Possible Run 10 plan based on 25 Nov Revised Plan

- Run10, 25 cryo-weeks (my guesses after Jan 12)
  - Dec. 1, Begin cool down to 4.5K
  - Dec. 4, Cooldown to 4.5K complete in both rings!
  - Dec. 5, beam setup in RHIC begins.
  - Dec 16, 20 hr unplanned Maintenance day
  - Dec 20 (AM)-21(PM), blizzard 09 shut us down
  - Dec. 27, RHIC Setup complete, begin Ramp Up for Physics (was 14 Dec, late)
  - Dec 31 (midnight-store 11340), Machine **(and PHENIX?)** Physics declared √s=200 GeV/n Au-Au
  - Jan 2 (midnight) STAR in Physics Mode
  - Jan 8 (0600) PHENIX in Physics Mode
  - Jan 12, Rebucketing not yet routine, stochastic cooling still to come.
  - Jan 22, changed beta* from 0.6 to 0.7 meters, rebucketing ~established, yellow transverse stochastic cooling on
  - Mar. 11, End 10 week √s = 200 GeV/n Run, begin √s = 62.4 GeV/n setup
  - Mar. 13, Begin 4 week √s = 62.4 GeV/n run
  - Apr. 10, End 4 week √s = 62.4 GeV/n Run, begin √s = 39 GeV/n setup
  - Apr. 12, Begin 1.5 week √s = 39 GeV/n run
  - **Apr 18-22, Satogata is away**
  - Apr. 23, End 1.5 week √s = 39 GeV/n Run, begin √s = 7.7 GeV/n setup
  - Apr. 25, Begin 4 week √s = 7.7 GeV/n run
  - May 20, End 4 week √s = 7.7 GeV/n Run, begin √s = 5.0 GeV/n setup
  - May 23, End 4 week √s = 7.7 GeV/n Run, begin √s = 5.0 GeV/n setup
  - **May 23 – 28 IPAC (Kyoto)**
  - May 25, begin 0.5 week beam studies at √s = 5 GeV/n and ν ~ 0.67 - – **25 CRYO WEEKS**
  - **This is it unless we have $'s to run longer – revisit in March**
  - May 29, end 0.5 week studies
  - May 31, begin √s = 11.5 GeV/n for STAR
  - Jun 8, – **27 CRYO WEEKS**
  - Jun 15, end 2 week √s = 11.5 GeV/n run
  - Jun 15 , Begin Cryo Warm-up
  - Jun 16, Warm-up complete, Run 10 ends – **28.2 CRYO WEEKS**

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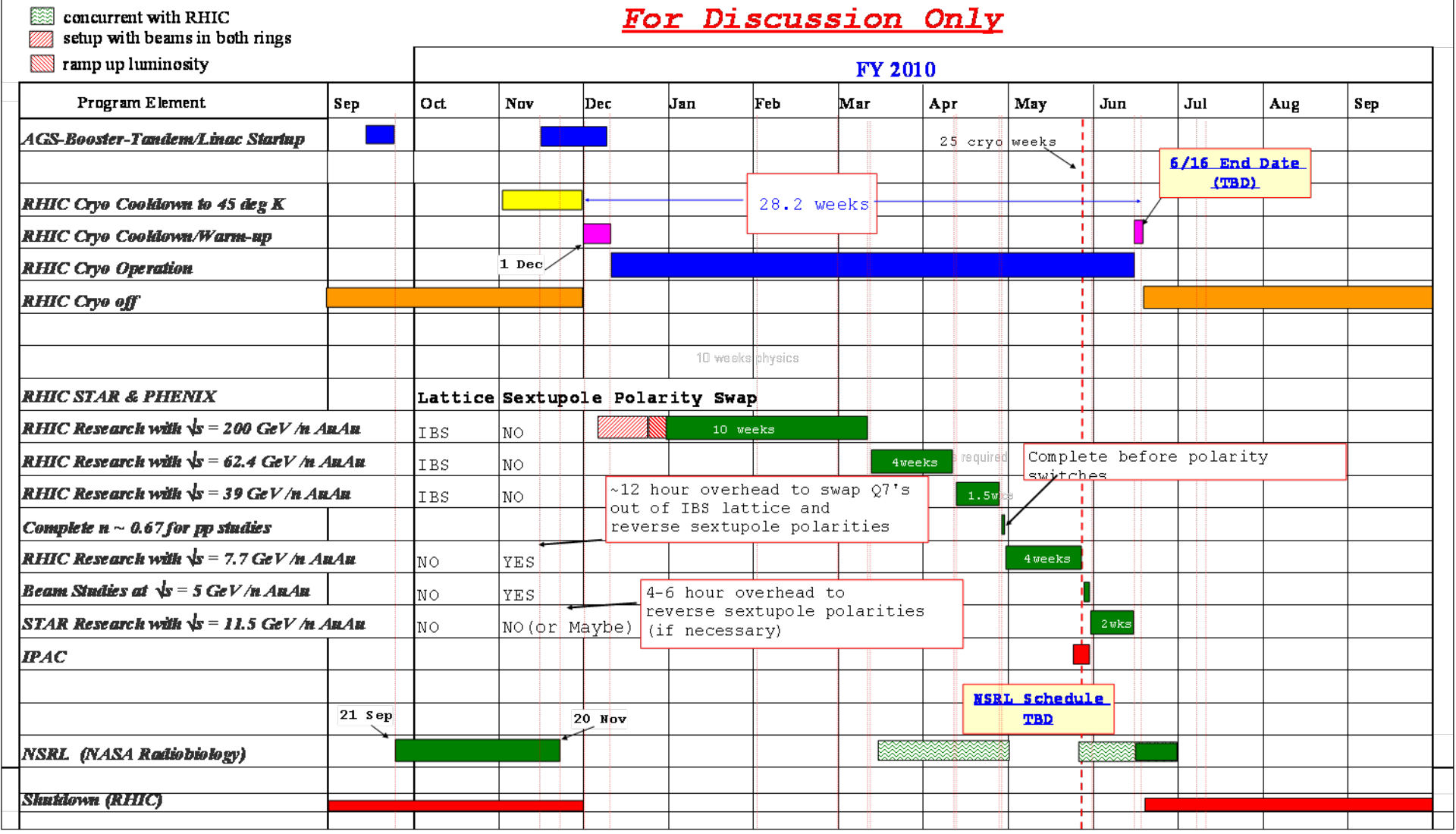
2 Mar 10

C-A Operations-FY10

For Discussion Only



Possible Run 10 plan based on 25 Nov Revised Plan and √s=200 extended by 1 week

- Dec. 1, Begin cool down to 4.5K
- Dec. 4, Cooldown to 4.5K complete in both rings!
- Dec. 5, beam setup in RHIC begins.
- Dec 16, 20 hr unplanned Maintenance day
- Dec 20 (AM)-21(PM), blizzard 09 shut us down
- Dec. 27, RHIC Setup complete, begin Ramp Up for Physics (was 14 Dec, late)
- Dec 31 (midnight-store 11340), Machine **(and PHENIX?)** Physics declared √s=200 GeV/n Au-Au
- Jan 2 (midnight) STAR in Physics Mode
- Jan 8 (0600) PHENIX in Physics Mode
- Jan 12, Rebucketing not yet routine, stochastic cooling still to come.
- Jan 22, changed beta* from 0.6 to 0.7 meters, rebucketing ~established, yellow transverse stochastic cooling on
- Mar. 18, End 10 week √s = 200 GeV/n Run, begin √s = 62.4 GeV/n setup
- Mar. 20, Begin 4 week √s = 62.4 GeV/n run
- Apr. 17, End 4 week √s = 62.4 GeV/n Run, begin √s = 39 GeV/n setup
- Apr. 19, Begin 1.5 week √s = 39 GeV/n run
- **Apr 18-22, Satogata is away**
- Apr. 30, End 1.5 week √s = 39 GeV/n Run, begin ν= 0.67 studies before polarity switches begin (i.e. this is a placeholder)
- May 1, complete ν= 0.67 studies for pp and √s = 7.7 GeV/n setup **(12 hr pol. switches)**
- May. 3, Begin 4 week √s = 7.7 GeV/n run
- **May 23 – 28 IPAC (Kyoto)**
- **May 25 – 25 cryo weeks**
- May 31, End 4 week √s = 7.7 GeV/n Run, begin √s = 5.0 GeV/n setup **(6 hr polarity switch)**
- Jun 2, begin 3 day beam studies at √s = 5 GeV/n
- Jun 5, end 3 day studies begin √s = 11.5 GeV/n setup
- Jun 7, begin √s = 11.5 GeV/n for STAR
- **Jun 8 – 27 cryo weeks**
- Jun 21, end 2 week √s = 11.5 GeV/n run
- Jun 22 , Begin Cryo Warm-up
- Jun 23, Warm-up complete, Run 10 ends – **29.2 CRYO WEEKS**

