

# RHIC Machine/Detector Planning Meeting

7 Jun 05

## Agenda

(if not covered in time meeting)

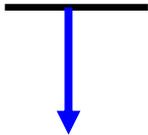
- **Report from experiments**
  - 205x205 GeV run summary
  - 100x100 GeV pp status report
  - *What ion beams are presently envisioned for RHIC Rnu-6?*
  
- **Report for Accelerators (Bai)**
  - 205x205 GeV pp summary
  - 100x100 GeV development (anything left to do?)
  
- **Other business**

Planning Meeting Web Site: [http://www.c-ad.bnl.gov/esfd/RMEM/rhic\\_planning.htm](http://www.c-ad.bnl.gov/esfd/RMEM/rhic_planning.htm)

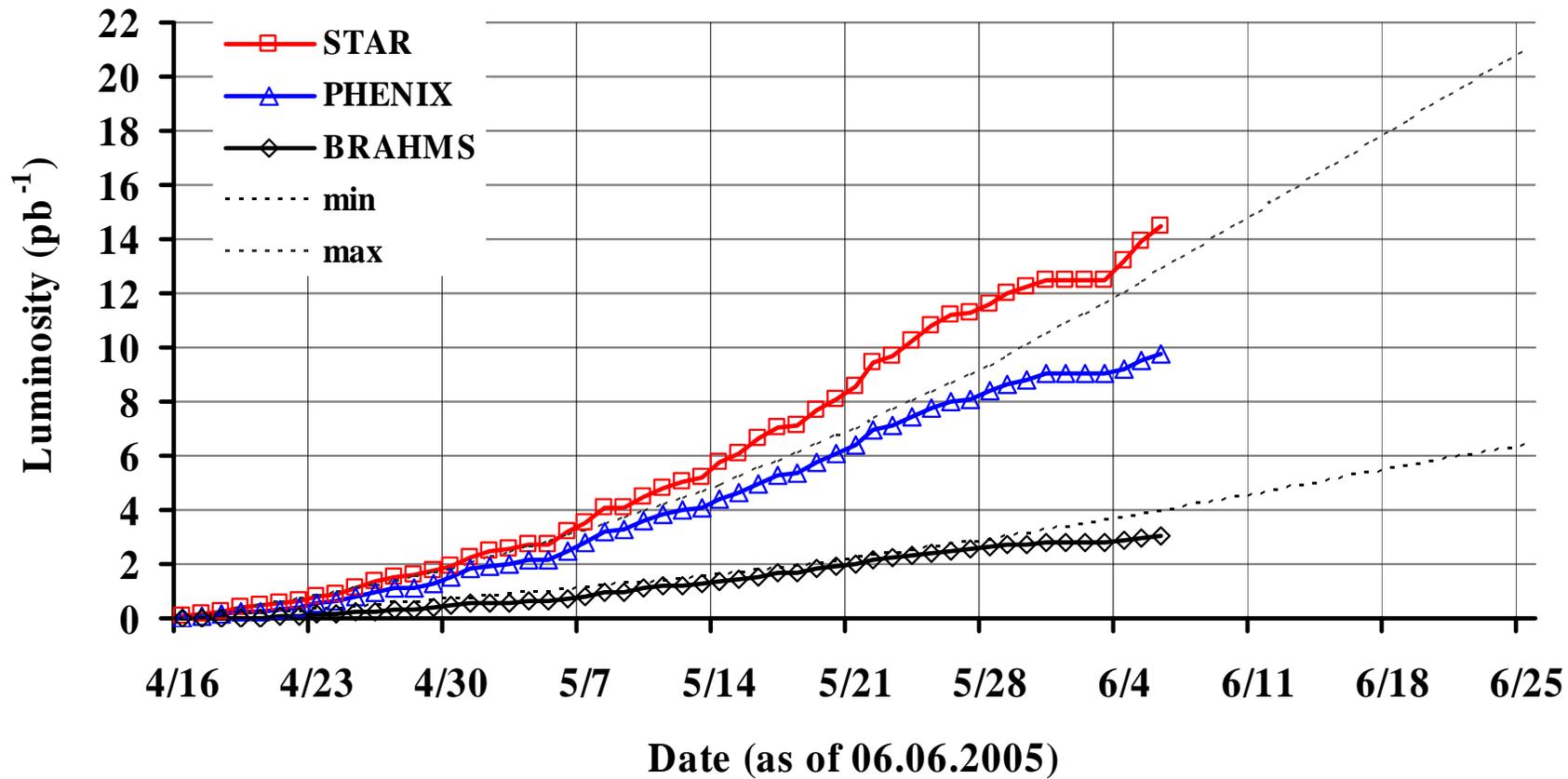
# RHIC Machine/Detector Planning Meeting

