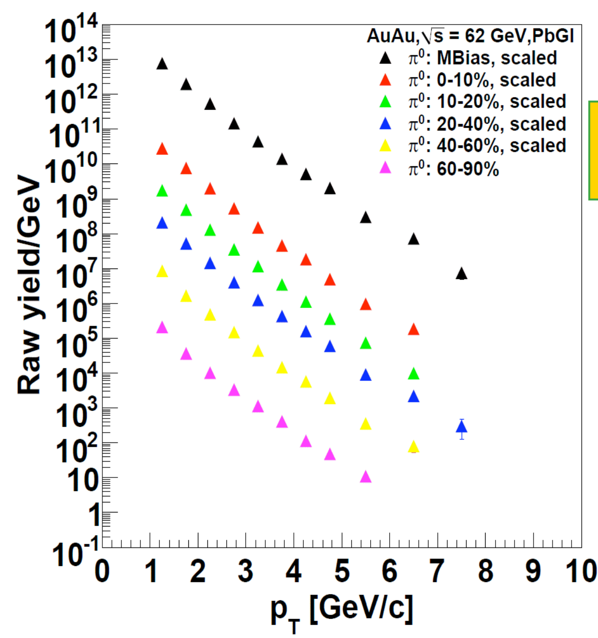


62 GeV

Previous p_T reach (Run-4)

Enhanced p_T reach (Run-10)





39 GeV

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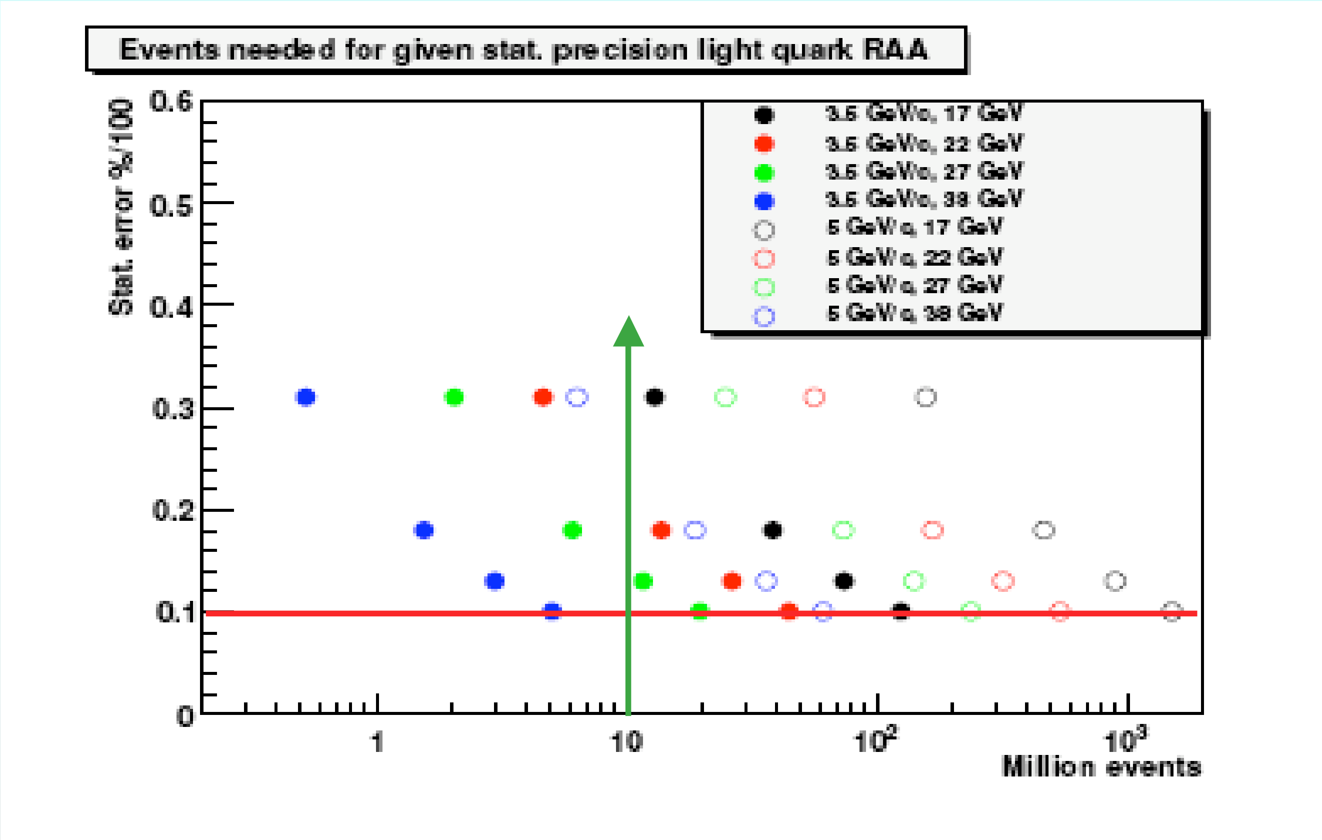
Projection for Run-11



Vertex cut

± 10 cm

uncertainty at p_T = 3.5 GeV:

~14% at 27 GeV

~ 30% at 18 GeV

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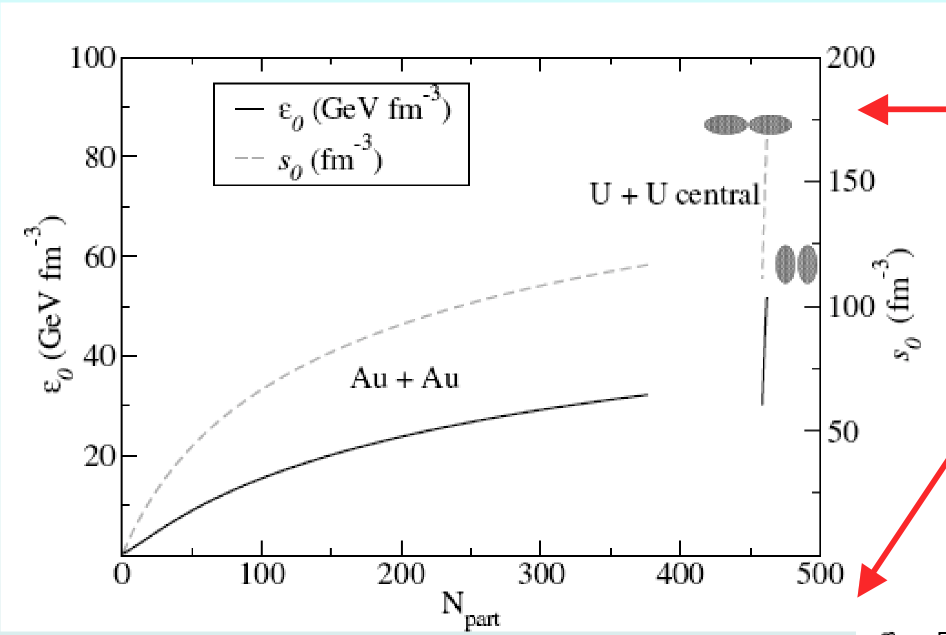
Basis for time estimates

$\sqrt{s_{NN}}$	ave.lumi. $(cm^{-2}sec^{-1})$	σ (b)	Events/Day in 30 cm	Events/Day in 10 cm
Au+Au				
18	6.00 E+25	6.8	3.73 M	1.24 M
27	8.00 E+25	6.8	4.98 M	1.66 M
p+p				
22	2.50 E+29	0.03	68.6 M	22.9 M
27	6.00 E+29	0.032	176 M	58.5 M
39	2.40 E+30	0.033	724 M	241 M
62	4.80 E+30	0.0356	1.56 B	521 M

- Projections from W. Fischer

U+U "engineering" run simulations

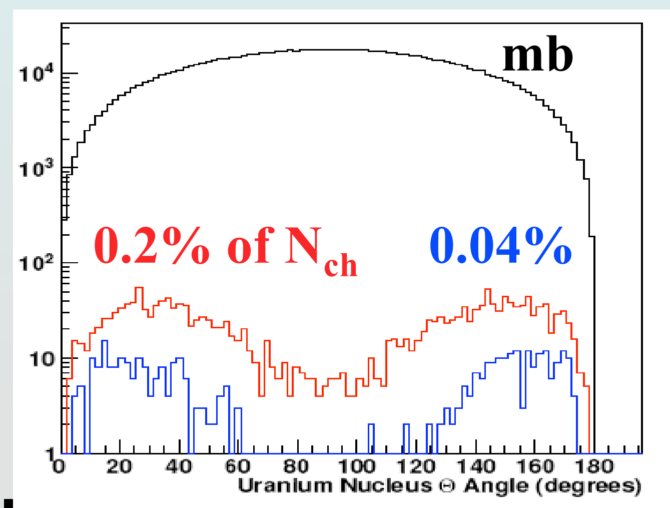


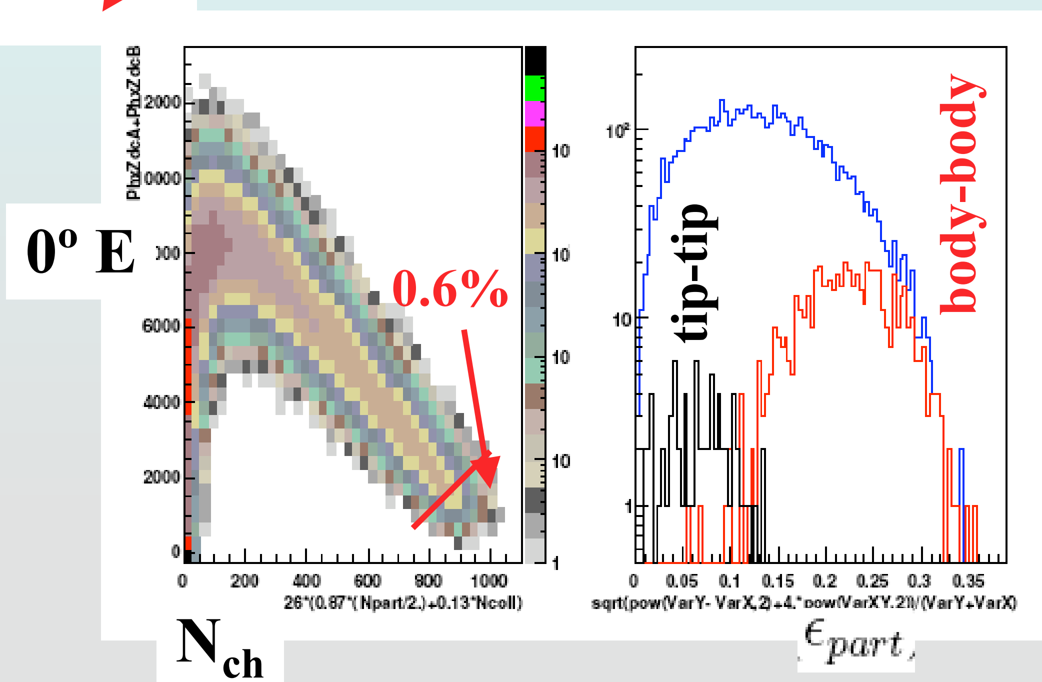
The goal

The problem

The solution: 200M evt

~ 400k tip-tip events





Run-12 Physics goals

- Reach 150 pb-1 sampled for W in 500 GeV p+p
- Full energy Au+Au
  Extend open heavy flavor study to forward angle
- Low energy p+p comparison running