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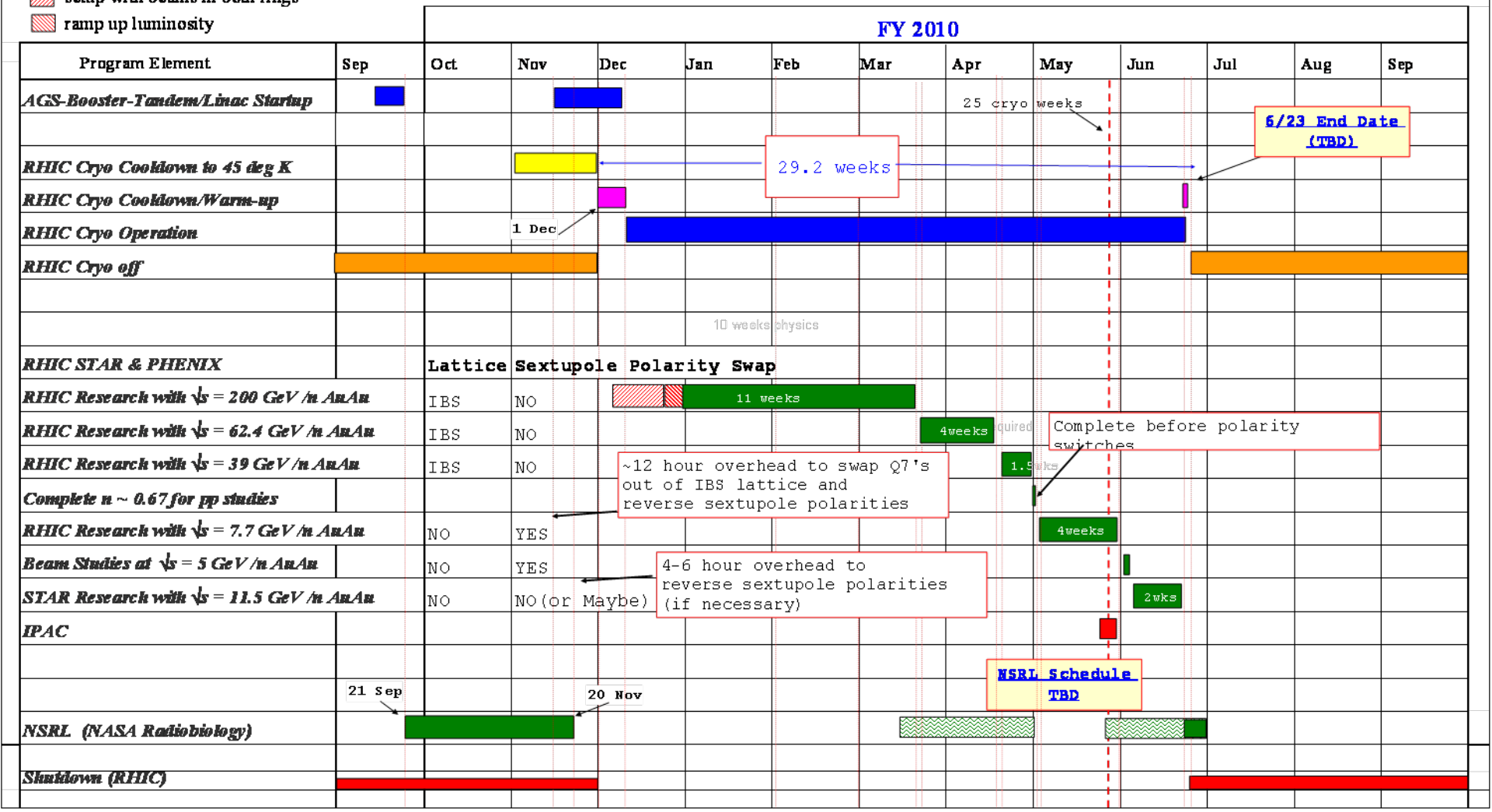
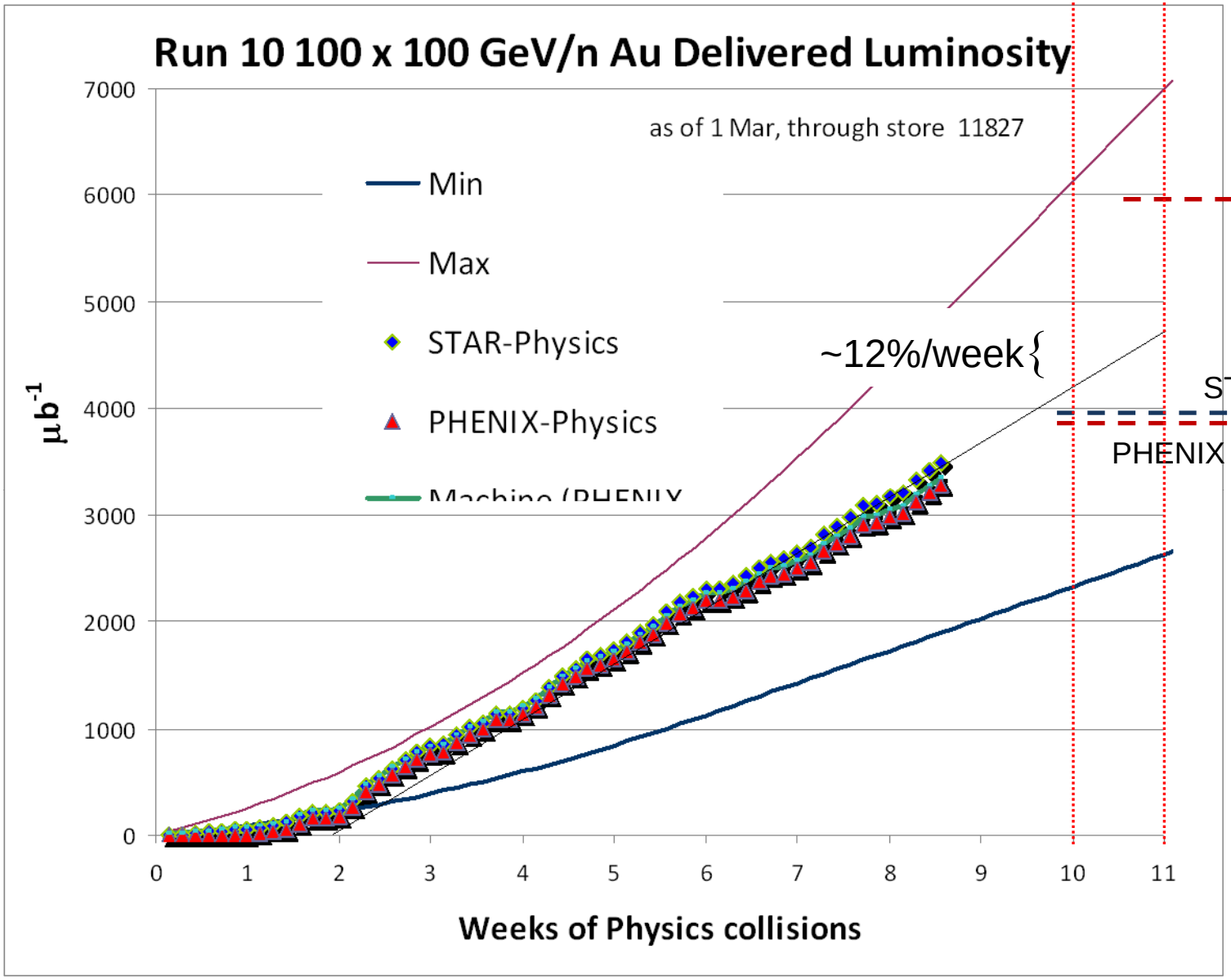
2 Mar 10

C-A Operations-FY10

with √s=200 extended 1 week (For Discussion Only)