- **Details – as run/planned**

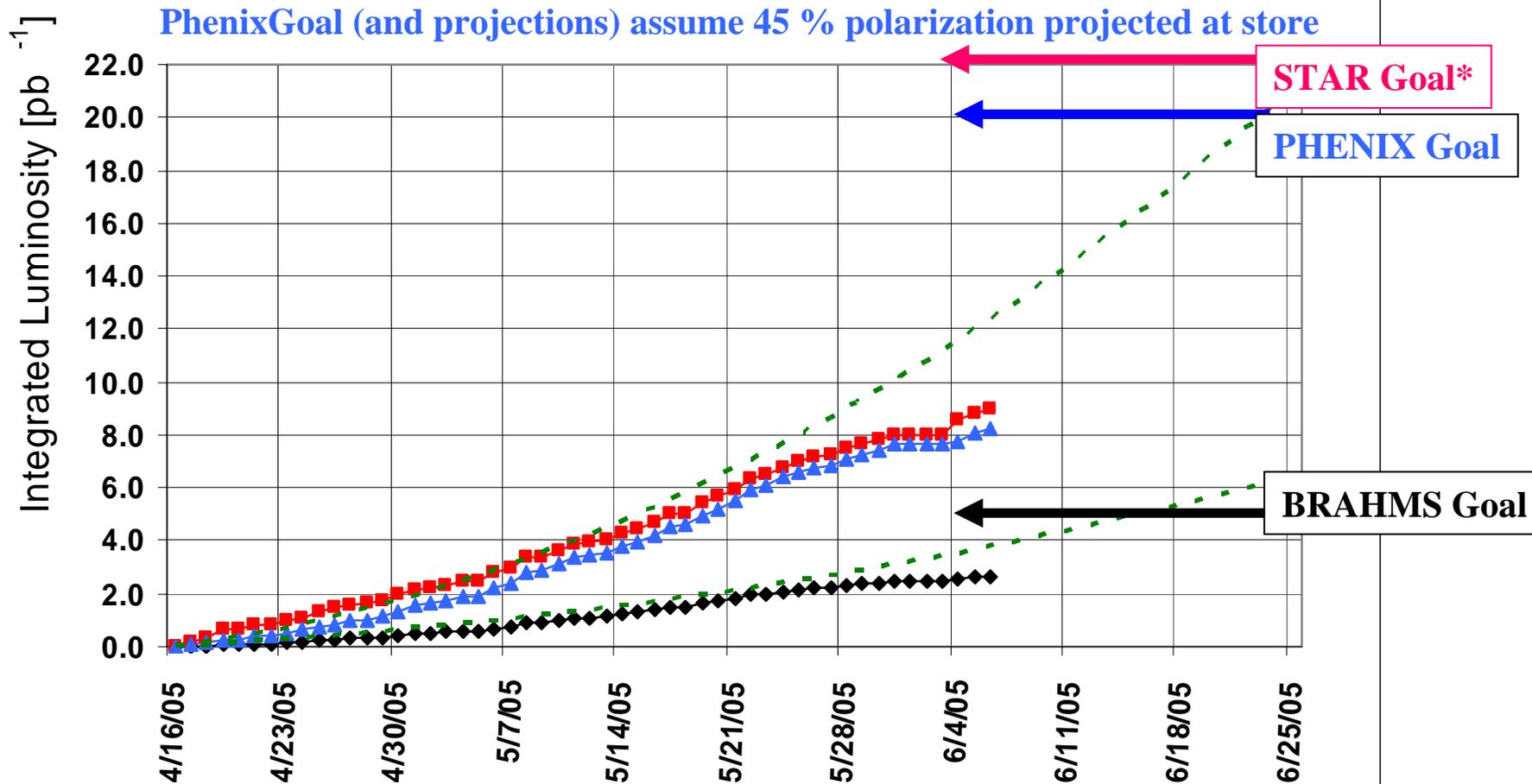
- *11 Jan – Physics with Cu-Cu began*
- *7 Mar (0800) – end 200 GeV/n Cu-Cu*
- *7-9 Mar – Setup 62.4 GeV/n Cu-Cu*
- *9-15 Mar - 62.4 GeV/n Cu-Cu Physics*
- *10 March – Physics begins*
- *15 Mar – 8 hours at injection energy 10 March – Physics begins*
- *15-22 (1400) Mar - 62.4 GeV/n Cu-Cu Physics*
- *22 (1400)-24 (0800) March Cu-Cu Physics at RHIC Injection*
- **24 Mar (0800) – End of 10.3 week Cu-Cu run, 8 hr maintenance**
- *24-30 Mar – begin 3 week pp setup*
- **30 Mar - 1 Apr 05 Cold Snake/Jet Installation/CNI etc**
- *1-16 Apr – complete 3 week pp setup (7 April, overnight stores for experiments started)*
- *17 Apr – Begin 10.0 week pp Physics run*
- *31 May – Begin 410 GeV pp setup*
- *2-3 June – 2 shifts Physics at 410 GeV*
- *3 June – Back to 200 GeV pp*
- **25 Jun – end pp run (midnight 24 June), **RHIC Run 5 ends****
- **30 Jun – Cryo switch to LN<sub>2</sub> complete, 32.0 weeks of RHIC cryo operation ends**



### RHIC Delivered p^p^ Luminosity Run-5



# Run5 RHIC pp Delivered (Physics) Integrated Luminosity



**STAR Goal\***

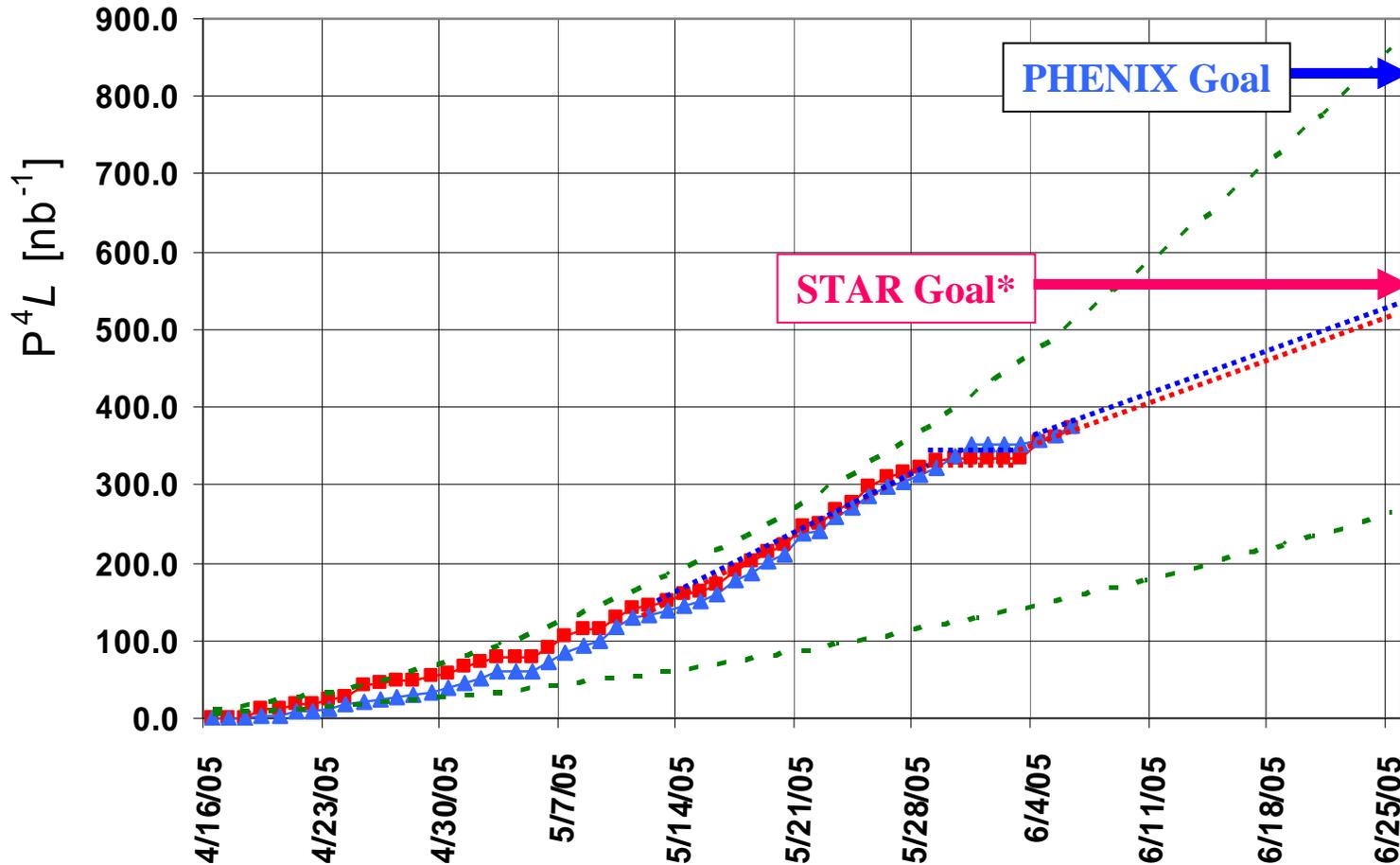
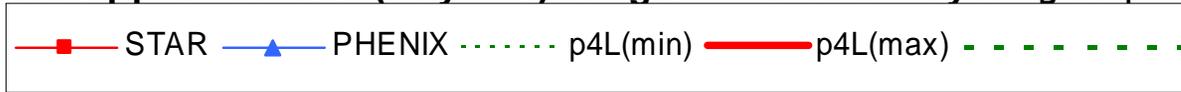
**PHENIX Goal**

**BRAHMS Goal**

**End of Run**

\* Sum of transverse and longitudinal polarization luminosities > 40% p[olarization]