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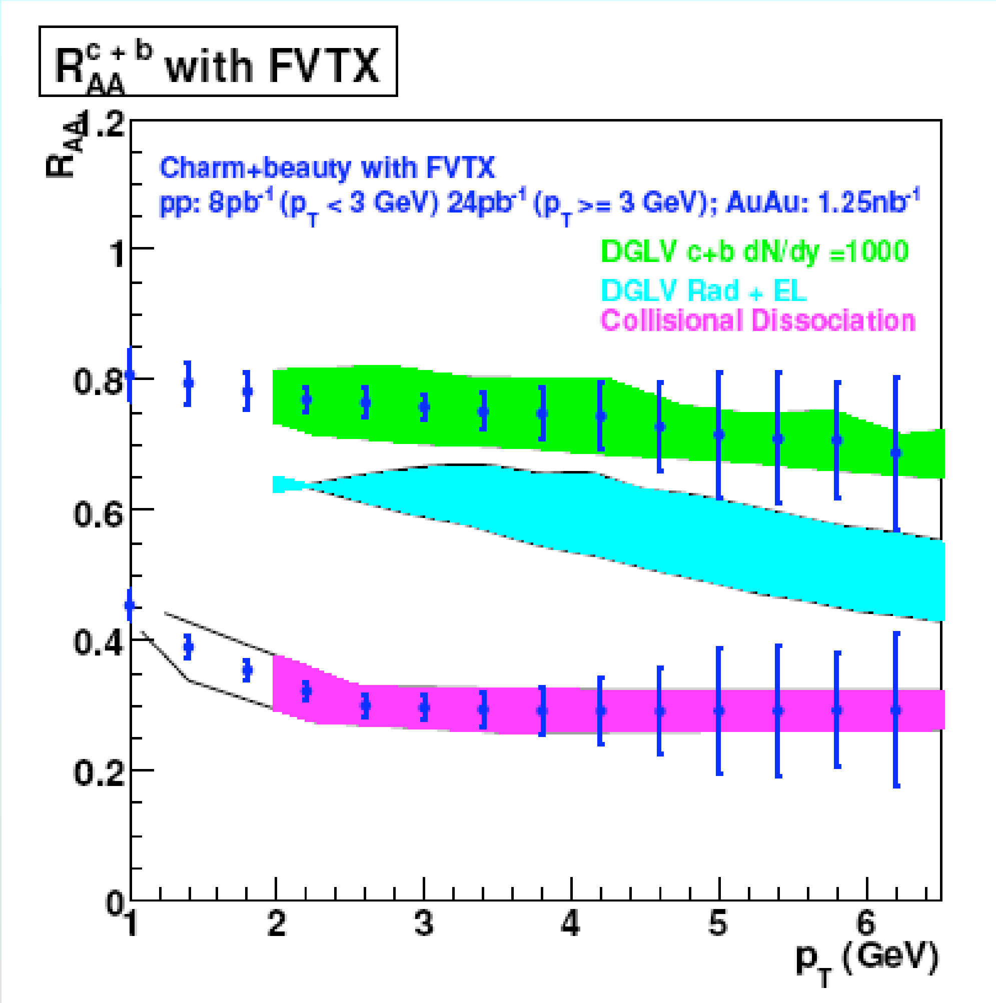
Run-12 FVTX physics

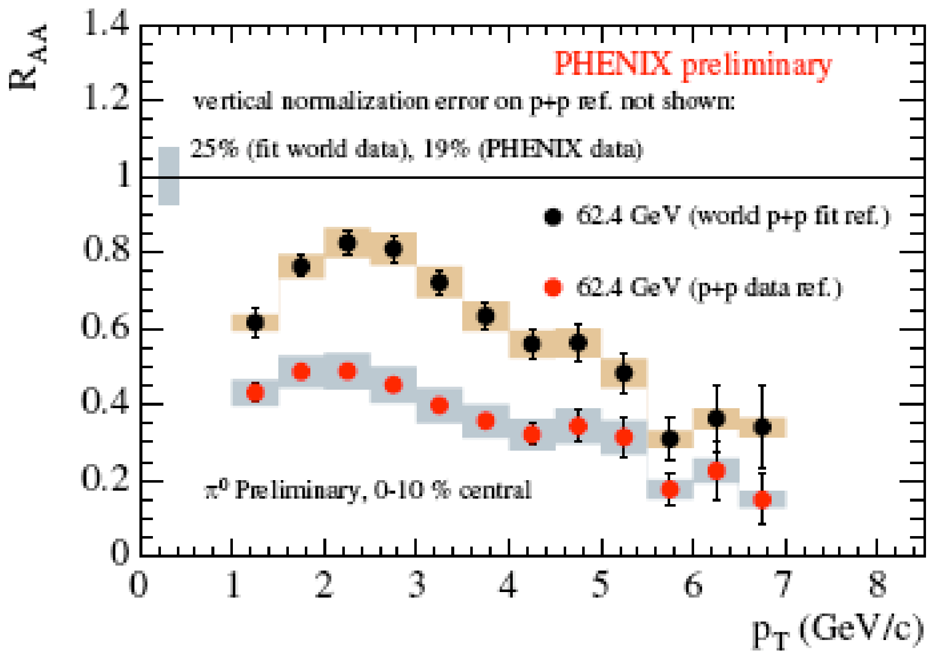


Run-12 Goals:

Commission

Take first part of this data set

Low energy p+p comparison running

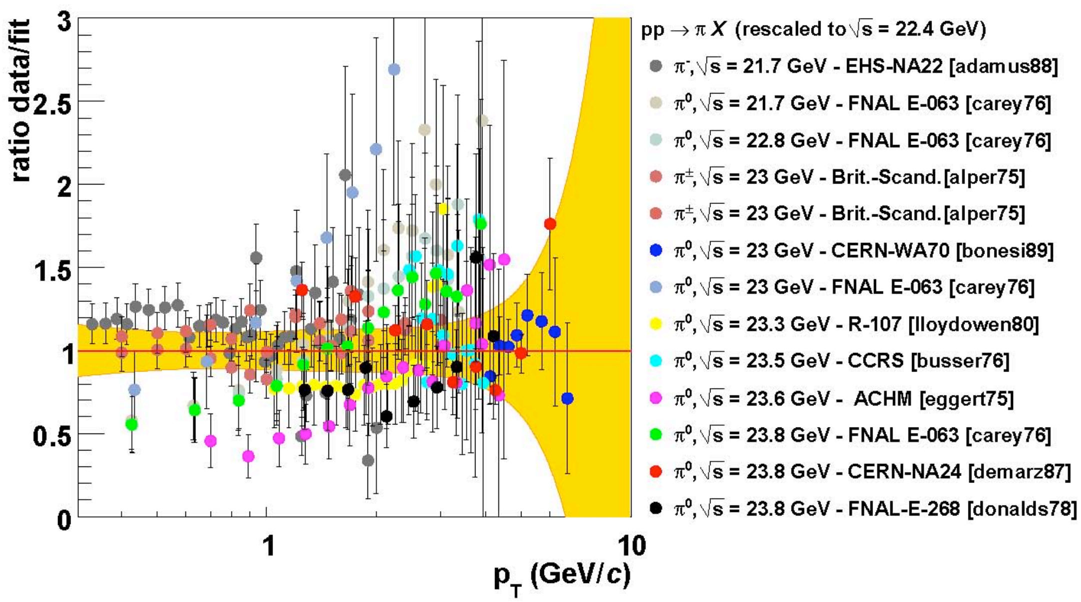


Measurement way better than fit!

But, p+p data run out at 7 GeV/c p_T so we request new run

Arleo & d'Enterria, Phys.Rev.D78:094004,2008

- **Key: p+p data at $\sqrt{s}$ = 22.4 GeV**
- **For Cu+Cu statistics, require 0.01 pb^{-1}**
  I.e. 6 days + changeover



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PHENIX beam use proposal

RUN	SPECIES	$\sqrt{s_{NN}}$ (GeV)	PHYSICS WEEKS	$\int \mathcal{L}dt$ (recorded)	p+p Equivalent	Polarization
11	p+p	500	10	50 pb^{-1}	50 pb^{-1}	50%
	Au+Au	200	8	0.7 nb^{-1}	28 pb^{-1}	
	Au+Au	27	1	35M events		
	Au+Au	18	1.5	37M events		
	U+U	192.8	1.5	150-200M events		
12	p+p	500	8	100 pb^{-1}	100 pb^{-1}	50%
	Au+Au	200	7	0.7-0.9 nb^{-1}	28-36 pb^{-1}	
	p+p	62.4, 22.4	2.5	1.0, 0.01 pb^{-1}		0%

If less than 30 cryo weeks:

- Shorten U+U from 1.5 weeks to 0.5 weeks
- Shorten 500 GeV p+p from 10 weeks to 8.5 weeks
- Remove Au+Au at 18 GeV.
- Shorten 200 GeV Au+Au from 8 weeks to 7 weeks.

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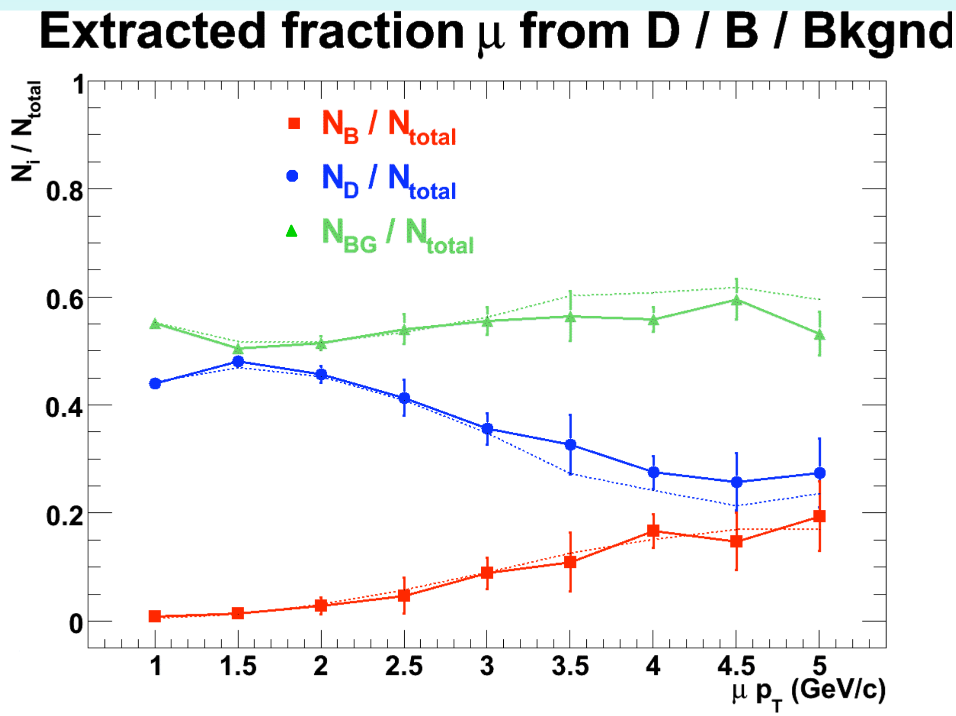
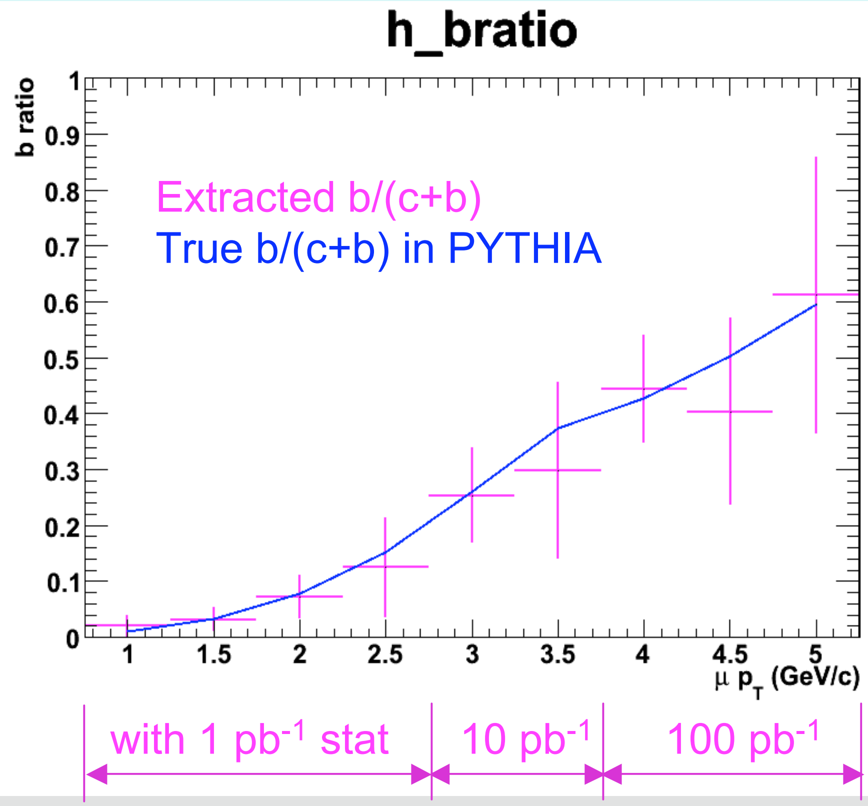
- **backup slides**