concurrent with RHIC
setup with beams in both rings
ramp up luminosity



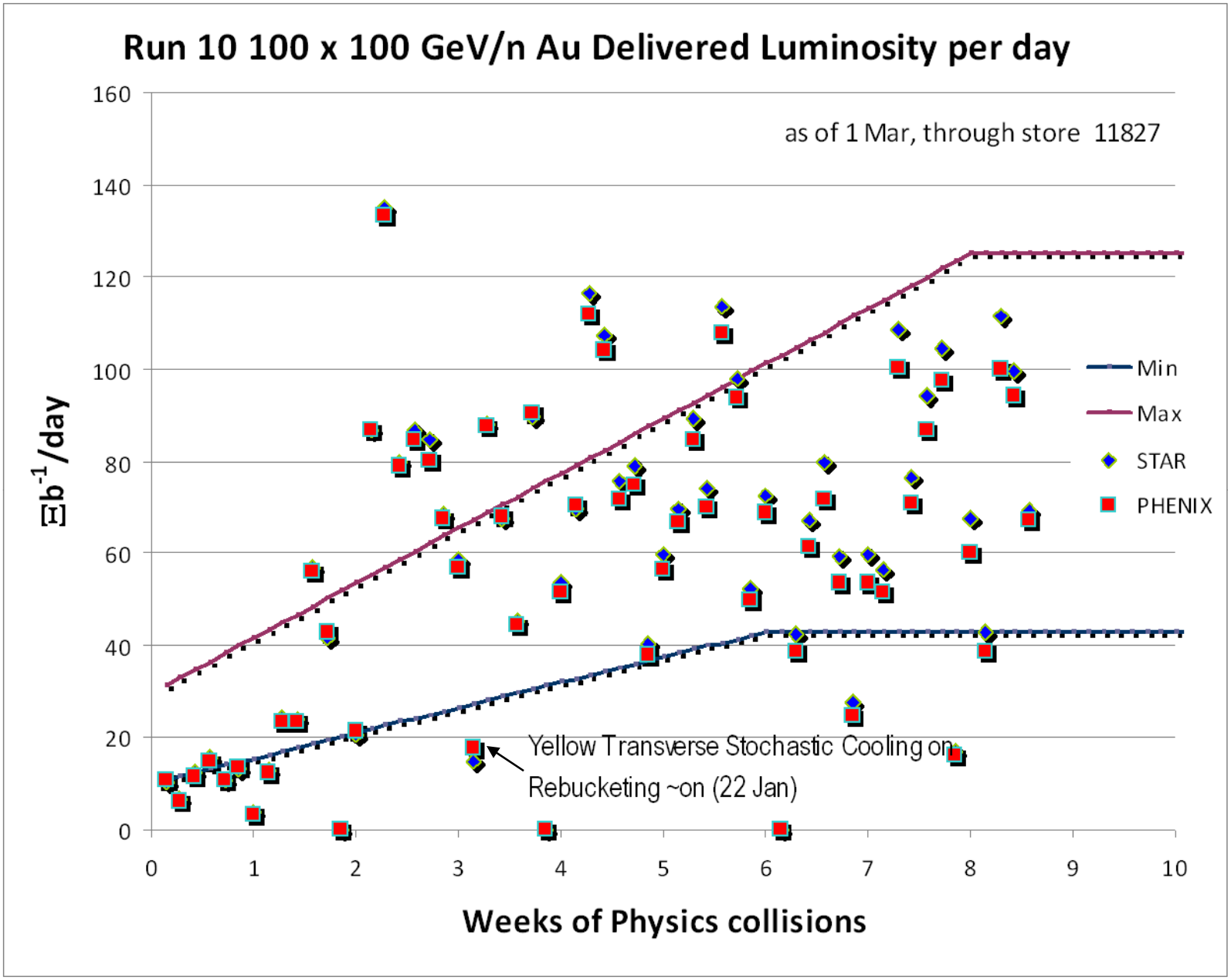


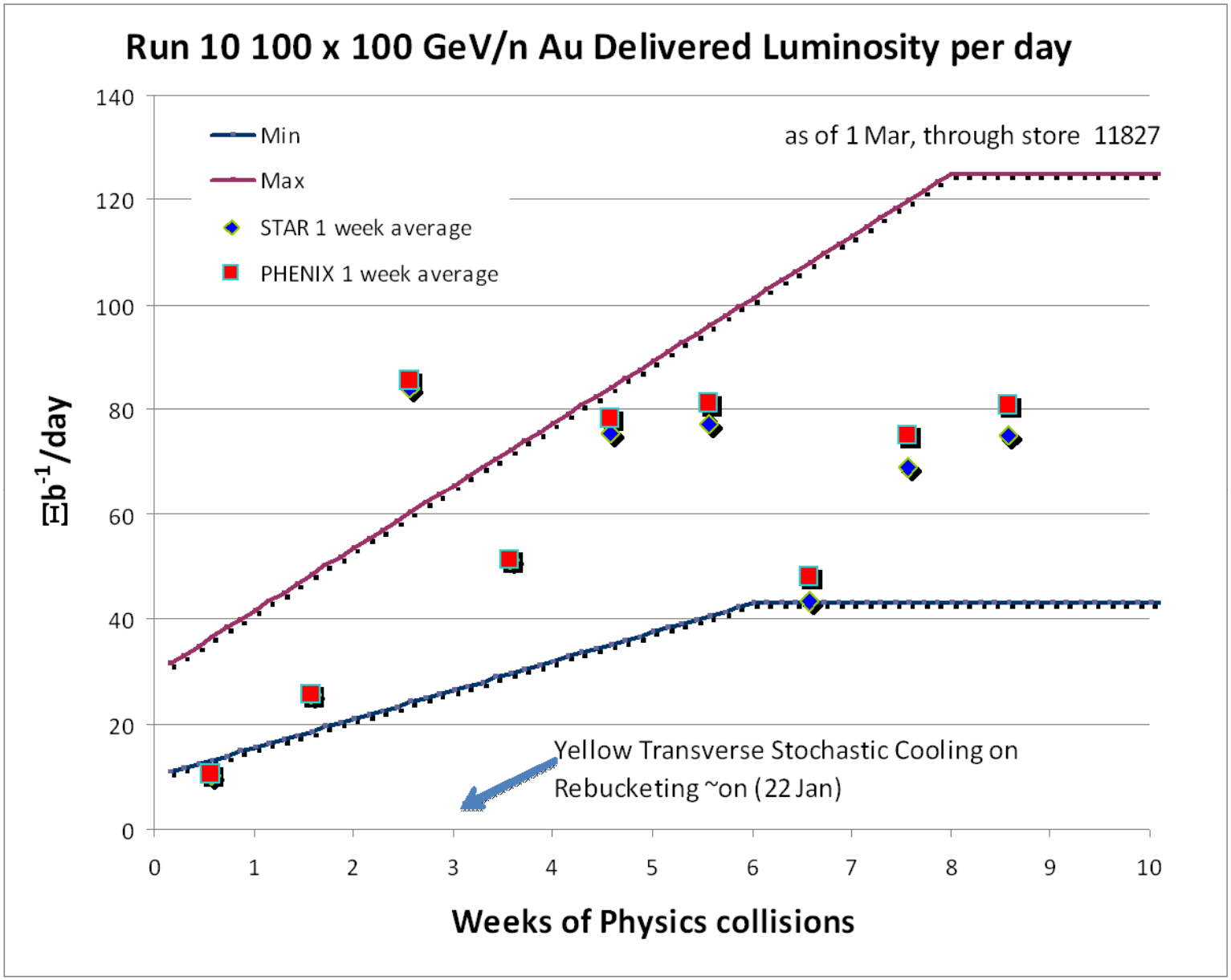
PHENIX Goal*

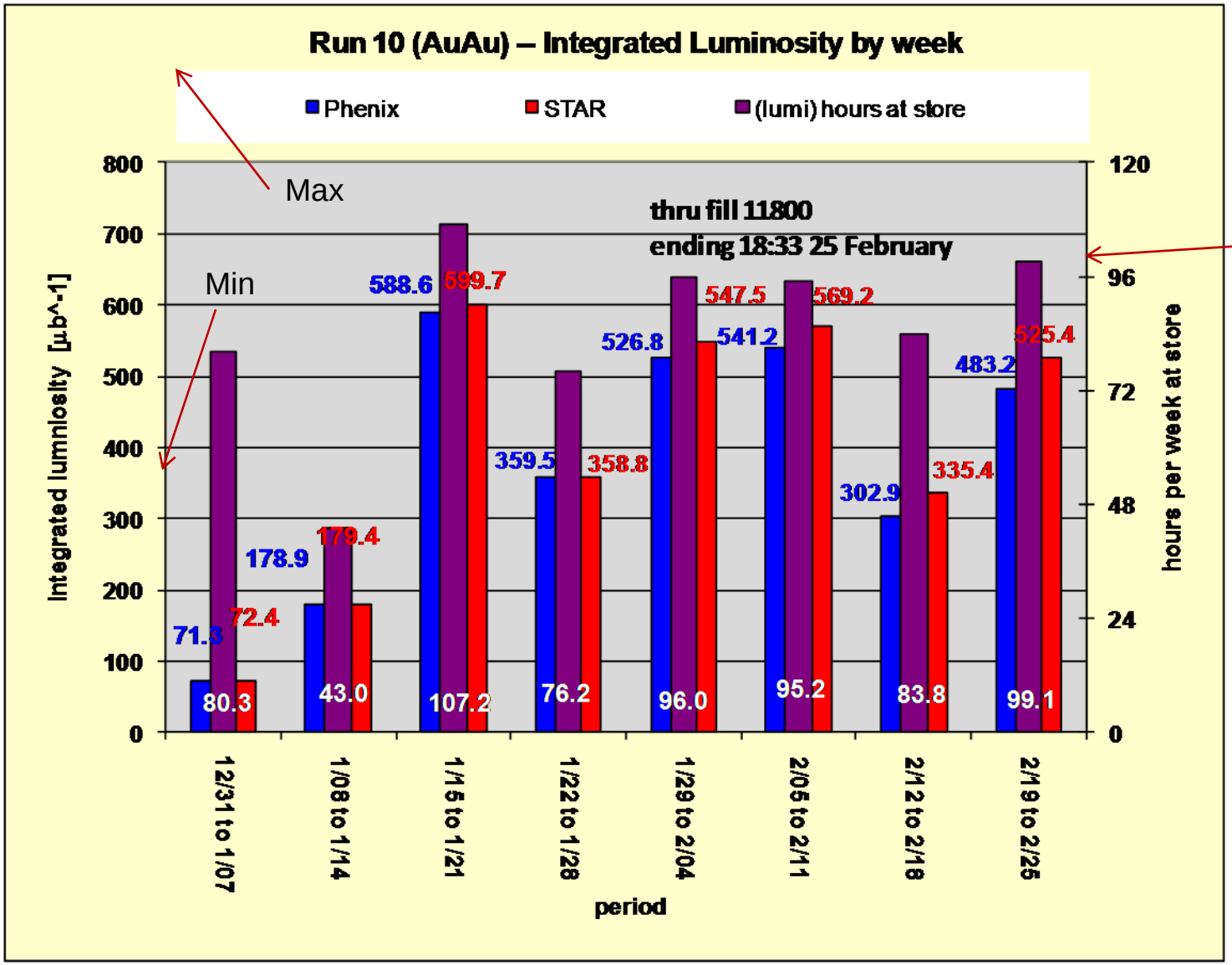
STAR Goal

PHENIX Minimum Goal*

* With 20 cm sigma IR diamond

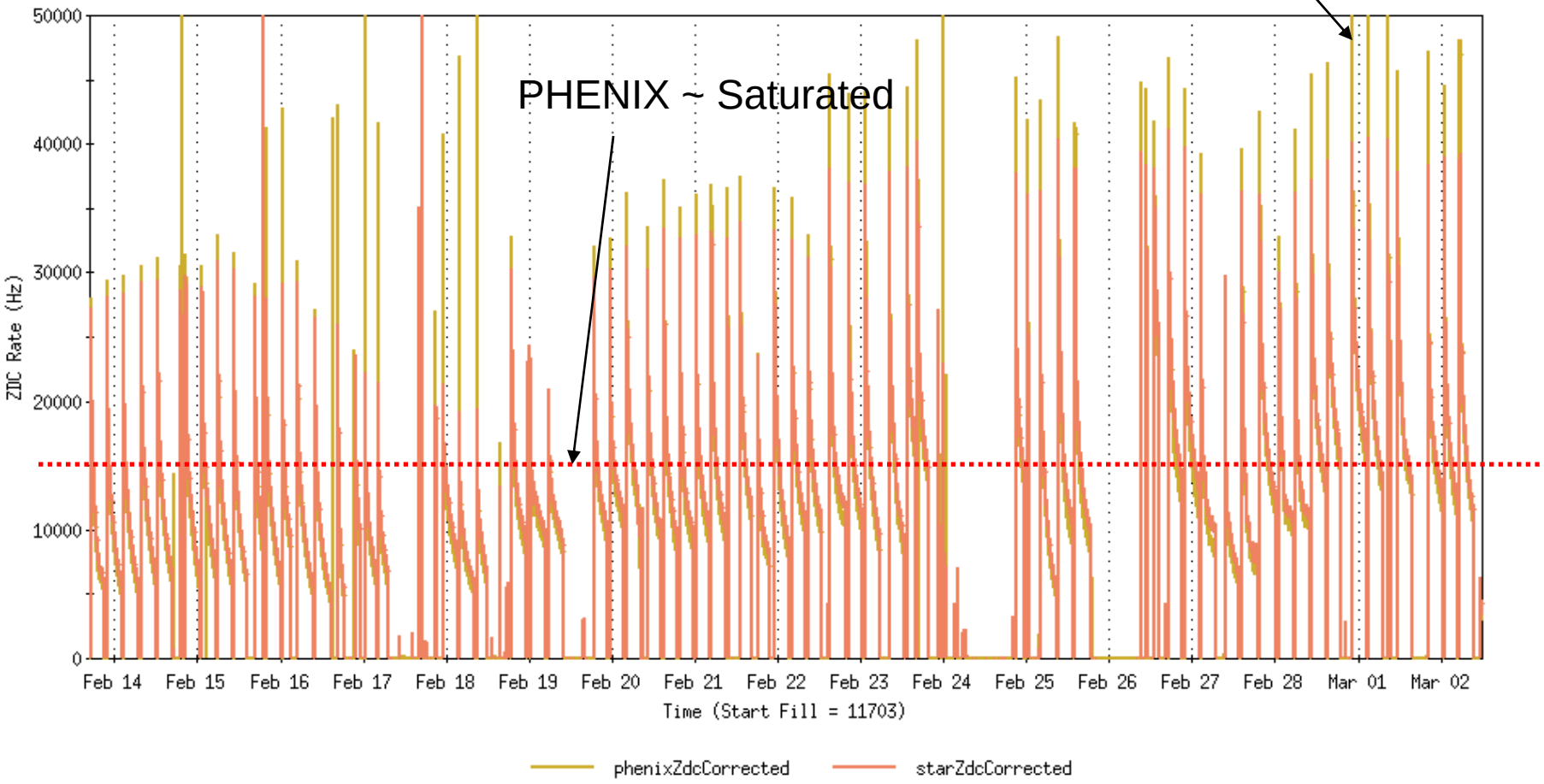

Run 10 100 x 100 GeV/n Au Delivered Luminosity per day
as of 1 Mar, through store 11827
Ξb-1/day
Weeks of Physics collisions
Min
Max
STAR
PHENIX
Yellow Transverse Stochastic Cooling on
Rebucketing ~on (22 Jan)
0
20
40
60
80
100
120
140
160
0
1
2
3
4
5
6
7
8
9
10


Run 10 100 x 100 GeV/n Au Delivered Luminosity per day
Min
Max
STAR 1 week average
PHENIX 1 week average