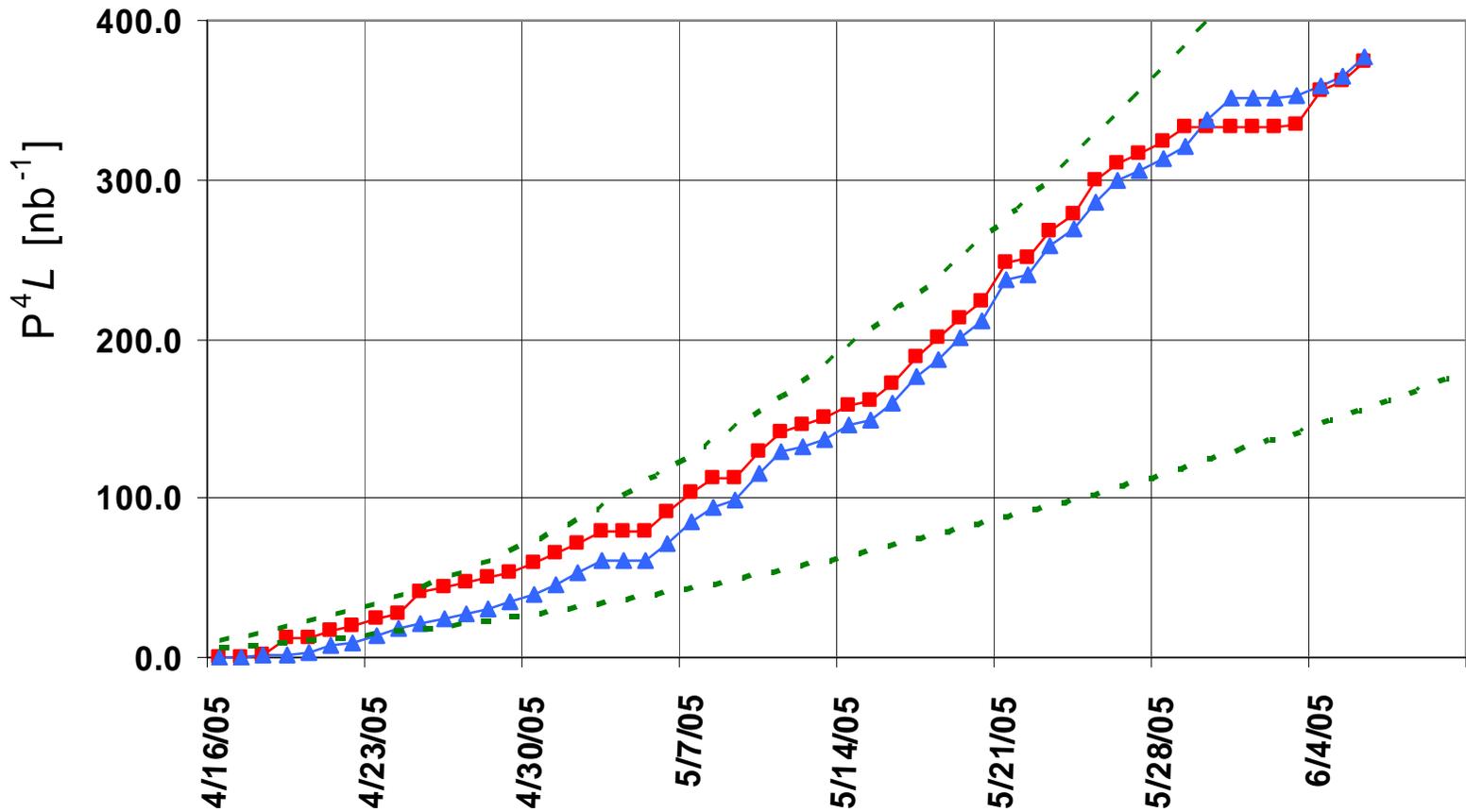
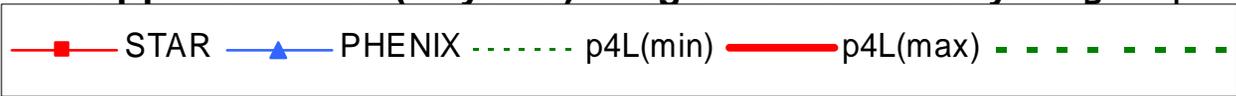
# Run5 RHIC pp Delivered (Physics) Integrated Luminosity x $P_B^2 \times P_Y^2$