Beauty & charm separation at different muon p_T





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Department of Physics, Lund University, Box 118, SE-221 00 Lund, Sweden

PHENIX **14 Countries; 70 Institutions**

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Backgrounds at 500 GeV

- Data analysis underway…

- First taste of >1 MHz interaction rates
- Demonstrated operability of detectors
- Multiple collisions per crossing and in adjacent crossings
  - Learned how to deal with it
  - Revised drift chamber calibration approach
- Scaling the backgrounds to the collision rate worked OK as a rule of thumb
- RPCs provided key monitoring instrumentation
  - Probably would like to install additional monitors

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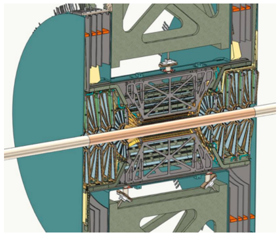
Future HI Milestones

Requires upgrade

Year	#	Milestone
2009	DM4	Perform realistic three-dimensional numerical simulations to describe the medium and the conditions required by the collective flow measured at RHIC.
2010	DM5	Measure the energy and system size dependence of J/Ψ production over the range of ions and energies available at RHIC.
2010	DM6	Measure e^+e^- production in the mass range $500 \leq m_{e+e-} \leq 1000$ MeV/c2 in $\sqrt{s_{NN}} = 200$ GeV collisions.
2010	DM7	Complete realistic calculations of jet production in a high density medium for comparison with experiment.
2012	DM8	Determine gluon densities at low x in cold nuclei via p + Au or d + Au collisions.
2015	DM9 (new)	Measure bulk properties, particle spectra, correlations and fluctuations in Au + Au collisions at $\sqrt{s_{NN}}$ from 5 to 40 GeV to search for evidence of a critical point in the QCD matter phase diagram.
2014	DM10 (new)	Perform calculations including viscous hydrodynamics to quantify, or place an upper limit on, the viscosity of the nearly perfect fluid discovered at RHIC.
2014	DM11 (new)	Measure jet and photon production and their correlations in A≈200 ion+ion collisions at energies from $\sqrt{s_{NN}} = 30$ GeV up to 5.5 TeV.
2016	DM12 (new)	Measure production rates, high pT spectra, and correlations in heavy-ion collisions at $\sqrt{s_{NN}} = 200$ GeV for identified hadrons with heavy flavor valence quarks to constrain the mechanism for parton energy loss in the quark-gluon plasma.
2018	DM13 (new)	Measure real and virtual thermal photon production in p + p, d + Au and Au + Au collisions at energies up to $\sqrt{s_{NN}} = 200$ GeV.

Spin Physics Milestones

Year	#	Milestone
2013	HP8	Measure flavor-identified q and $\bar{q}$ contributions to the spin of the proton via the longitudinal-spin asymmetry of W production.
2013	HP12	Determine if gluons have appreciable polarization over any range of momentum fraction between 1 and 30% of the momentum of a polarized proton.
2015	HP13	Test unique QCD predictions for relations between single-transverse spin phenomena in p-p scattering and those observed in deep-inelastic lepton scattering.



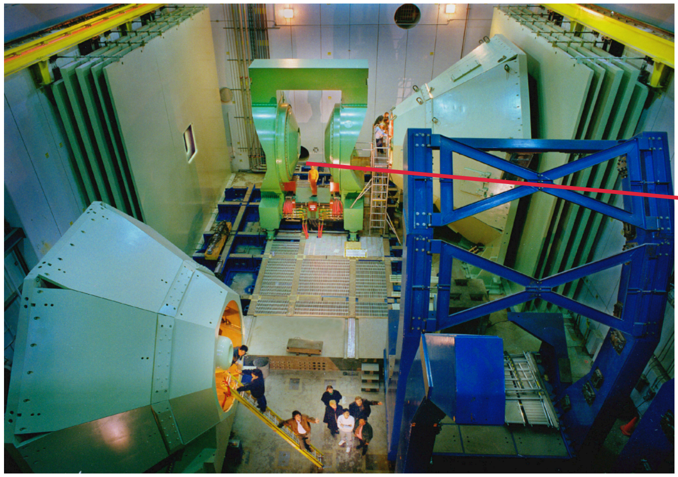
Forward Silicon Vertex Detector (FVTX)