as of 1 Mar, through store 11827
Yellow Transverse Stochastic Cooling on
Rebucketing ~on (22 Jan)
140
120
100
80
60
40
20
0
0
1
2
3
4
5
6
7
8
9
10
Ξb-1/day
Weeks of Physics collisions

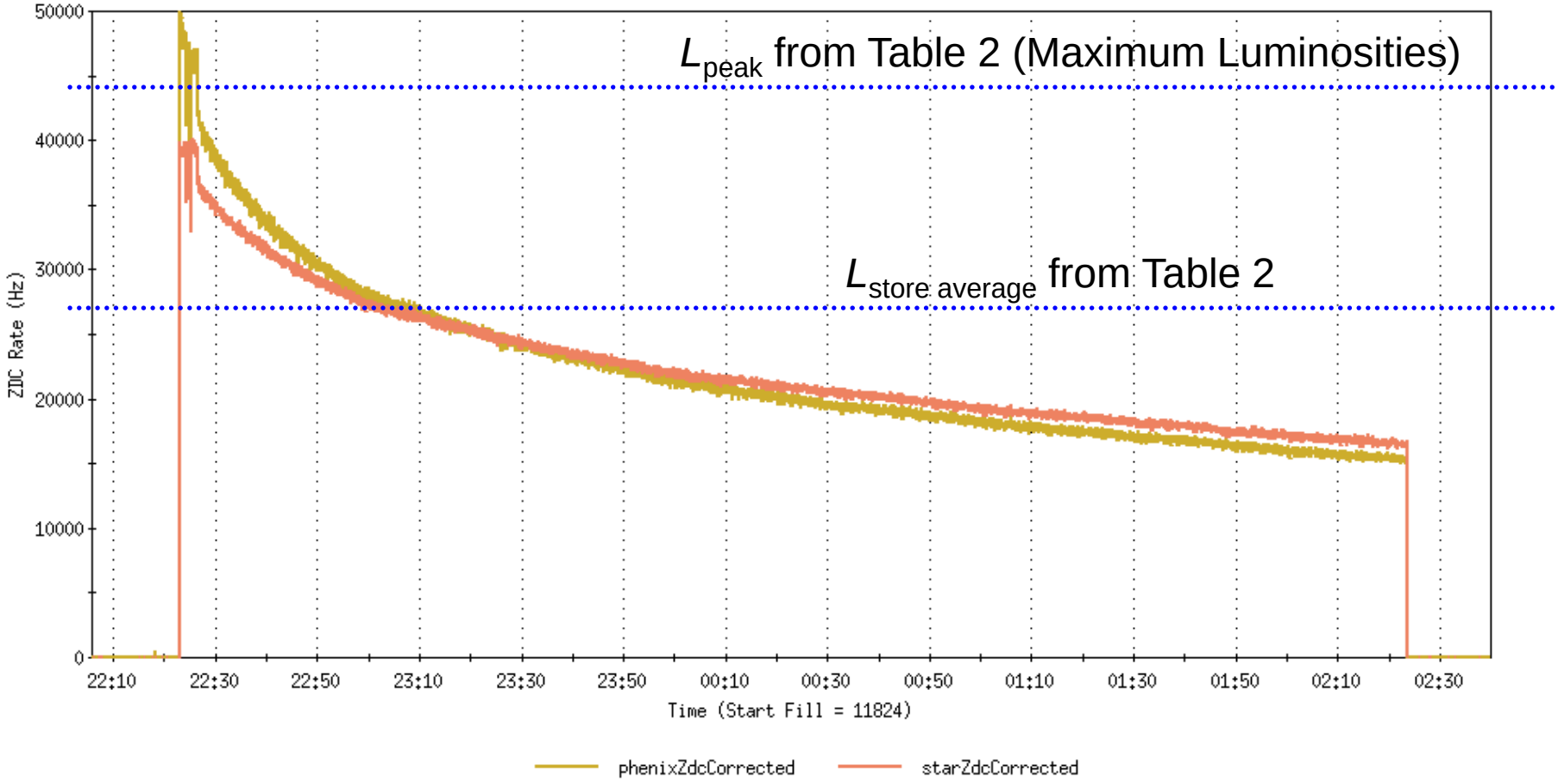

Run 10 (AuAu) – Integrated Luminosity by week
Phenix
STAR
(lumi) hours at store
Max
Min
Goal
thru fill 11800
ending 18:33 25 February
Integrated luminosity [µb^-1]
hours per week at store
period
800
700
600
500
400
300
200
100
0
120
96
72
48
24
0
71.3
72.4
80.3
178.9
179.4
43.0
588.6
599.7
107.2
359.5
358.8
76.2
526.8
547.5
96.0
541.2
569.2
95.2
302.9
335.4
83.8
483.2
525.4
99.1
12/31 to 1/07
1/08 to 1/14
1/15 to 1/21
1/22 to 1/28
1/29 to 2/04
2/05 to 2/11
2/12 to 2/18
2/19 to 2/25