\* Sum of transverse and longitudinal polarization luminosities

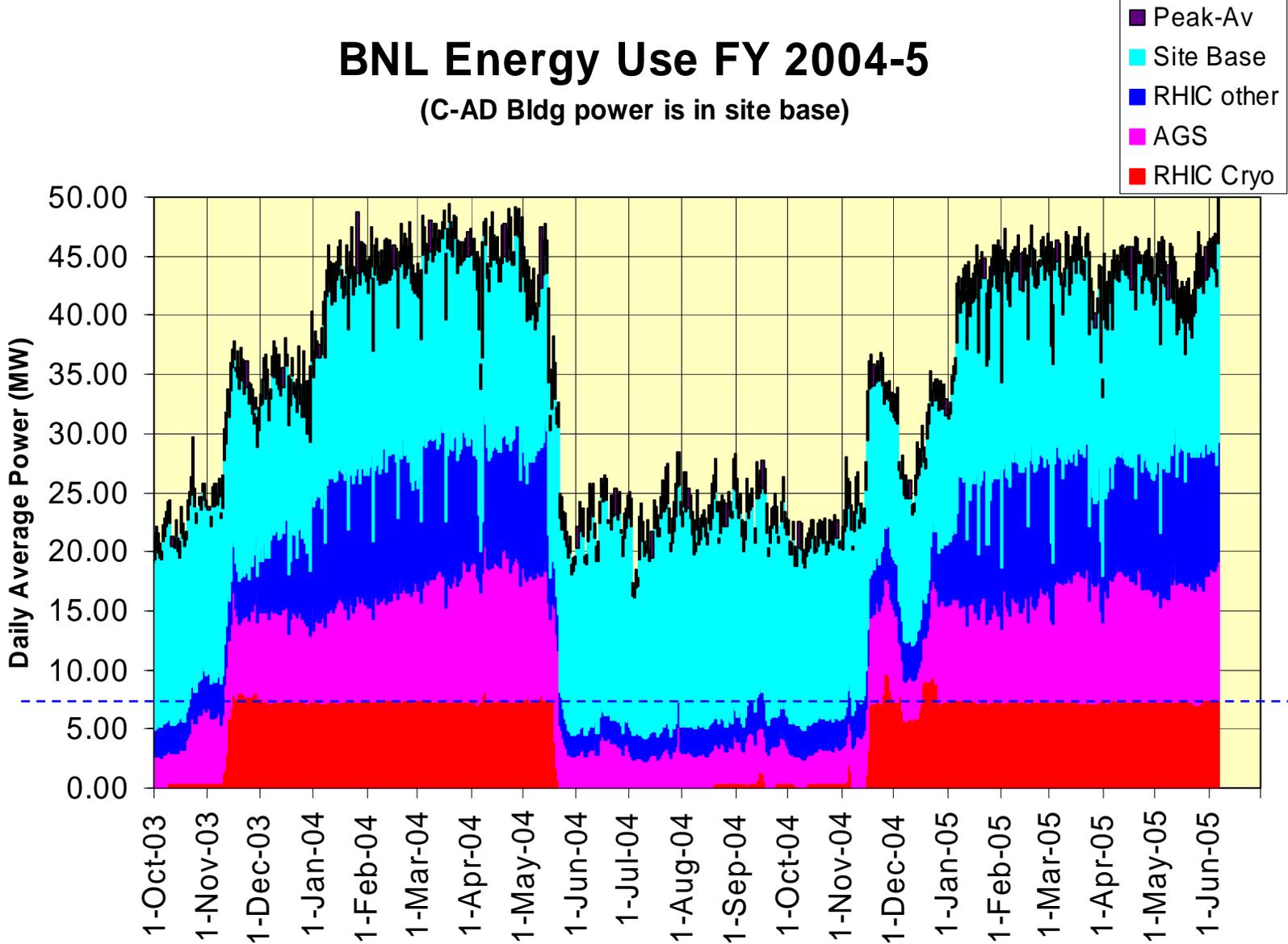
End of Run

# Run5 RHIC pp Delivered (Physics) Integrated Luminosity x $P_B^2 \times P_Y^2$

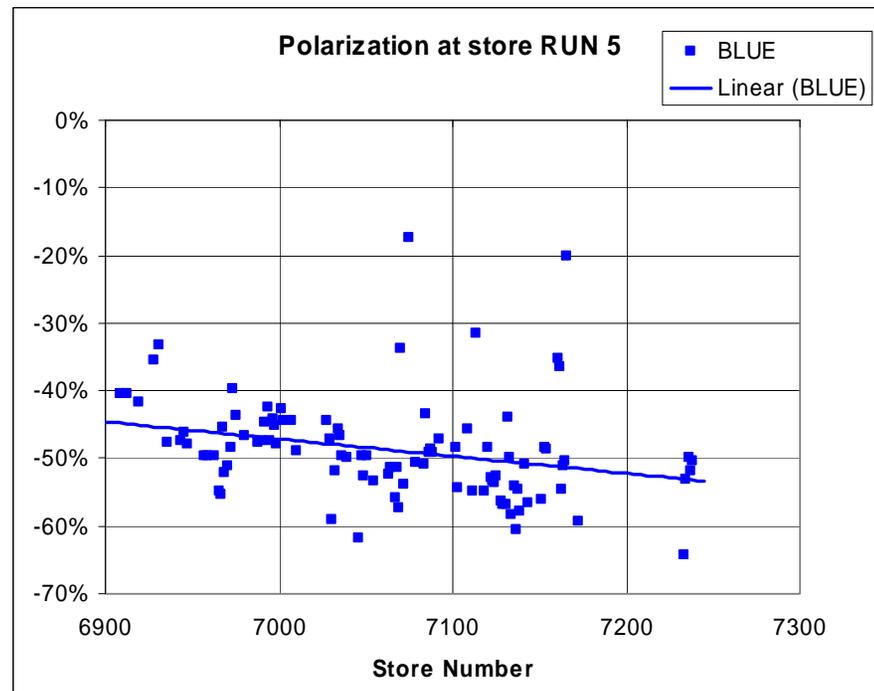
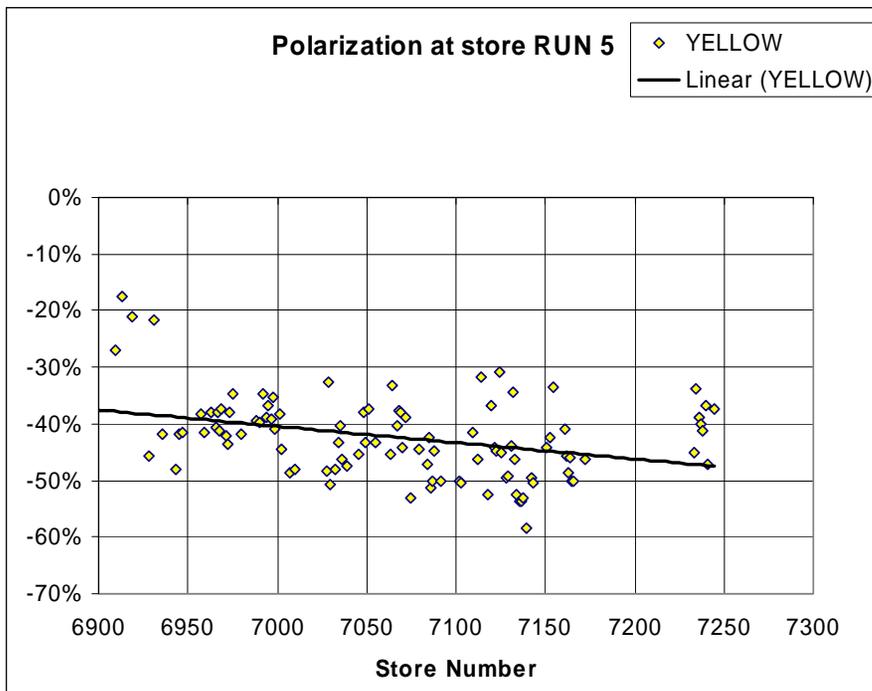


# BNL Energy Use FY 2004-5

(C-AD Bldg power is in site base)



# RHIC Run-5 pp 100x100 GeV



# **RHIC Machine/Detector Planning Meeting**

**Archive**

# RHIC Machine/Detector Planning Meeting

- *RHIC Run5 As Run/Plan*

- **18 Nov 04 – Cool down begins**
- **23 Nov 04 – Blue Ring Cold**
- **28 Nov 04 – Yellow Cold**
- **29 Nov 04 – Short in D6-D8 dipoles Yellow Ring, schedule delay**
- **3 Dec 04 – quad bus-bus short in sector 12, shutdown to repair**
- **27 Dec 04 – short problem resolved, rings at 4 degrees again**
- **27 Dec 04 - “2 week” RHIC setup with beam began**
- **28-29 Dec 04 – found & fixed aperture problem in Yellow Ring (Al foil)**
- *5 Jan 05 – “2 week” ramp-up with colliding beams began*

# 400 GeV pp Run Issue 20 Apr 05

## Summary of discussion to date (Y. Makdisi)

### ➤ Machine issues

- 3 days to setup ramps
- 3+ days to establish adequate polarization
- Can start mid-May, before PAC meeting (3<sup>rd</sup> week of May) or after the PAC meeting
- Prefer 1.5 day PHOBOS physics at end of 200 GeV pp run

### ➤ Experiments issues

- PHOBOS – strong advocate for short physics run, above schedule OK
- STAR – decide after pp physics is established, priority is to integrate 4-6 pb<sup>-1</sup> of delivered luminosity (P>35%) at expense of 400 GeV development run if necessary
- PHENIX – priority is to integrate 1.5 pb<sup>-1</sup> of recorded luminosity (P>45%) before development run and push 1 day PHOBOS physics run to end of 200 GeV pp run
- BRAHMS – does not plan to run

### ➤ Status:

- Decision will be made at a later date

# Experiment Goals RHIC Run 5, 100x100 GeV pp

- **BRAHMS**

- Began physics 17 April
- Goal 5 pb<sup>-1</sup> transverse polarized (>45%) delivered

