

PHENIX Goals for Run-9

- **500 GeV p+p**
- **200 GeV p+p**
- **If time for short runs:**
 - 22.4 GeV p+p comparison**
 - 62.4 GeV p+p comparison**



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PHENIX Beam Use Proposal

RUN	SPECIES	$\sqrt{s_{NN}}$ (GeV)	PHYSICS WEEKS	$\int \mathcal{L} dt$ (recorded)
9	p+p	200	10	25 pb ⁻¹
	OR p+p	500	5	25 pb ⁻¹
	Au+Au	200	10	1.4 nb ⁻¹
10	p+p	500	5	25 pb ⁻¹
	OR p+p	200		
	p+p	62.4, 39, 28, 22.4	2.5	~ 1 week
	Au+Au	62.4, 39, 28	15	
11	Au+Au	200	M	
	p+p	500	25-M	
12	U+U	200	N	
	p+p	200	25-N	
13	p+p	500	Q	
	Au+Au	various	25-Q	

2

1

3



Priority & order



500 GeV p+p goals for Run-9

- **Measure backgrounds under high p_T muons**
- **Test muon trigger electronics (currently being installed)**
- **Measure production cross sections**
 π^0, γ to $p_T \sim 30$ GeV, $J/\psi, \Upsilon$
- **With 25 /pb can record W's in central arm**
 ~ 500 W^+ and ~ 90 W^-
First look at A_L with $\Delta A_L \sim 0.05$.

- **Estimate 4 or 5 Physics Weeks needed**

1st 2 items underway, need luminosity of course

3rd item certain with $\int L$ in physics running mode

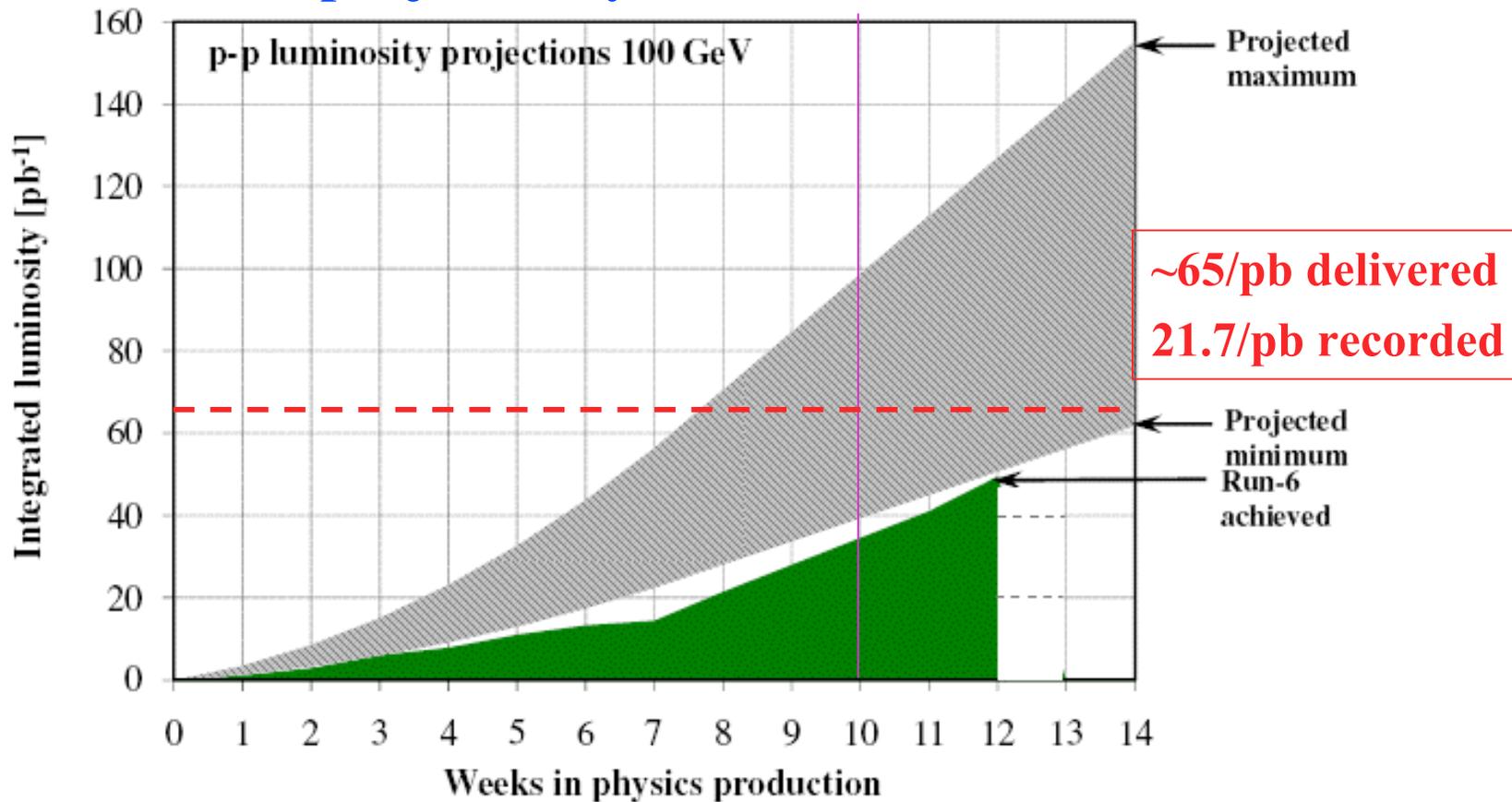
4th item: W observation certain with $\int L$