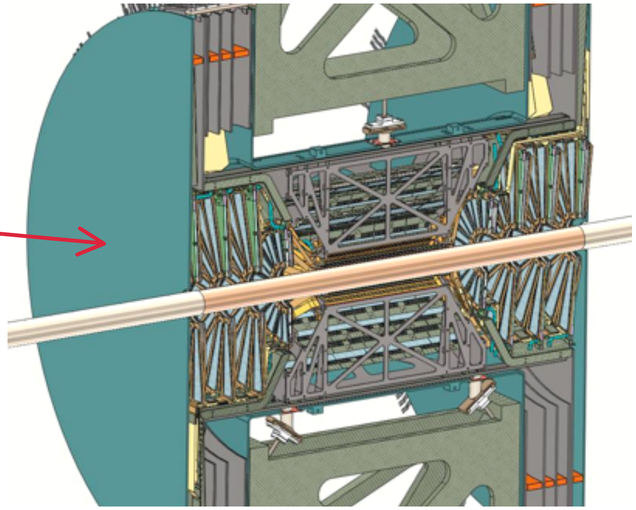
Single Muons:

- Precision heavy flavor and hadron measurements at forward rapidity
- Separation of charm and beauty
- Additional W background rejection

Dimuons:

- First direct bottom measurement via $B \rightarrow J/\psi$
- Separation of J/ψ from ψ' with improved resolution and S:B
- First Drell-Yan measurements from RHIC

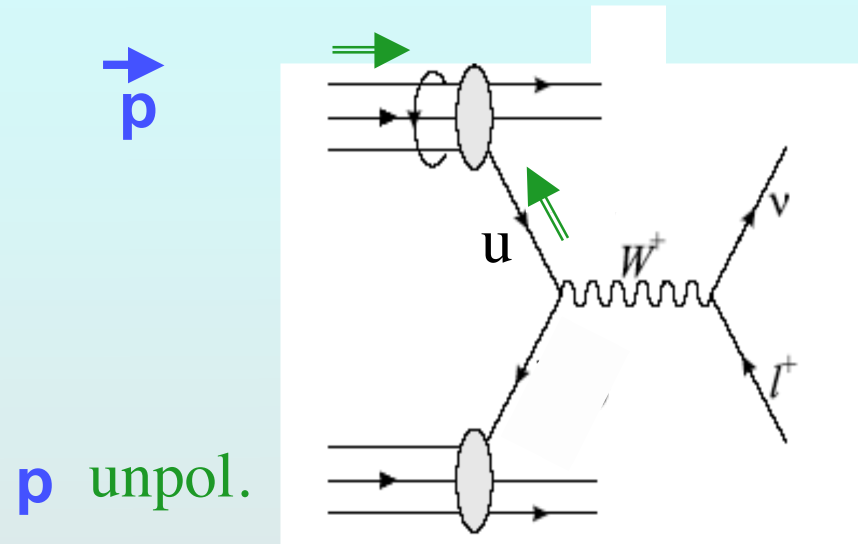




ΔG not large: sea quarks polarized? d vs. u?

Probe $\Delta\bar{q}$-Δq via W production

$$\Delta d + \bar{u} \rightarrow W^-$$
$$\Delta \bar{u} + d \rightarrow W^-$$
$$\Delta \bar{d} + u \rightarrow W^+$$
$$\Delta u + \bar{d} \rightarrow W^+$$