- **PHENIX**

- Began min-bias physics 17 April, main physics 19 April
- Goal 5.5 pb<sup>-1</sup> recorded Luminosity with 45% polarization, 20 pb<sup>-1</sup> delivered
- Translates to:  $P_B^2 P_Y^2 L$  goal 226 nb<sup>-1</sup> recorded
- Translates to:  $P_B^2 P_Y^2 L$  goal 226 nb<sup>-1</sup> / (0.45 \* 0.6) = 837 nb<sup>-1</sup> delivered

- **STAR**

- Began physics 17 April
- Goal ~ 20 Mevts min-bias (~70 hrs)
- Goal ~ 7 pb<sup>-1</sup> longitudinal polarized (>40%) collisions, 14 pb<sup>-1</sup> delivered (useable)
- Goal ~ 4 pb<sup>-1</sup> transverse polarized (>40%) collisions, 8 pb<sup>-1</sup> delivered (useable)

# Experiment Goals RHIC Run 5, 100x100 GeV/n CuCu, Summary of Results (3/23/05 update)

- **BRAHMS**
  - Soft physics goal  $0.8 \text{ nb}^{-1}$  recorded, achieved  $0.8 \text{ nb}^{-1} \rightarrow 100\%$  of goal
  - High-Pt goal  $2.4 \text{ nb}^{-1}$  recorded, achieved  $1.75 \text{ nb}^{-1} \rightarrow 73\%$  of goal
- **PHENIX**
  - Integrated recorded luminosity goal (live BBCLL1)  $2.9 \text{ nb}^{-1}$ , achieved  $3.06 \text{ nb}^{-1} \rightarrow 105\%$  of goal
- **PHOBOS**
  - Goal 1000M events to tape, achieved 500M  $\rightarrow 50\%$  of minimum goal
  - Minimum Goal 400M events to tape, achieved 500M  $\rightarrow 125\%$  of minimum goal
- **STAR**
  - Min bias, Goal 80M events, recorded 64.5M events  $\rightarrow 80\%$  of goal
  - High Pt Trigger (BEMC HT18), Goal to sample  $1\text{-}2 \text{ nb}^{-1}$ , recorded  $>1 \text{ nb}^{-1} \rightarrow 100\%$  of goal

# Experiment Goals RHIC Run 5, 31.2 x31.2 GeV/n and 11.2x11.2 GeV/n CuCu and Final Results (3/30/05)

- **BRAHMS**
  - 62 GeV, Integrated Recorded Luminosity Goal  $90 \mu\text{b}^{-1}$   
Actual recorded luminosity  $120 \mu\text{b}^{-1}$  (133% of goal)
  - 22 GeV, Goal 1.5M FFS triggers recorded  
Actual recorded 1.9M triggers (126% of goal)
- **PHENIX**
  - 62 GeV, Integrated Delivered Luminosity Goal =  $250 \mu\text{b}^{-1}$   
Integrated Recorded Luminosity Goal  $92 \mu\text{b}^{-1}$   
Actual recorded luminosity  $190 \mu\text{b}^{-1}$  (206% of goal)
  - 22 GeV, ~20M recorded events  
Actual recorded 23.8M events (119% of goal)
- **PHOBOS**
  - 62 GeV, Goal 250M events to tape, minimum Goal 100M events  
Actual recorded 115M events (115% of minimum goal)
  - 22 GeV, Goal 8M events to tape  
Actual recorded 20M events (250% of goal)
- **STAR**
  - 62 GeV, Min bias, Goal >20M events to tape  
Actual recorded 27.3M events (136% of goal)
  - 22 GeV, Min bias, Goal >1M events to tape  
Actual recorded 3.85M events (385% of goal)

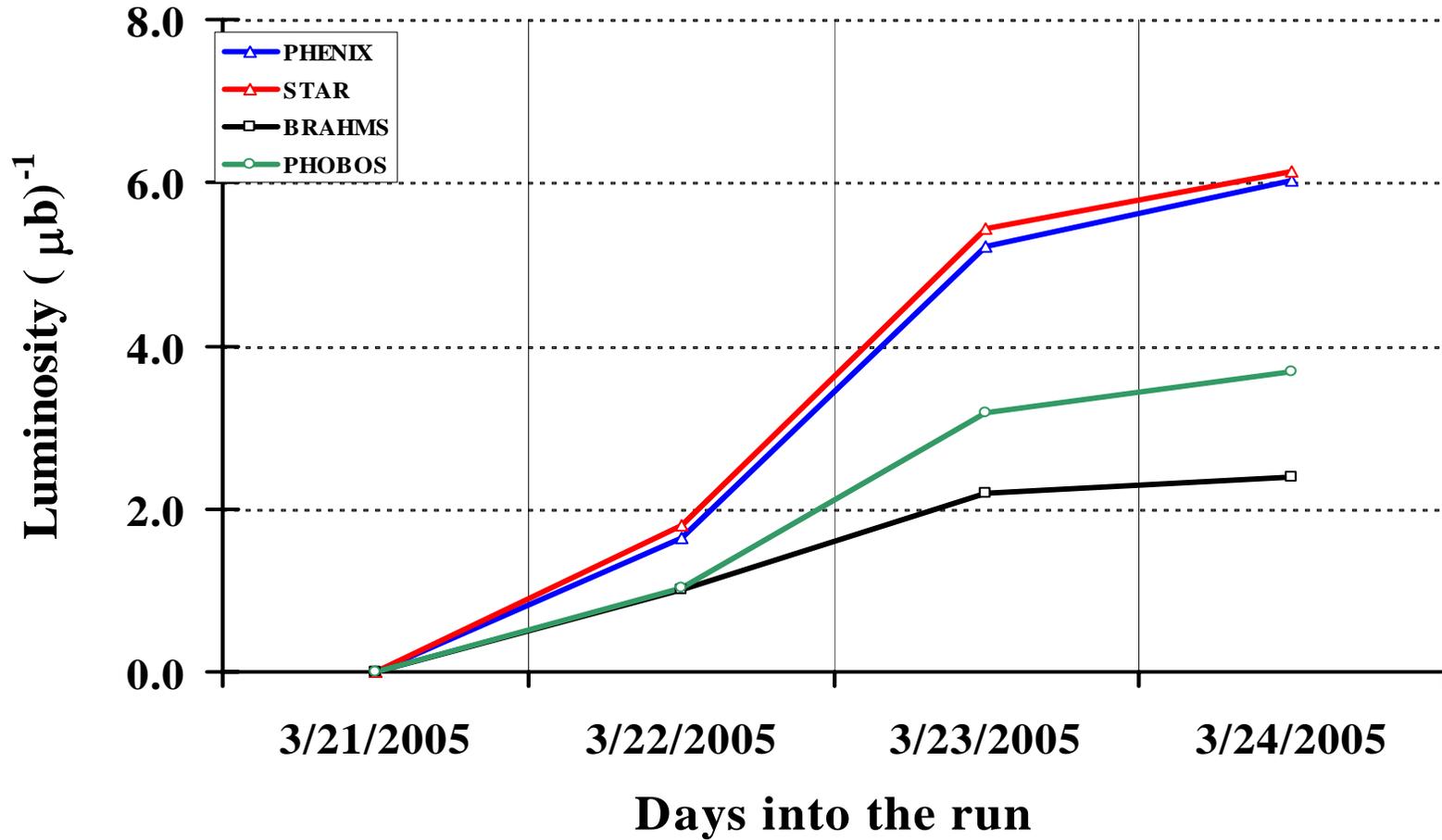
# RHIC Machine/Detector Planning Meeting