A_L feasible, depending on polarization



200 GeV p+p (65% polarization)*

* assumed, and projected by CAD

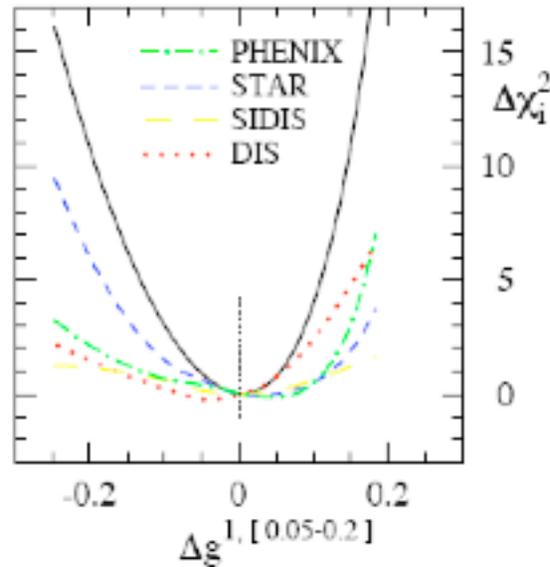


Run-8 ratio recorded/delivered = 0.3

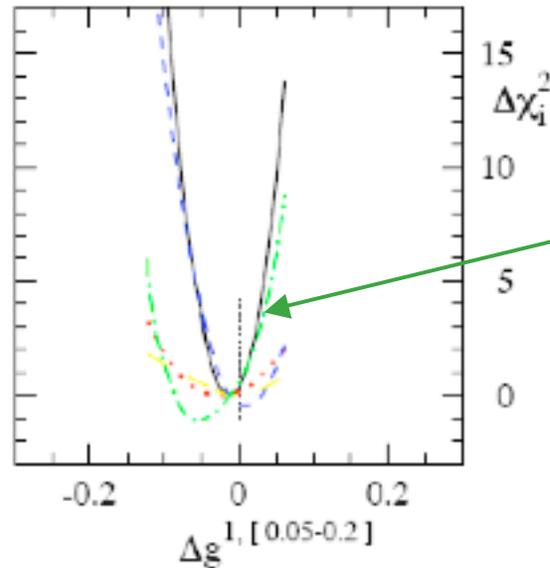
Narrowing in on ΔG

PHENIX will provide best constraint if ΔG is positive (in the range $0.05 < x < 0.2$)

In that case, the best sensitivity is via gluon-gluon interactions - high rates at low p_T .