100% Parity-violating: $A_L = \dfrac{\sigma_+ - \sigma_-}{\sigma_+ + \sigma_-}$

Start: 2009(tests)/2010(trigger) with 500 GeV p+p

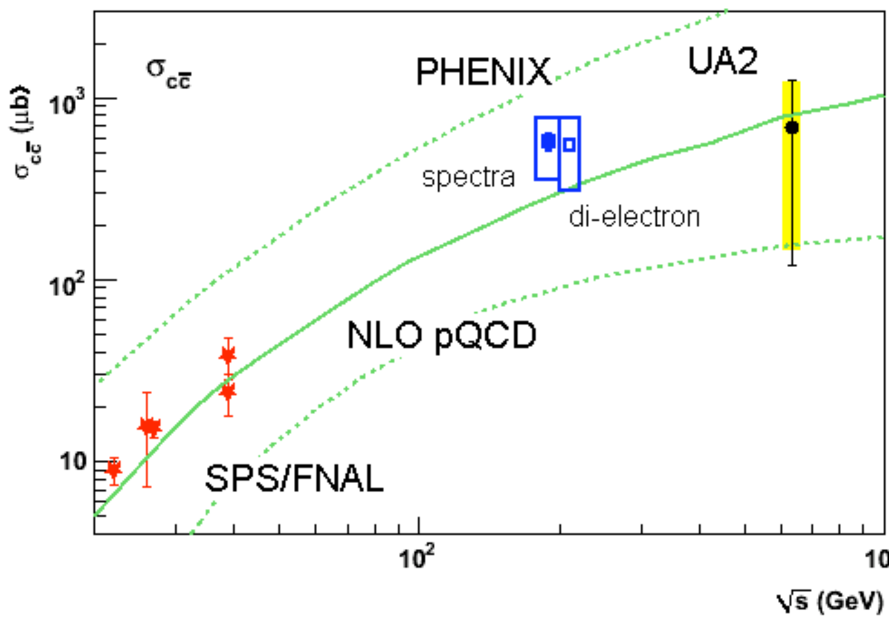
Charm & bottom cross section in p+p

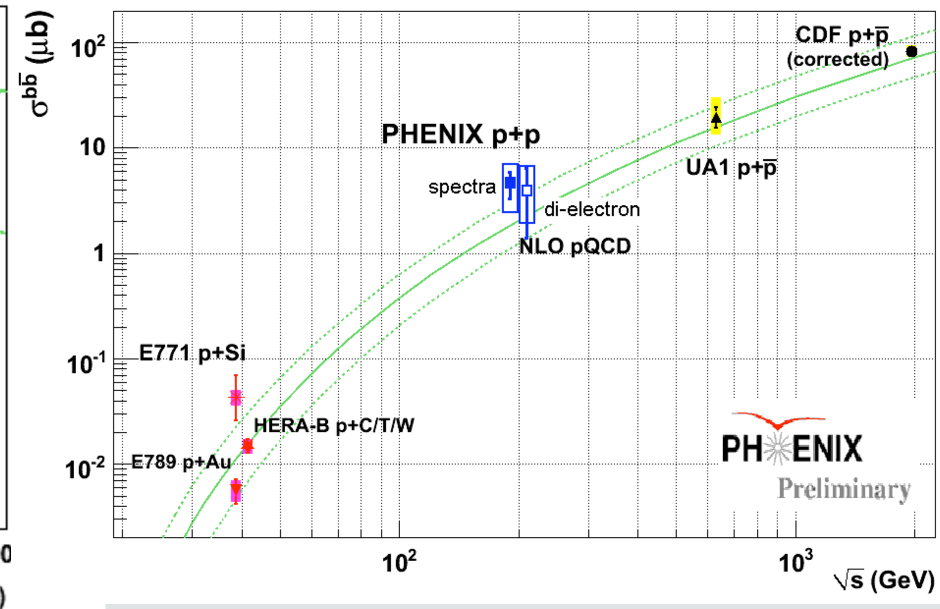
CHARM

Dilepton measurement in agreement with single electron, single muon, and with FONLL (upper end)

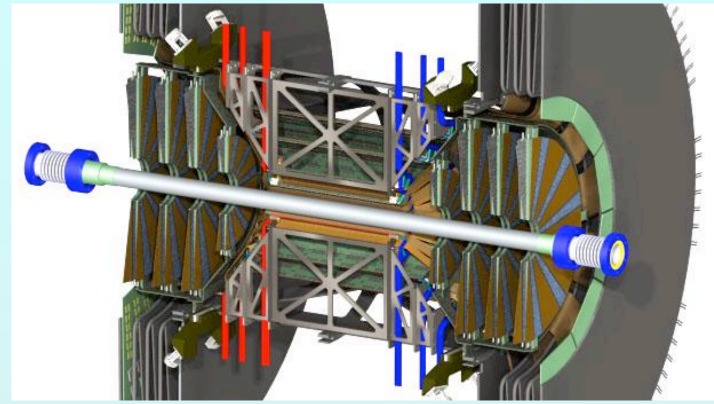
BOTTOM

Dilepton measurement in agreement with measurement from e-h correlation and with FONLL (upper end)





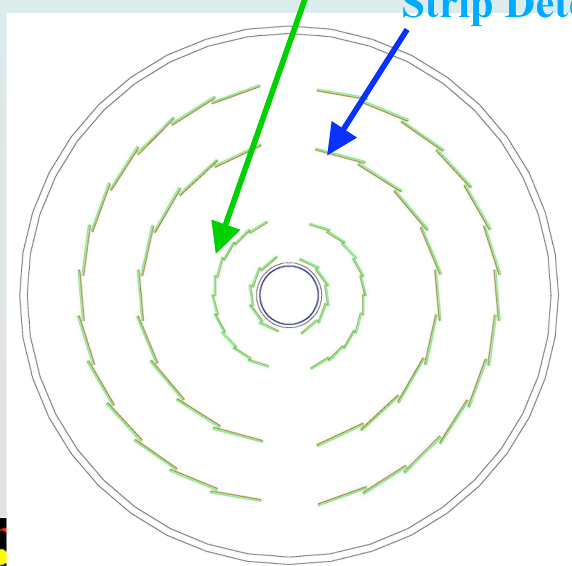
Barrel VTX Detector

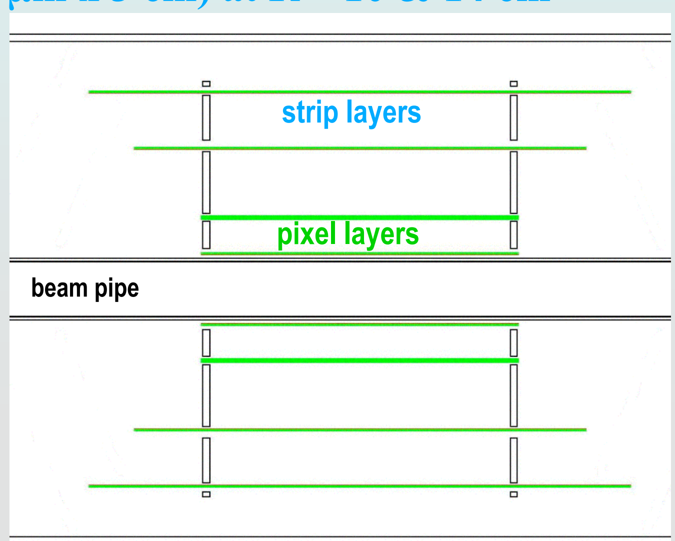


- **Specifications:**
  - **Large acceptance ($\Delta\phi \sim 2\pi$ and $|\eta| < 1.2$)**
  - **Displaced vertex measurement $\sigma < 40\ \mu m$**
  - **Charged particle tracking $\sigma_p/p \sim 5\%$ p at high pT**
  - **Detector must work for both HI and pp collisions.**
- **Technology Choice**
  - **Hybrid pixel detectors developed at CERN for ALICE**
  - **Strip detectors, sensors developed at BNL with FNAL's SVX4 readout chip**