13 Feb – 2 Mar 10

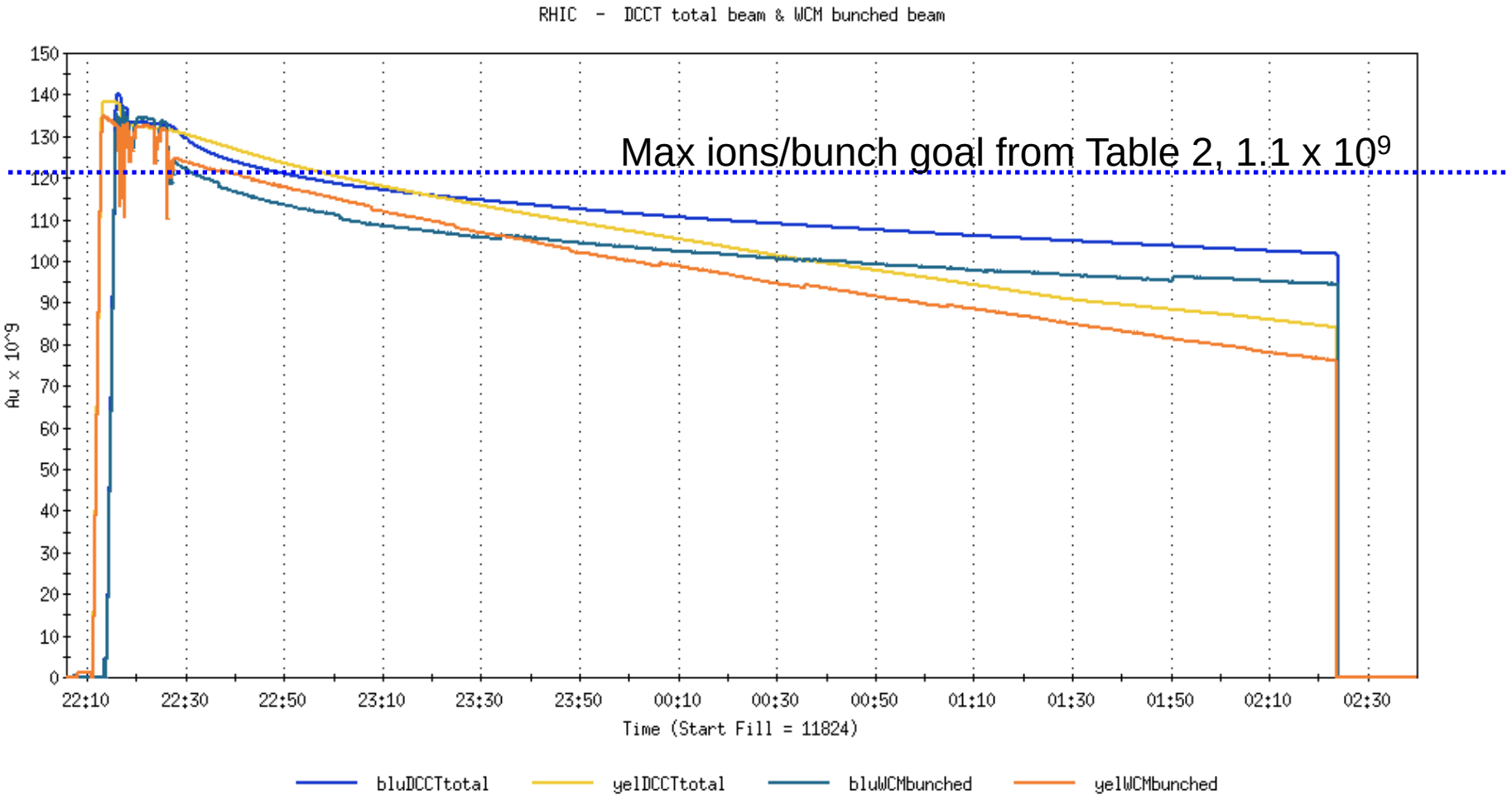
Look at this one in detail



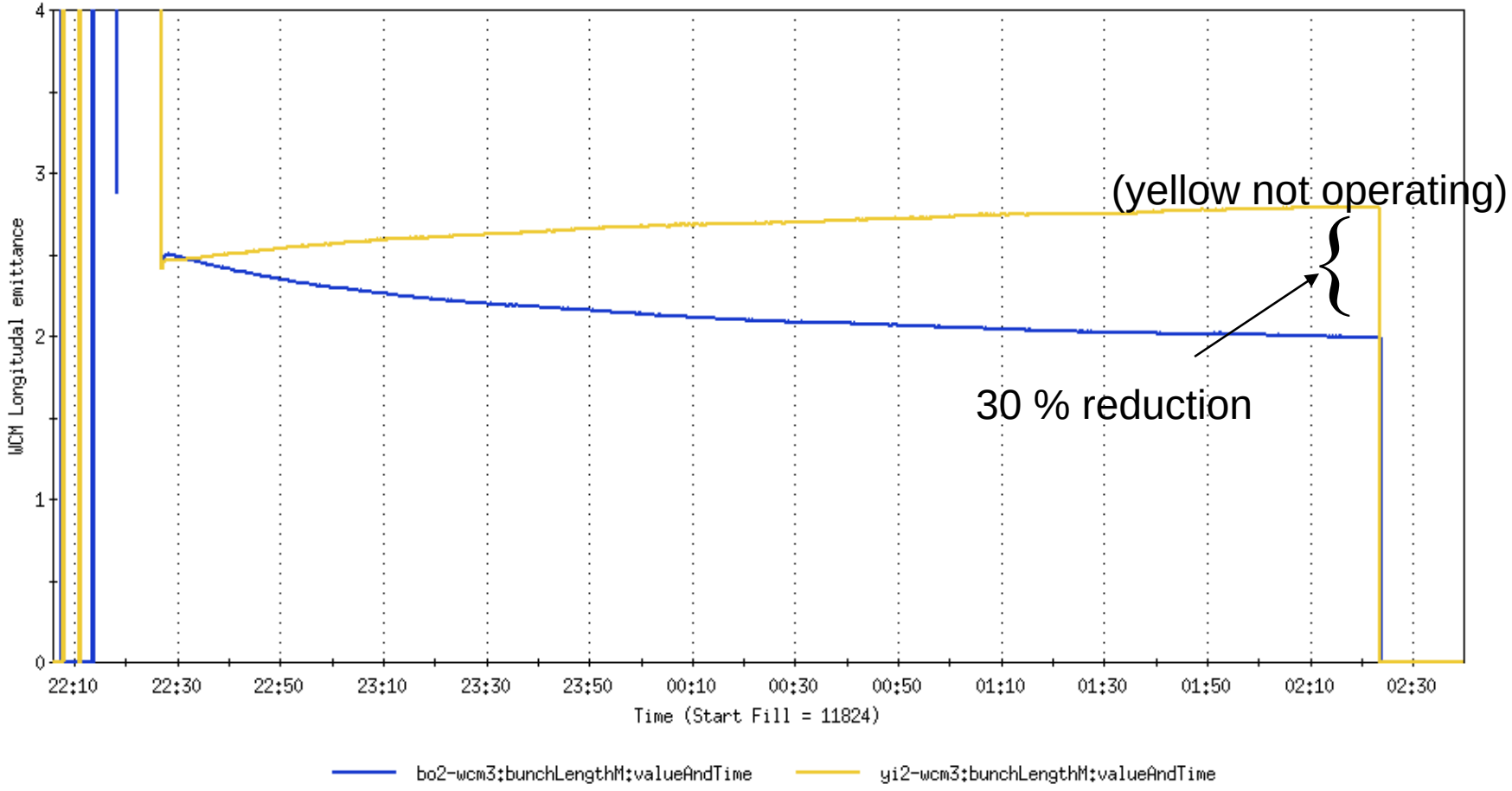
Fills 11824 28 Feb 10



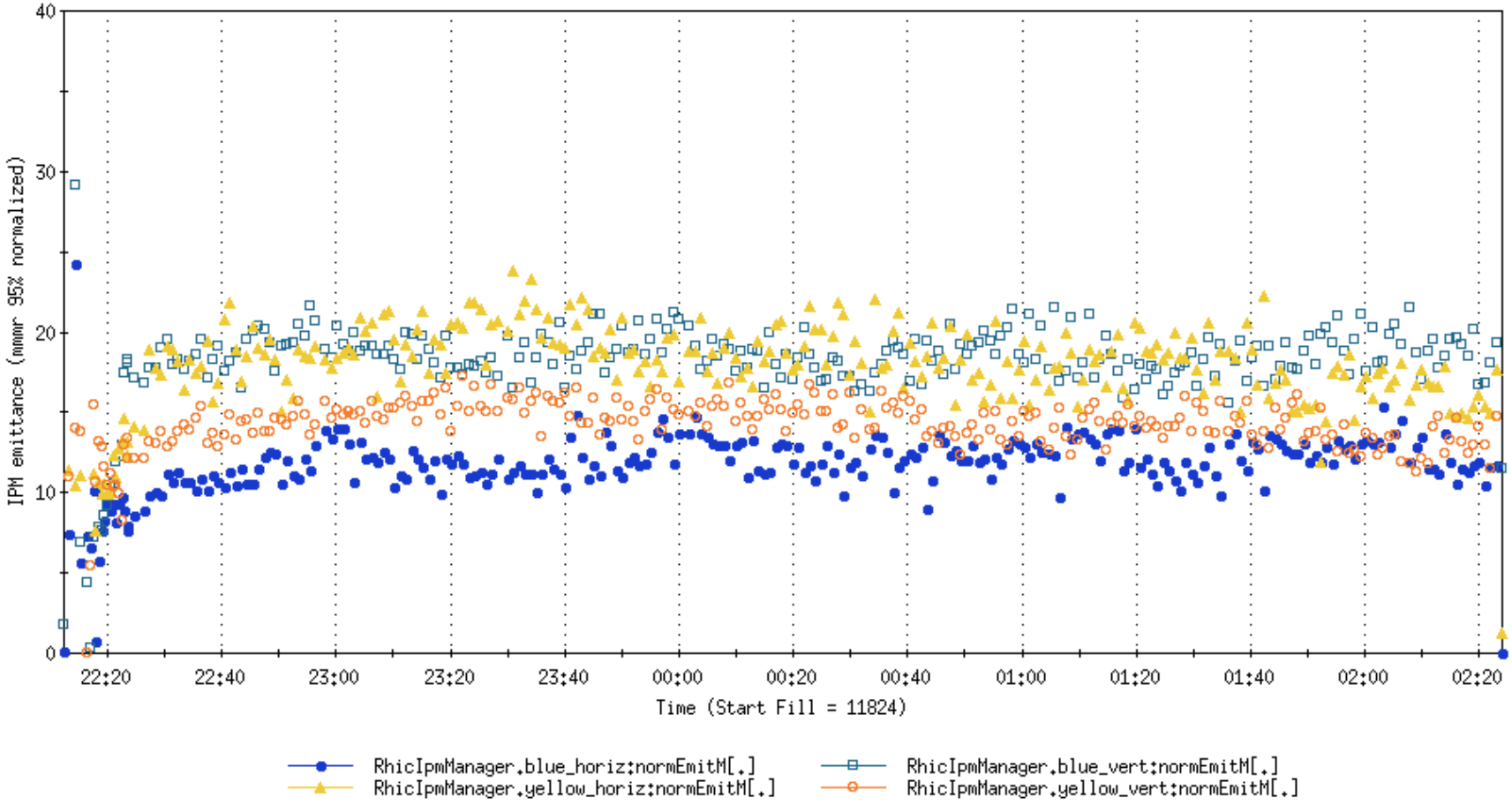
Fills 11824 28 Feb 10



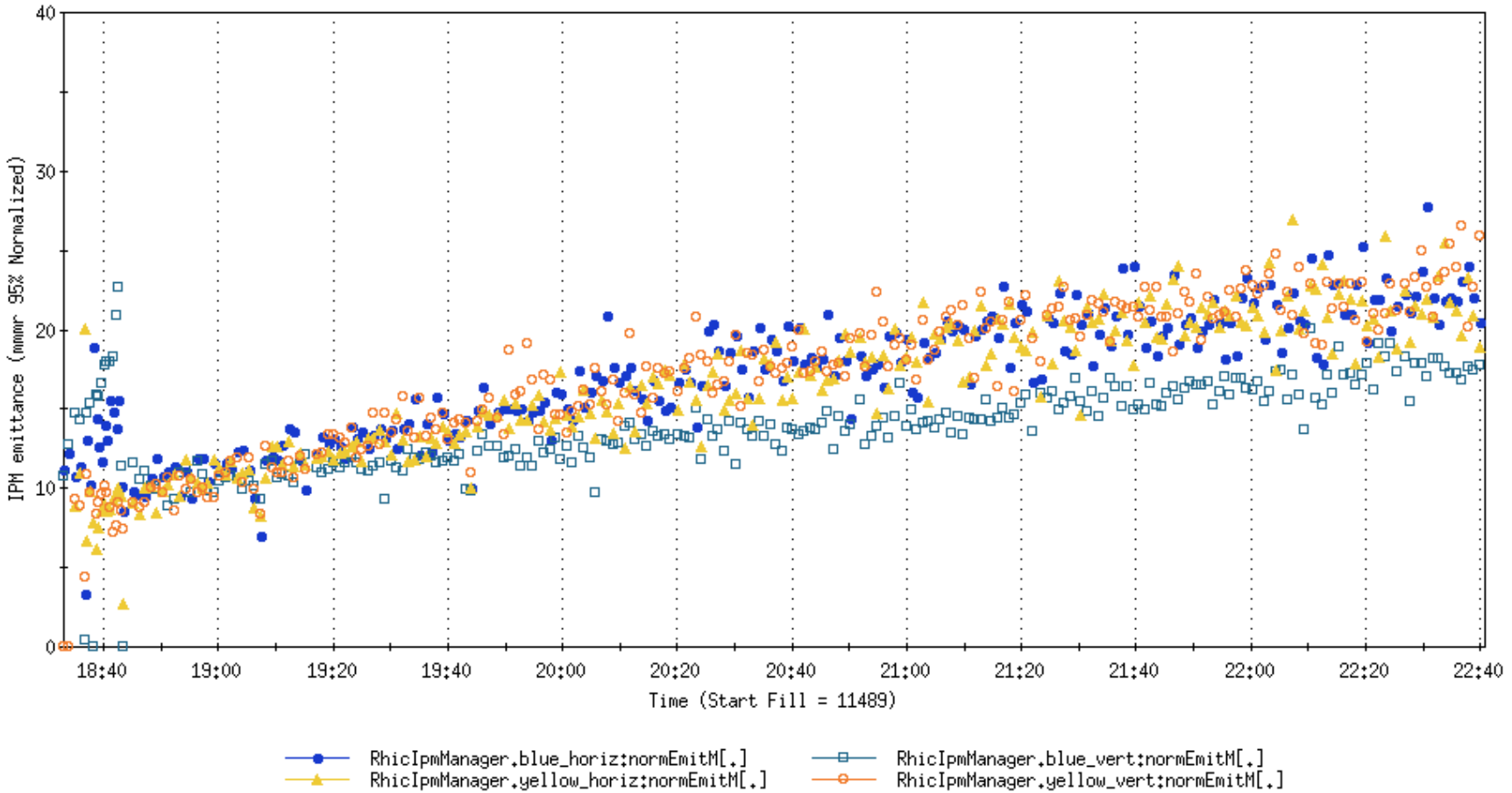
Fills 11824 28 Feb 10, Longitudal Stochastic Cooling



Fills 11824 28 Feb 10, Transverse Stochastic Cooling



Fill 11489, no cooling, no rebucketing (0.6 m beta*)
Monday, 18 Jan.



Ring	Bunches/Cycles	Avg Bunch in RHIC (10^6 ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	*Uxf1 to Wxf*	*Wxf to Arc*	*Arc to RHIC*
Blue	111/28	1196	0.911	1.024	*0.961*	*0.999*	*0.927*
Yellow	111/29	1168	0.879	1.023	*0.961*	*0.989*	*0.905*

31 Dec 1st Physics Store

Injected Beam Statistics for Fill number 11340

Started filling RHIC: Thu Dec 31 22:51:52 2009, Fill complete: Thu Dec 31 22:59:50 2009, Minutes to fill: 7