17 November 2004

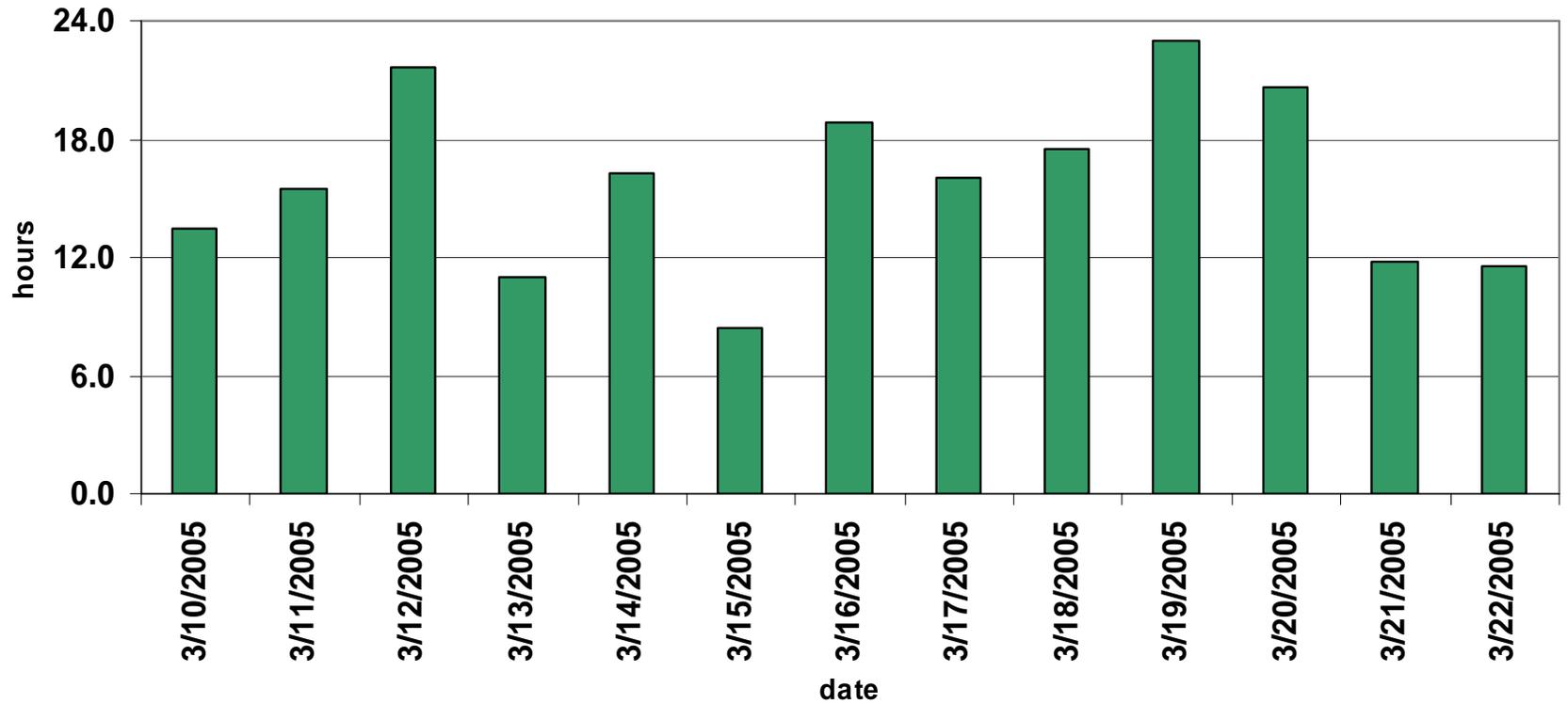
## PAC Recommendations (very short summary):

- 8-10 week pp run should have highest priority
- Cu-Cu run should accumulate an integrated delivered luminosity of at least  $7 \text{ nb}^{-1}$  at  $\sqrt{s} = 200 \text{ GeV}$
- Cu-Cu at  $\sqrt{s} = 62.4 \text{ GeV}$  and 1 day at injection is advisable if above goals are met
- 1-2 day pp (unpolarized) run at  $\sqrt{s} = 400\text{-}500 \text{ GeV}$  desirable