**Run-6
status**



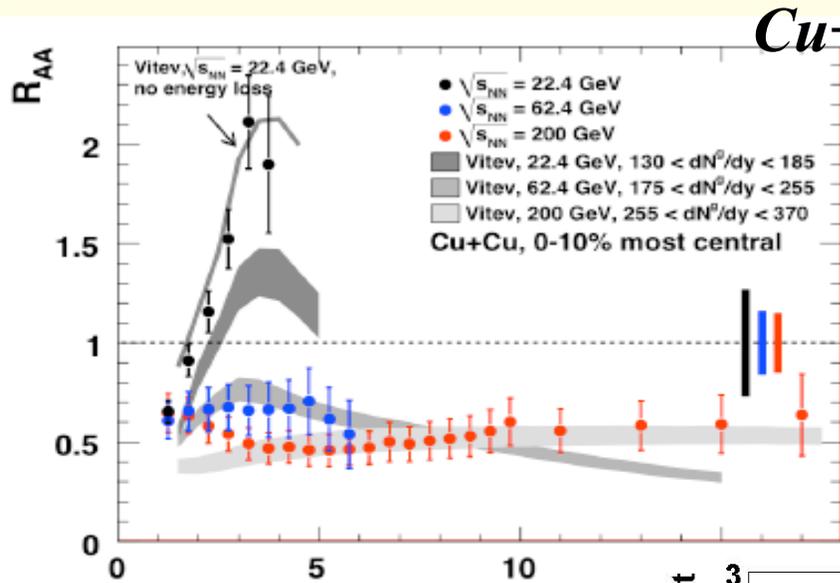
Run-9 Projected
The systematic error is what drives our big interest in spin flipper!

Third Priority

- **Comparison p+p**
Since that's what's in the machine!
- **For lower energy running**
Address two questions
where is onset of jet quenching?
is onset the same for heavy quarks?

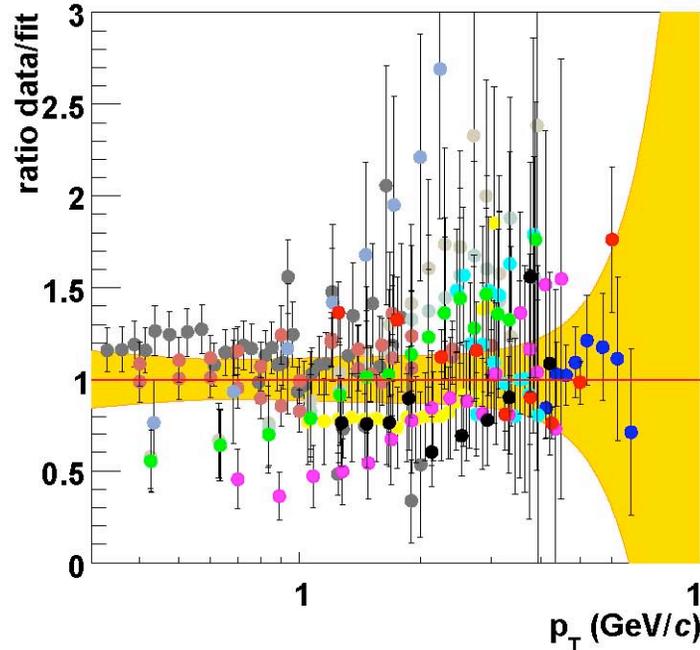


Onset of RHIC's perfect liquid



Emergence of opacity
Somewhere between
22.4 and 62.4!

PRL101, 162301 (2008)