Ring	Bunches/Cycles	Avg Bunch in RHIC (10^6 ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	*Uxf1 to Wxf*	*Wxf to Arc*	*Arc to RHIC*
Blue	56/56	909	0.836	1.056	*0.963*	*0.992*	*0.828*
Yellow	56/56	990	0.971	1.085	*0.962*	*0.959*	*0.970*

18 Jan Physics Store 11489, 0.6 m β* No cooling or rebucketing

Ring	**Bunches/Cycles**	**Avg Bunch in RHIC (10^6 ions)**	**Avg Efficiency XCBM to RHIC**	**XCBM to Uxf1**	***Uxf1 to Wxf***	***Wxf to Arc***	***Arc to RHIC***
Blue	111/28	1196	0.911	1.024	*0.961*	*0.999*	*0.927*
Yellow	111/29	1168	0.879	1.023	*0.961*	*0.989*	*0.905*

28 Feb Physics Store 11824, 0.7 m b* with some cooling and with rebucketing

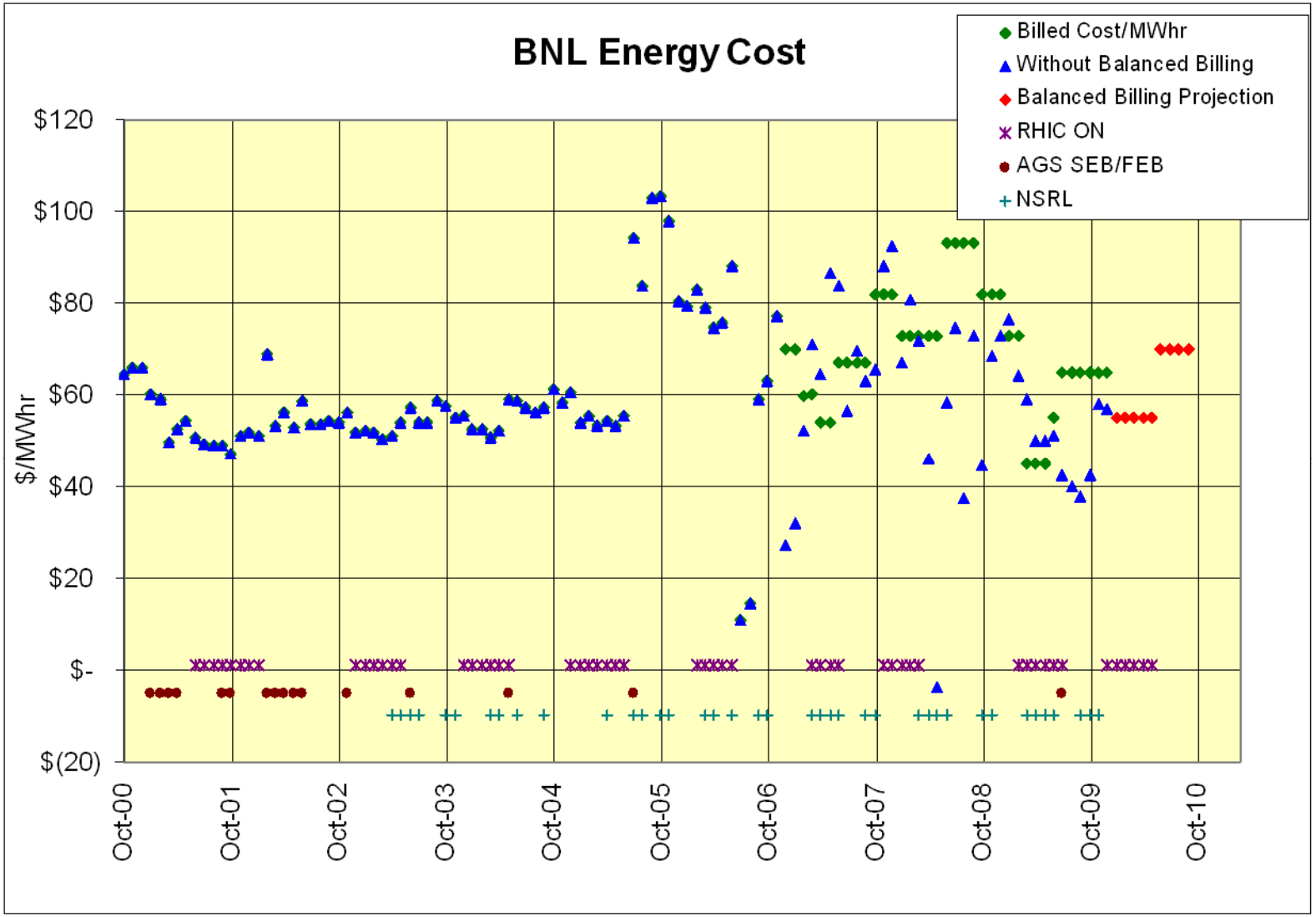
Ring	**Bunches/Cycles**	**Avg Bunch in RHIC (10^6 ions)**	**Avg Efficiency XCBM to RHIC**	**XCBM to Uxf1**	***Uxf1 to Wxf***	***Wxf to Arc***	***Arc to RHIC***
Blue	111/28	1262	0.917	0.975	*0.961*	*1.001*	*0.977*
Yellow	111/28	1246	0.910	0.961	*0.964*	*0.988*	*0.994*