# RHIC Run 5 (22 GeV) Final Delivered Cu-Cu Luminosity



**RHIC Run 5 (62GeV) Hours per Day at Store**

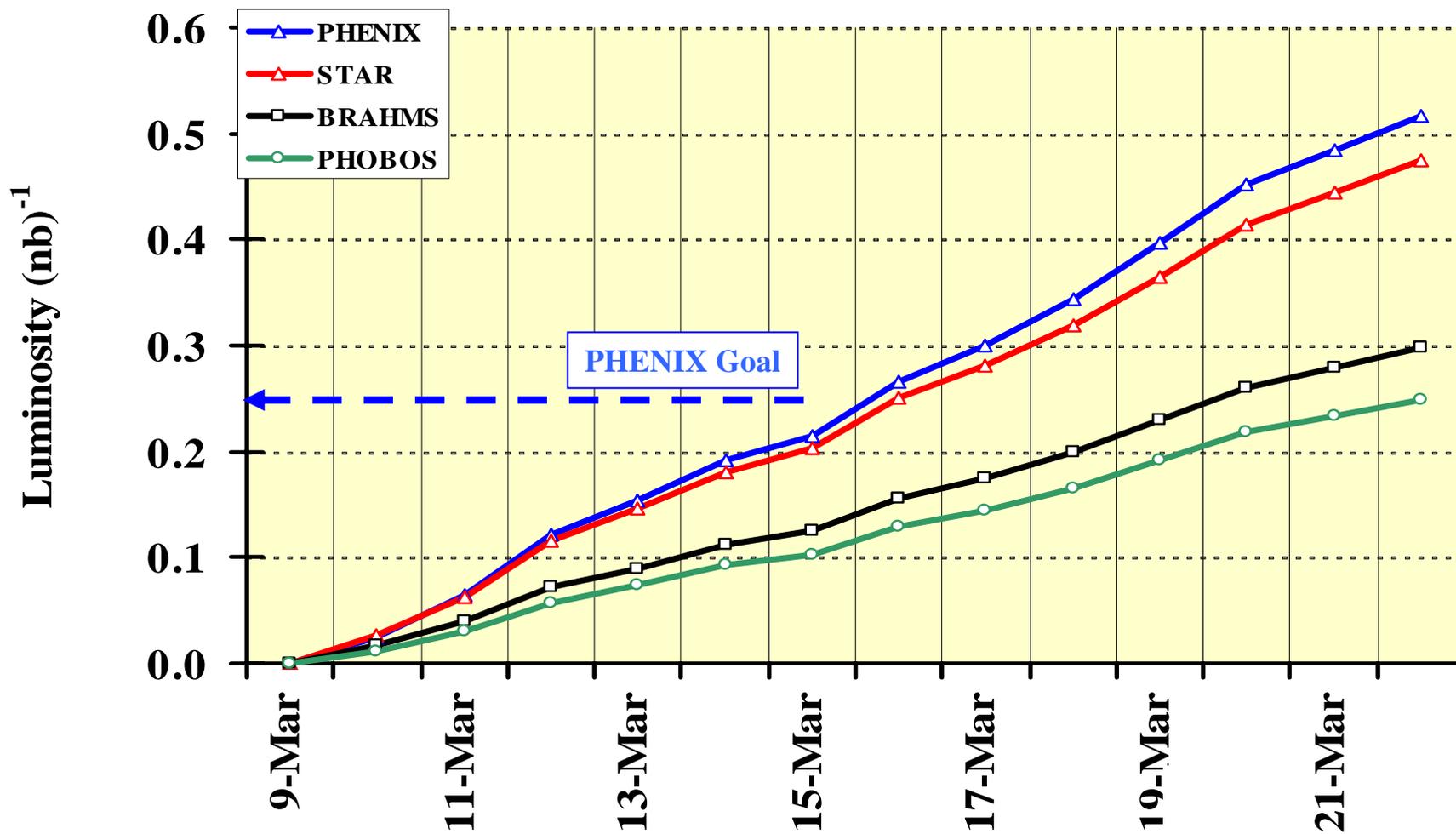


**Total = 205.5 hours**

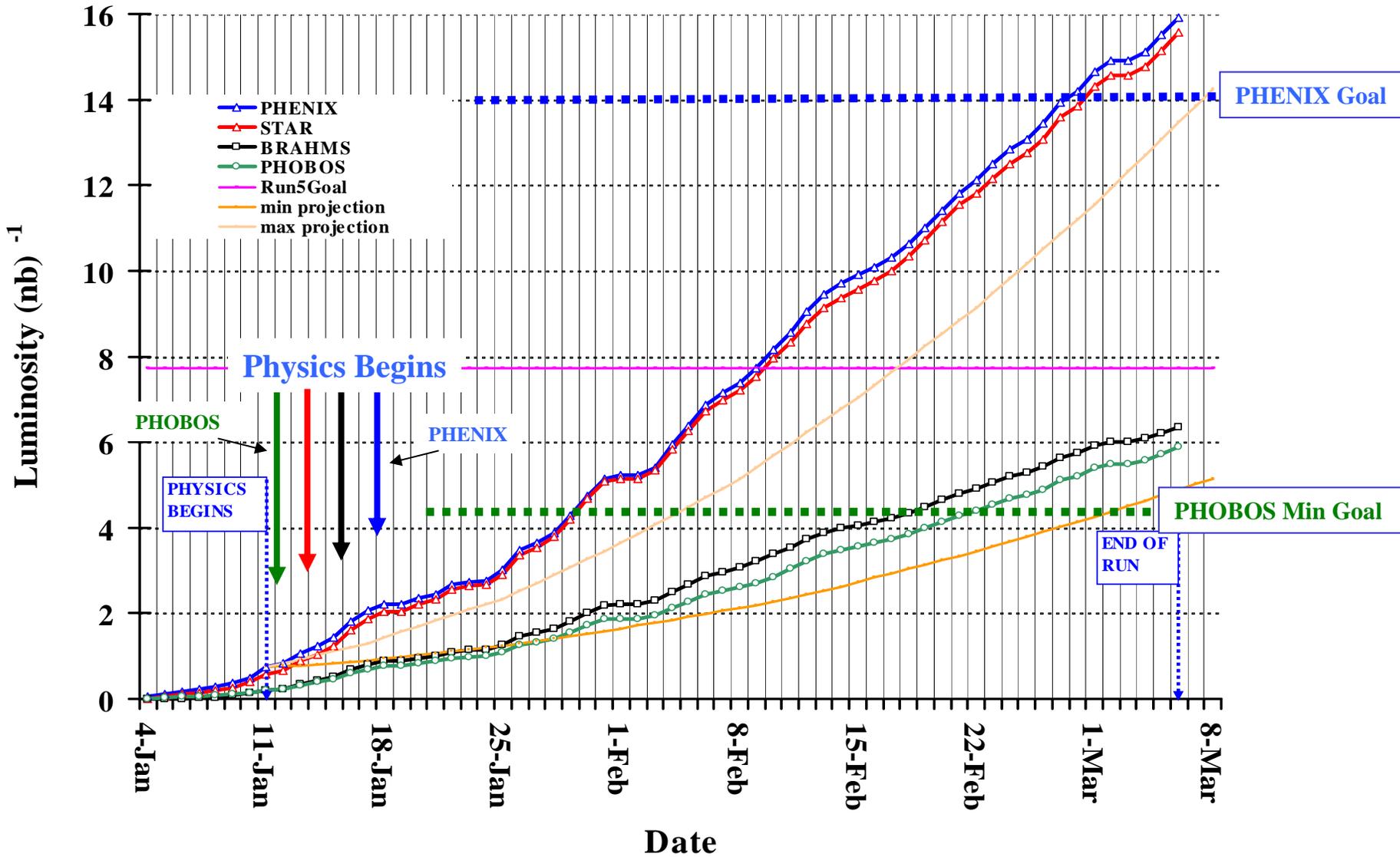
**0130 10 Mar – 1330 22 Mar = 300 clock hours**