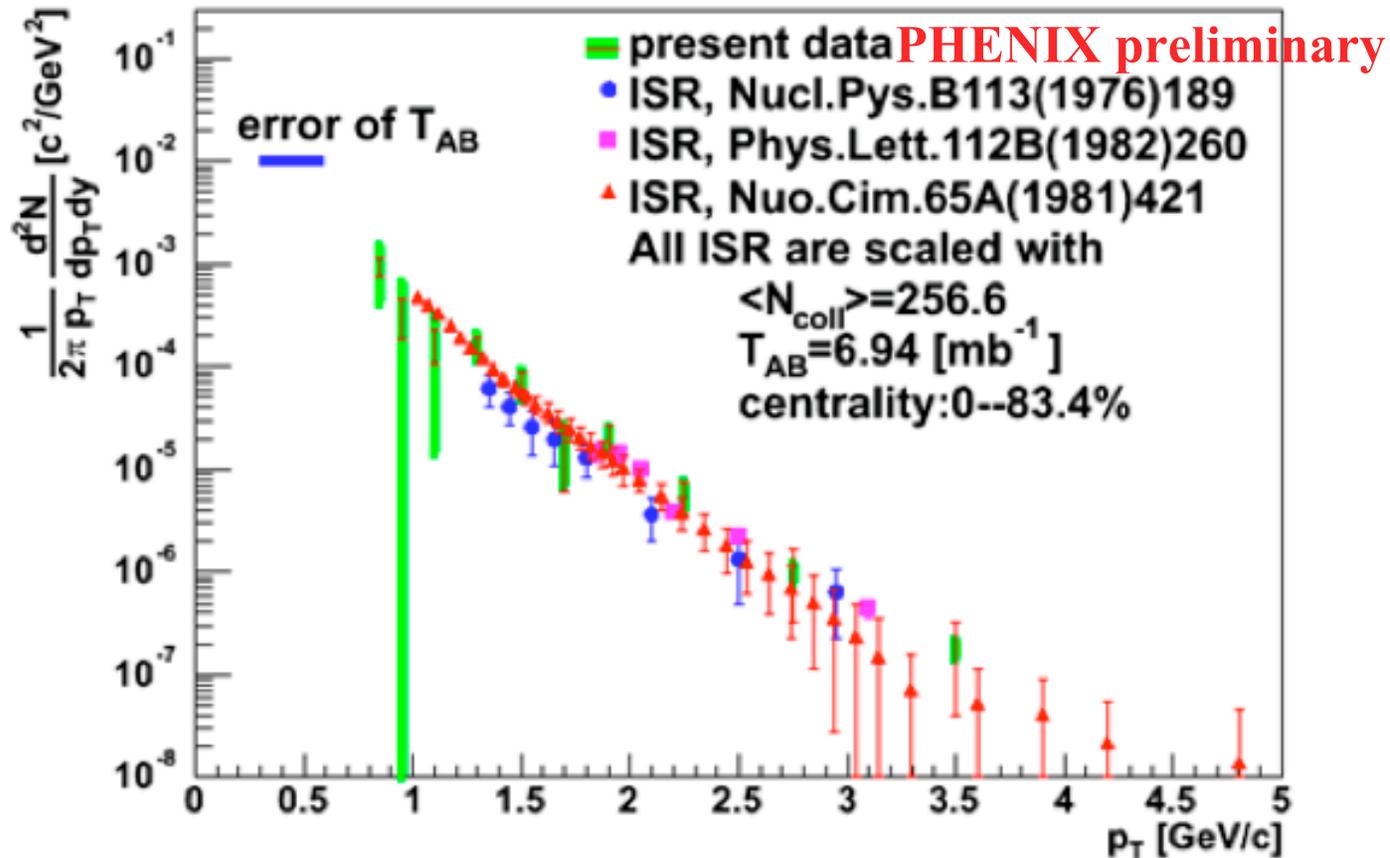
- $\pi^\pm, \sqrt{s} = 21.7$ GeV - EHS-NA22 [adamus88]
- $\pi^0, \sqrt{s} = 21.7$ GeV - FNAL E-063 [carey76]
- $\pi^0, \sqrt{s} = 22.8$ GeV - FNAL E-063 [carey76]
- $\pi^\pm, \sqrt{s} = 23$ GeV - Brit.-Scand. [alper75]
- $\pi^\pm, \sqrt{s} = 23$ GeV - Brit.-Scand. [alper75]
- $\pi^0, \sqrt{s} = 23$ GeV - CERN-WA70 [bonesi89]
- $\pi^0, \sqrt{s} = 23$ GeV - FNAL E-063 [carey76]
- $\pi^0, \sqrt{s} = 23.3$ GeV - R-107 [lloydowen80]
- $\pi^0, \sqrt{s} = 23.5$ GeV - CCRS [busser76]
- $\pi^0, \sqrt{s} = 23.6$ GeV - ACHM [eggert75]
- $\pi^0, \sqrt{s} = 23.8$ GeV - FNAL E-063 [carey76]
- $\pi^0, \sqrt{s} = 23.8$ GeV - CERN-NA24 [demarz87]
- $\pi^0, \sqrt{s} = 23.8$ GeV - FNAL-E-268 [donalds78]



Onset of heavy quark energy loss?

inclusive (e^+e^-)/2, minimum bias, (cent:0--83.4%)

62.4 GeV Au+Au



Estimated time required*

	$\sqrt{s_{NN}}$	weeks	events	comment
cooldown		2		
p+p start/rampup	500	3		
p+p physics	500	5		record 25pb ⁻¹
	62.4	0.5	6.5B	comparison
	39	0.5	≈1B	
	28	0.5	1.2B	
	22.4	1.0	2.5B	
Au+Au startup	62.4	2		
Au+Au energy changes	39, 28	0.5		
Au+Au physics	62.4	2	300M	
	39	5	300M	no charm measurement
	28	7.5	≈ 250M	
warm-up		0.5		
TOTAL		30		



* revisit with up to date L projections