Future Topics

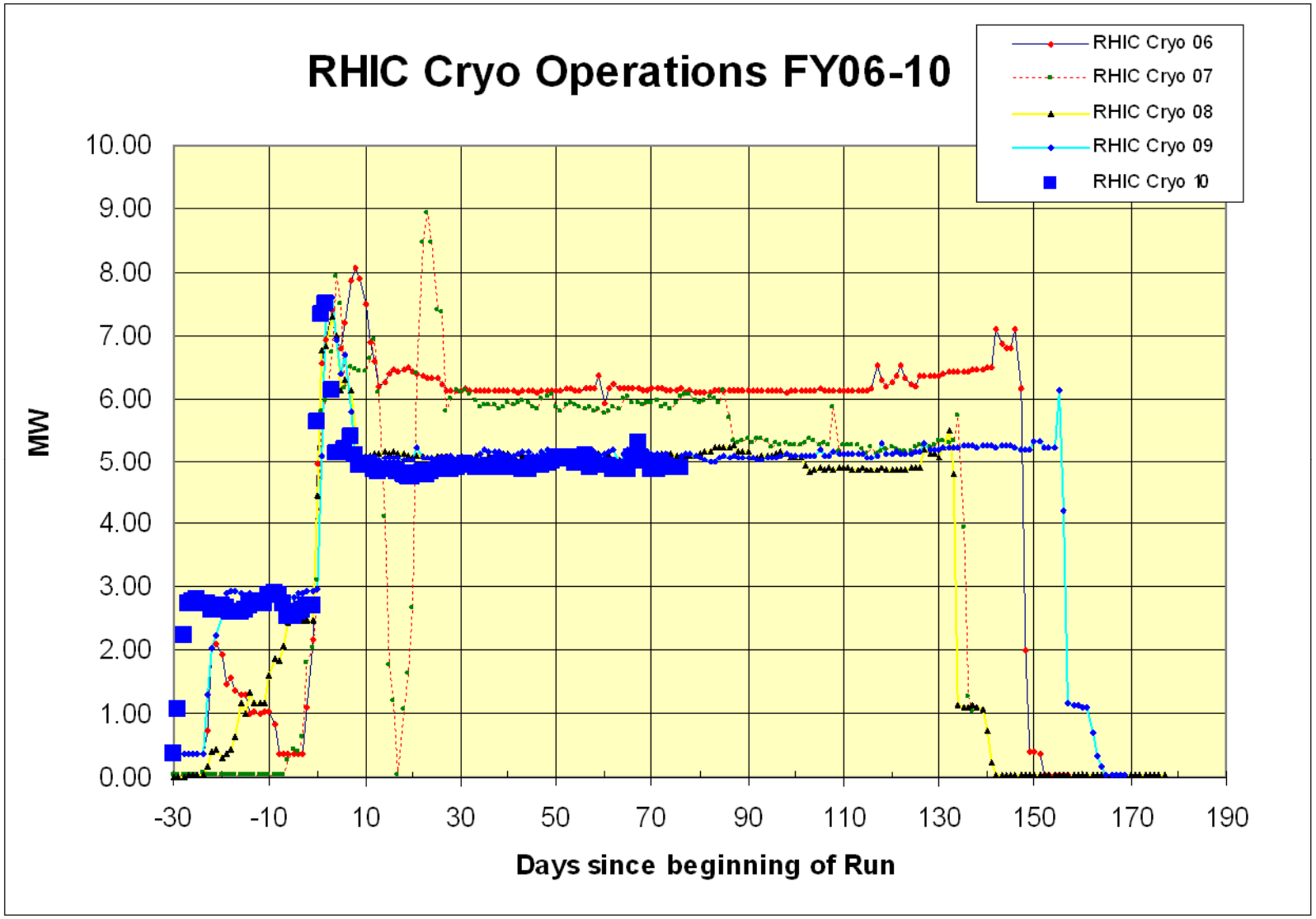
- 3rd integar studies update – M. Bai
- Toward Smaller beta* - new quad triplets – D. Trbojevic