**68.5% or 115 hrs/week average**

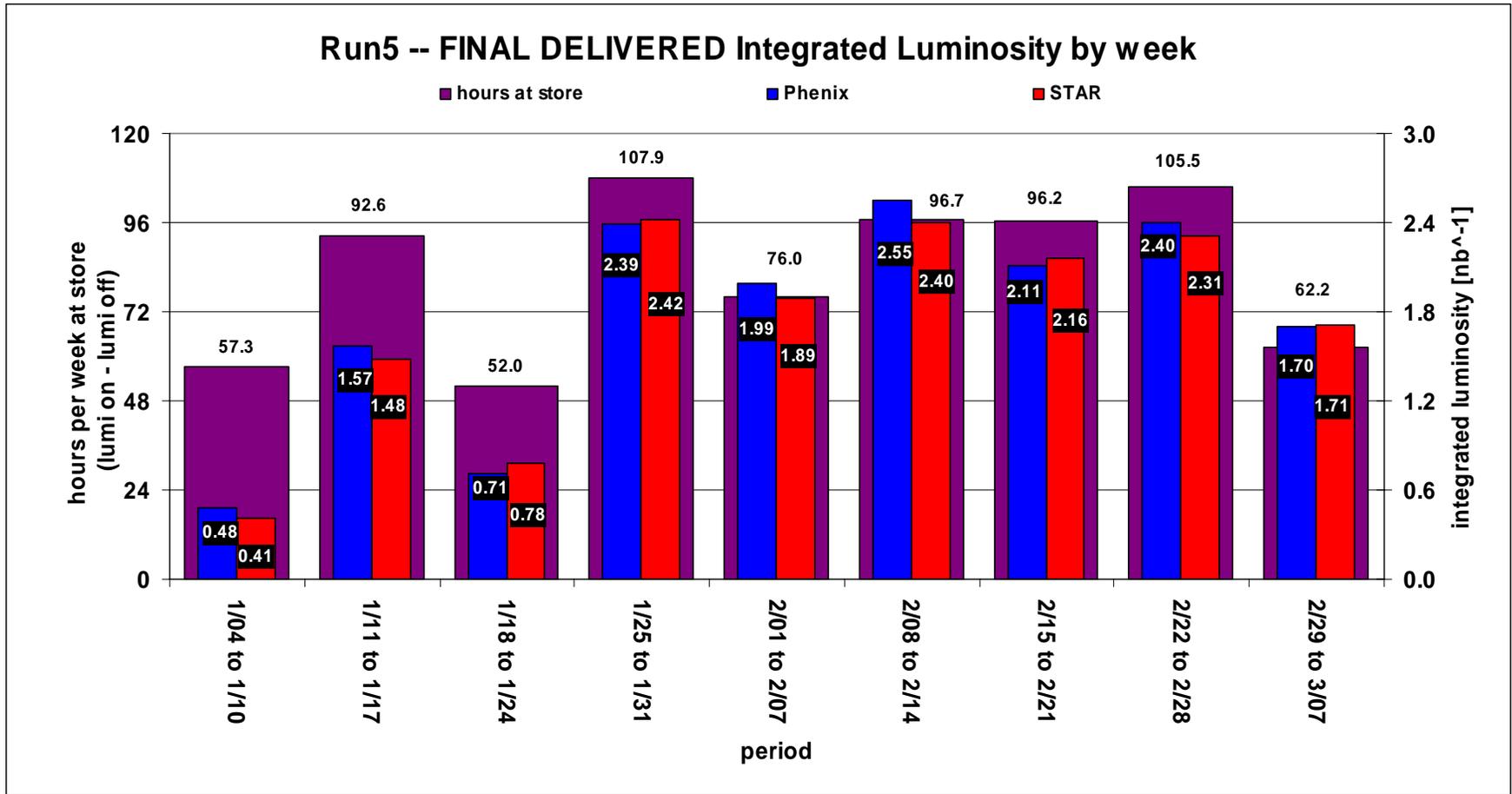
# RHIC Run 5 (62 GeV) Final Delivered Cu-Cu Luminosity



# RHIC Run 5 Final Delivered 100x100 GeV/n Cu-Cu Luminosity



# RHIC Machine/Detector Planning Meeting



# C-A Operations-FY05

-  pending approval/funding
-  schedule to be determined
-  setup/ramp up luminosity

*Schedule - subject to change*

FY 2005

Program Element	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
AGS-Booster-Tandem/Linac Startup													
RHIC Cryo Cooldown/switch to LN <sub>2</sub>													
RHIC Cryo Operation													
RHIC Cryo off													
RHIC Systems Test (no colliding beams)													
RHIC with colliding beams													
RHIC Research with Cu-Cu (100x100 GeV/n)													
RHIC Research with Cu-Cu (31x31 GeV/n)													
RHIC Research with Cu-Cu (11x11 GeV/n)													
RHIC Research with p-p (100x100 GeV)													
NSRL (NASA Radiobiology)													
AGS (NASA)													
Shutdown (RHIC)													

p,O(2),Si,Fe(2),Ti

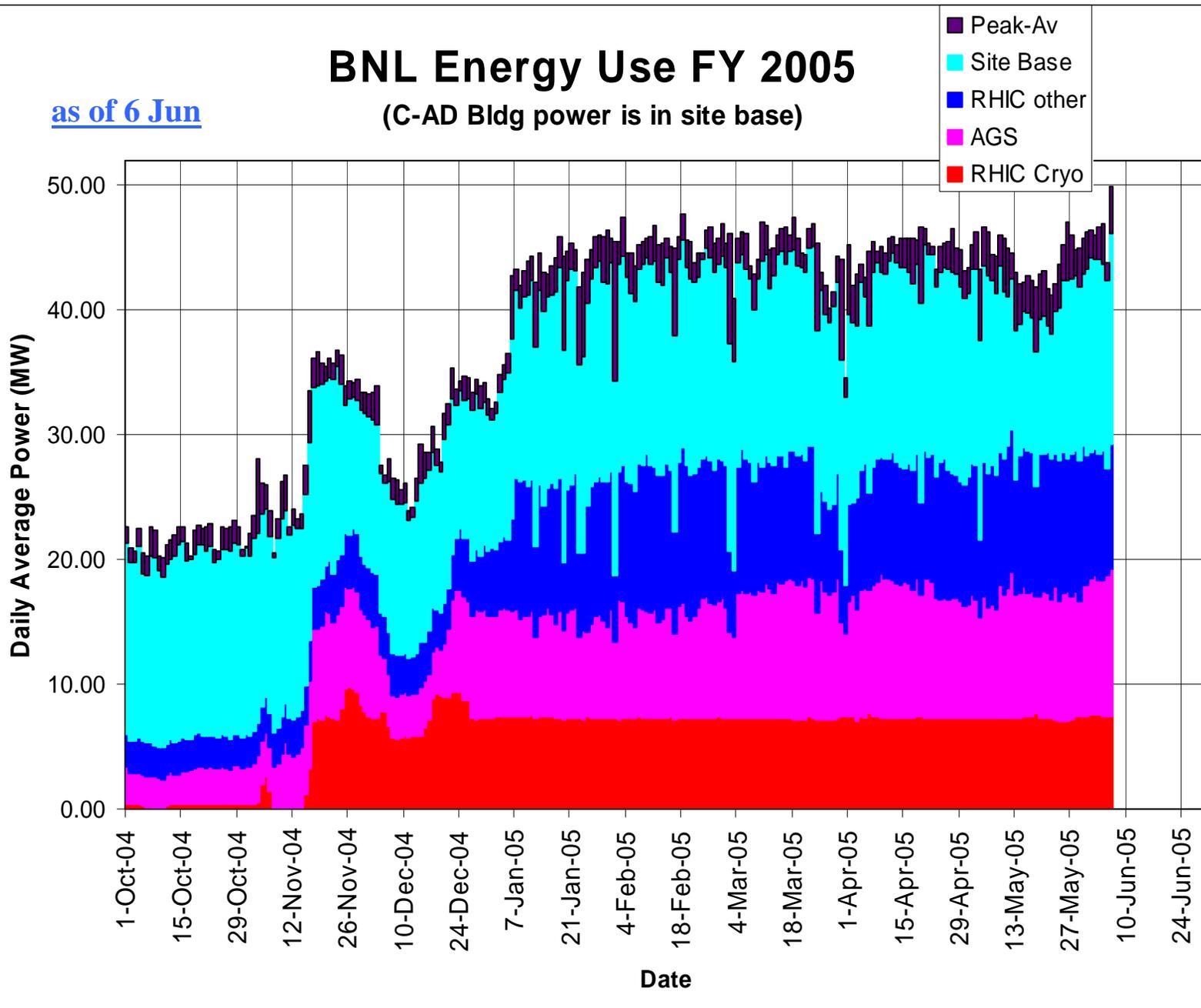
p,C,O,Si,Fe(2)

32 weeks

# BNL Energy Use FY 2005

(C-AD Bldg power is in site base)

[as of 6 Jun](#)



# RHIC Machine/Detector Planning Meeting

17 November 2004

## Purpose of this meeting:

- To address issues and priorities relating to the optimization of physics output from RHIC experiments.
- To discuss and promulgate policy (when needed).