Hybrid Pixel Detectors (50 μm x 425 μm) at R ~ 2.5 & 5 cm

Strip Detectors (80 μm x 3 cm) at R ~ 10 & 14 cm



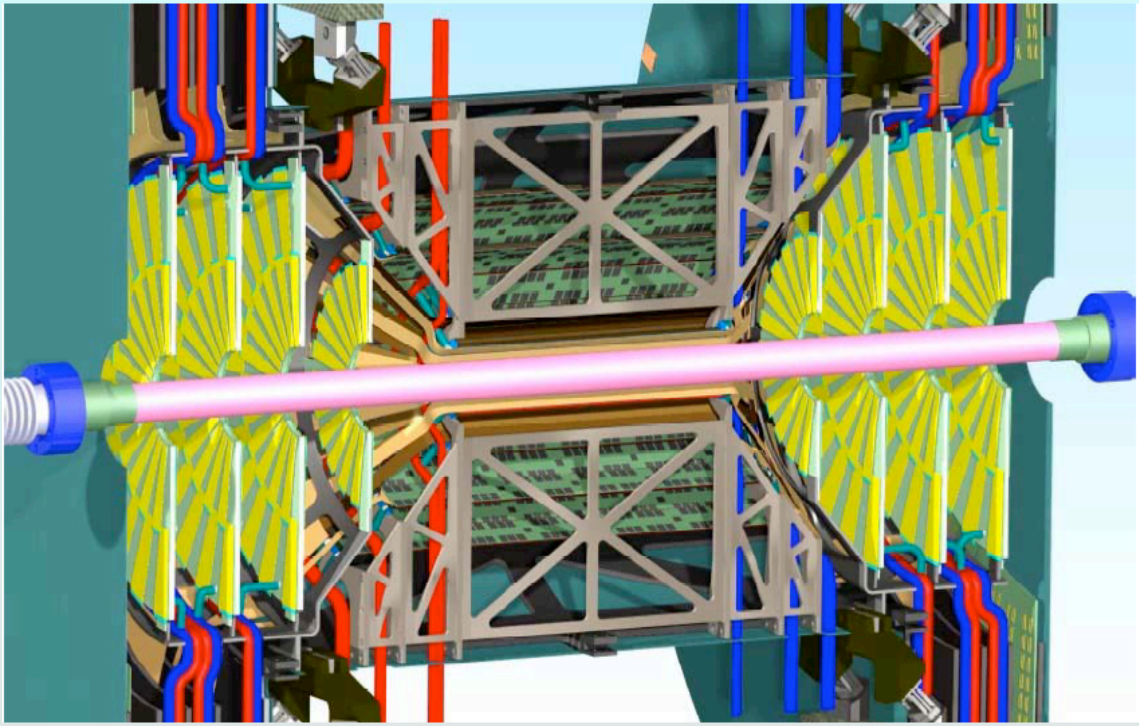


$|\eta|<1.2$
$\phi \sim 2\pi$
$z \sim \pm 10$ cm

Forward Silicon Vertex Detector - FVTX

FVTX Specifications:

- 2 endcaps
- 4 pixelpad layers/endcap
- ~550k channels/endcap
- Electronics a mod of BTeV readout chip
- Fully integrated mech design w/ VTX
- 2π coverage in azimuth and $1.2 < | \eta | < 2.4$
- Better than 100 μm displaced vertex resolution



PHENIX

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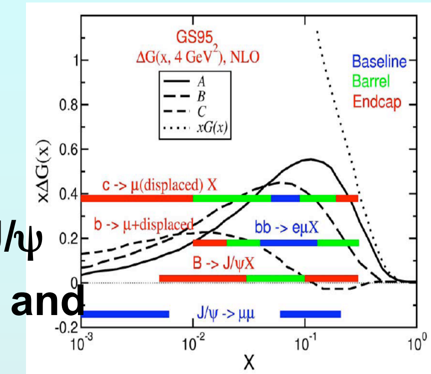
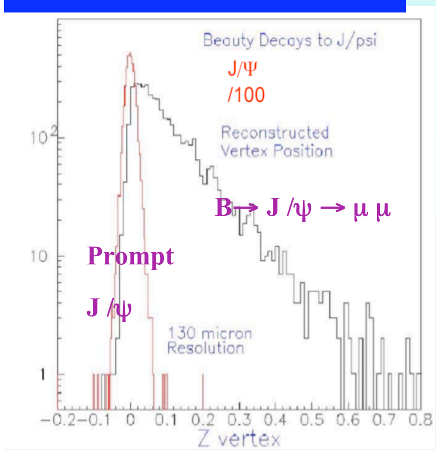
Enhanced x coverage



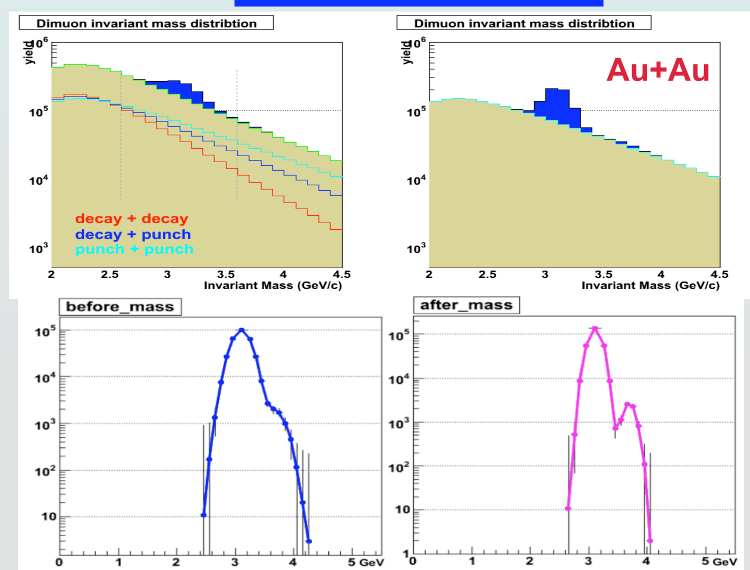
Physics Program of FVTX includes

- Resolving J/ψ and ψ' in Muon arms
- Resolving ϒ at y=0 using Muon arms
- Direct measure of B meson through displaced J/ψ
- Drell-Yan Measurements in dAu at both forward and midrapidities
- c, b ID for both HI physics & ΔG spin measurements
- Nuclear modification factor (CGC effects) in dAu using hadrons, c, b, and J/ψ

Direct measure of B



J/ψ, ψ' separation



c, b suppression at forward η