Archive

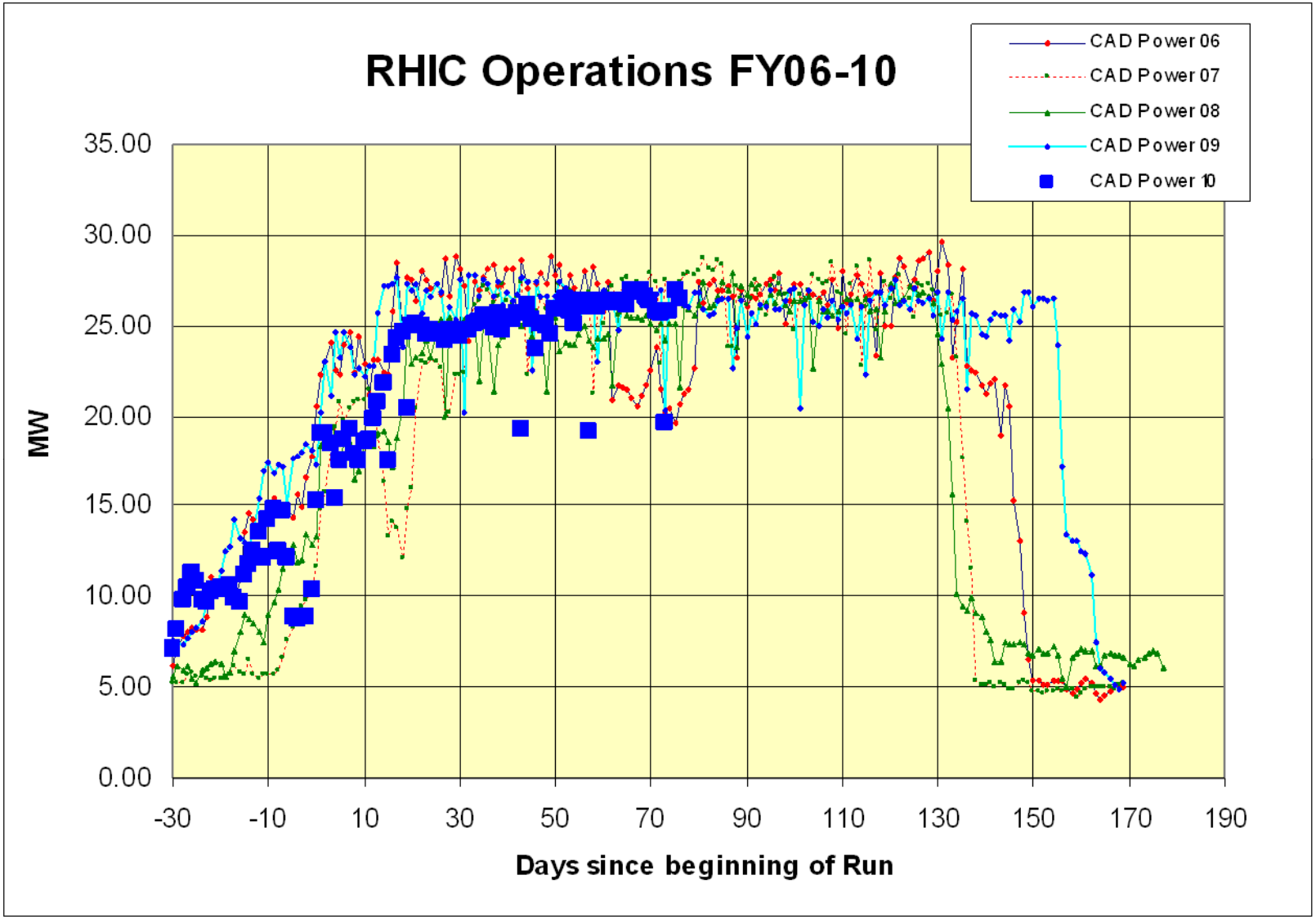
Through Dec 2009



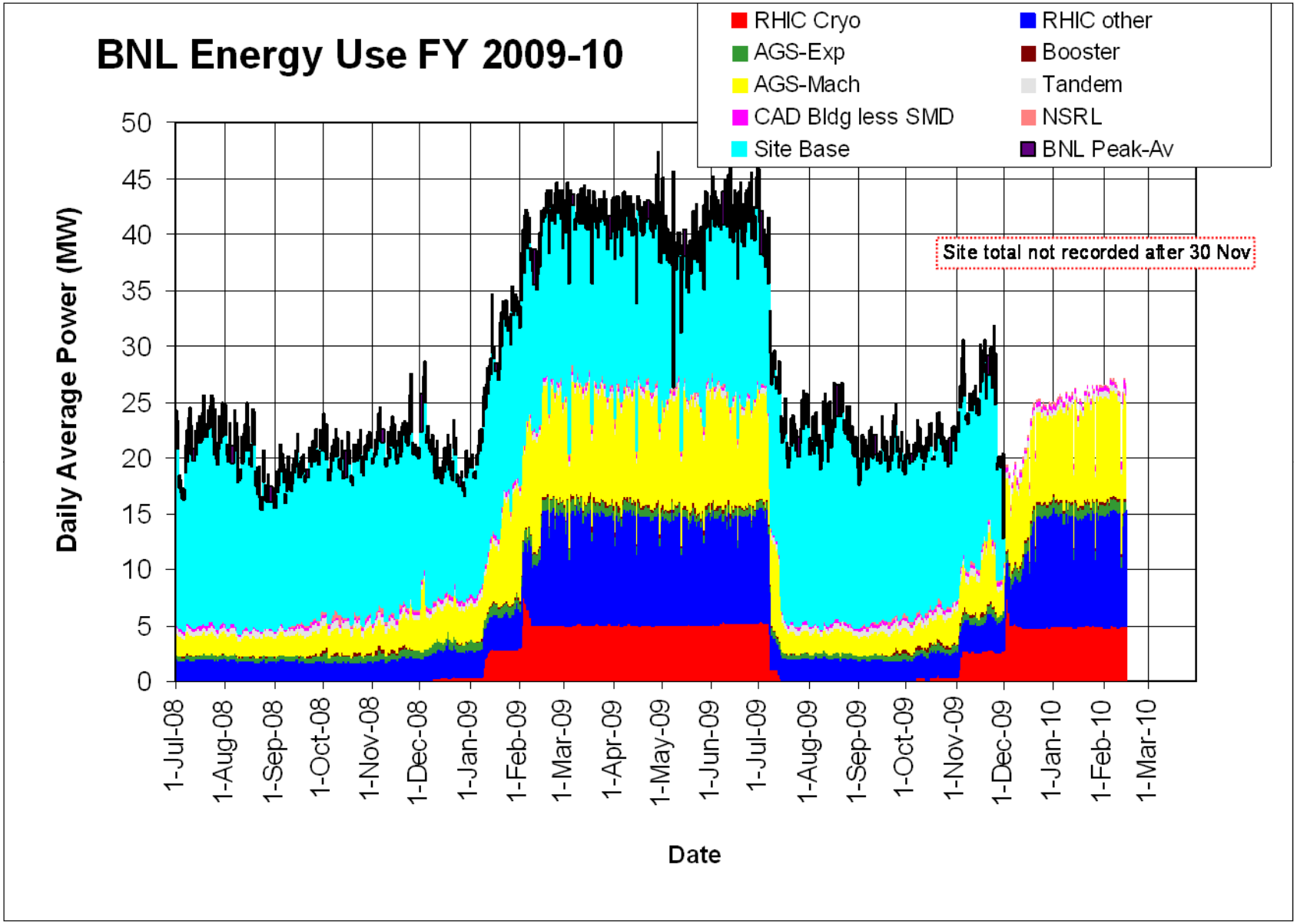
Through 2/15/10



Through 2/15/10



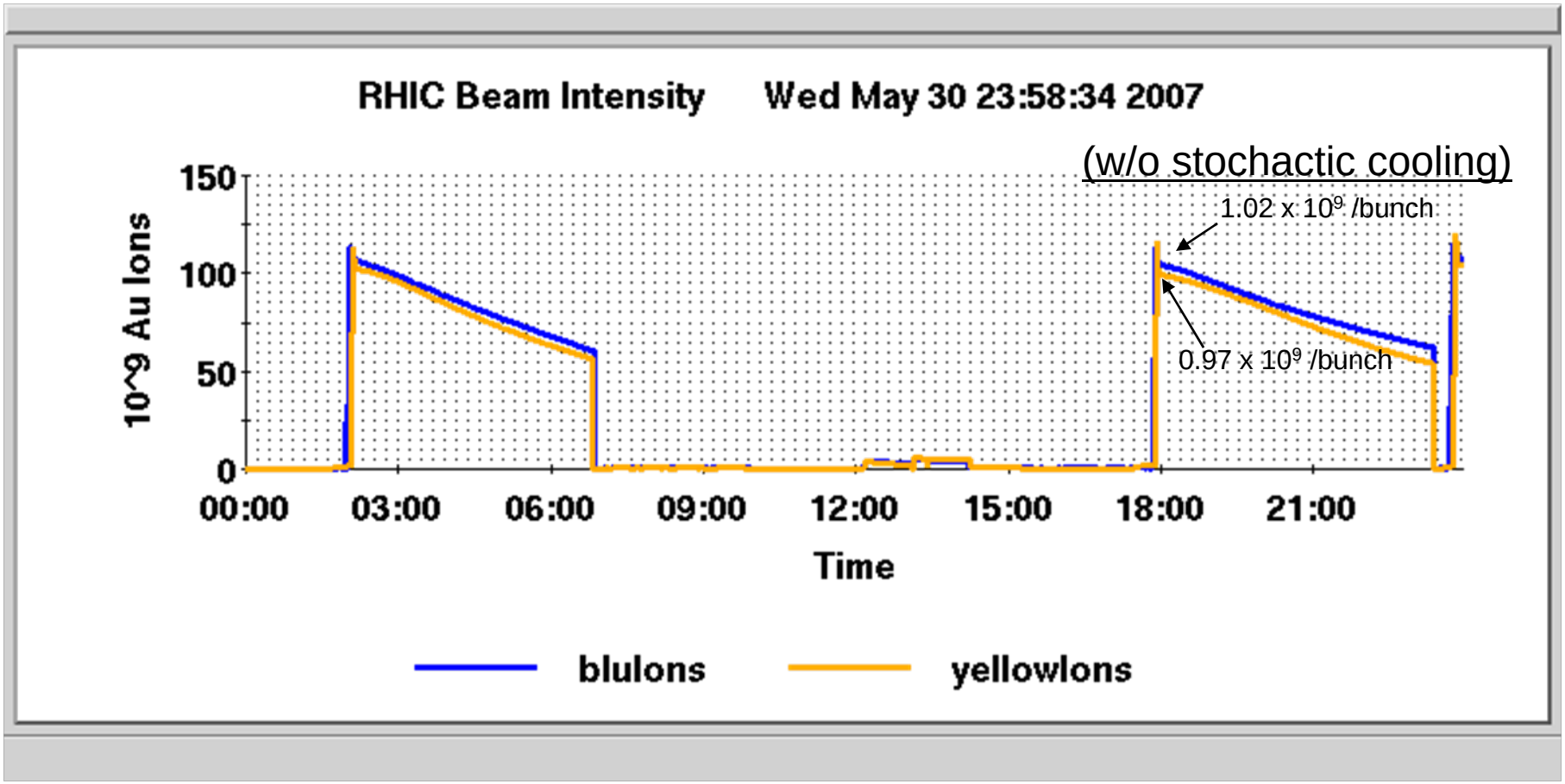
Through 2/15/10



Run 7 Fill 8878 Injected Beam Statistics from ELOG

Blue = 103 bunches 1.04×10^9/bunch

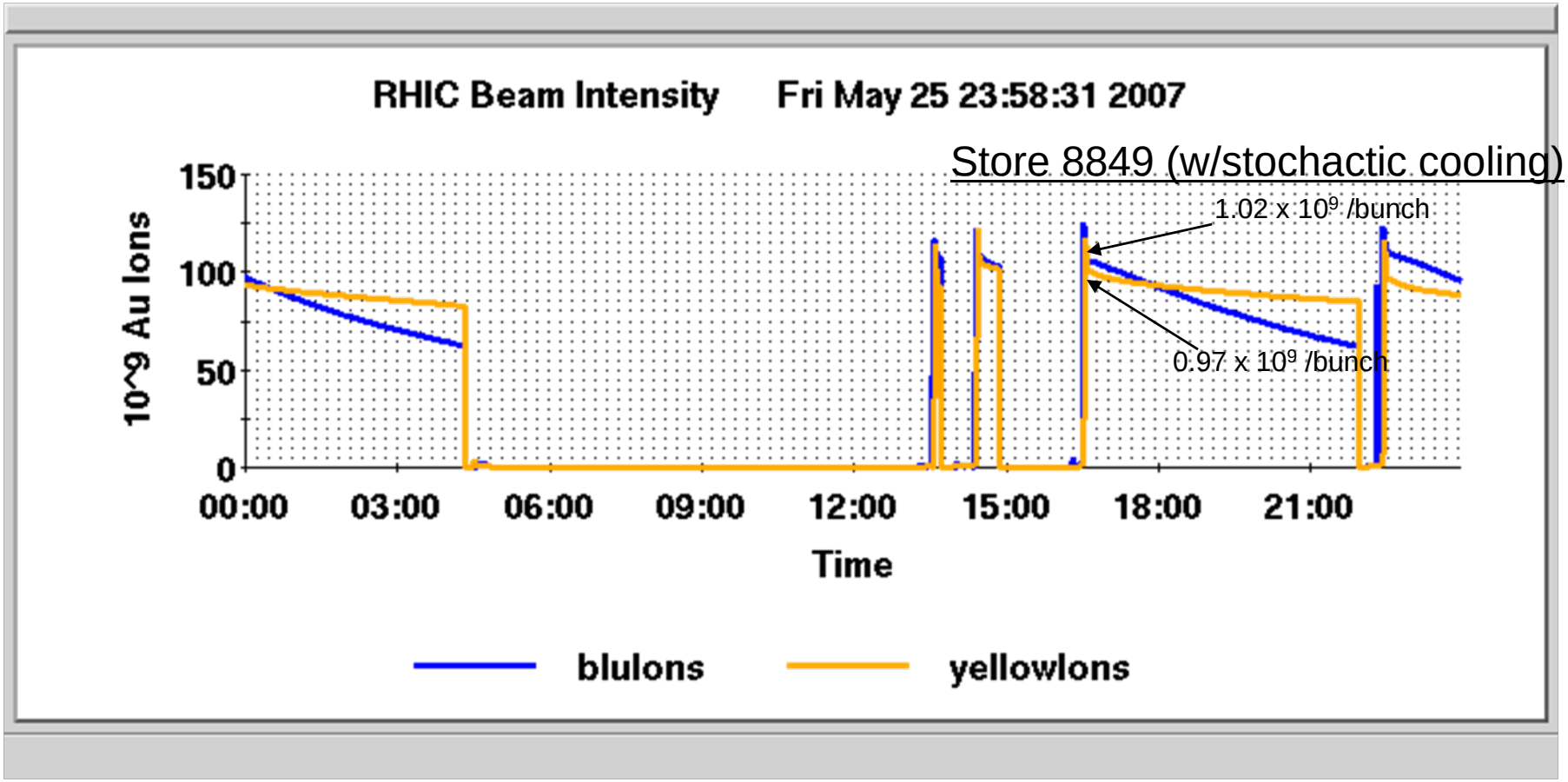
Yellow= 103 bunches 1.13×10^9/bunch

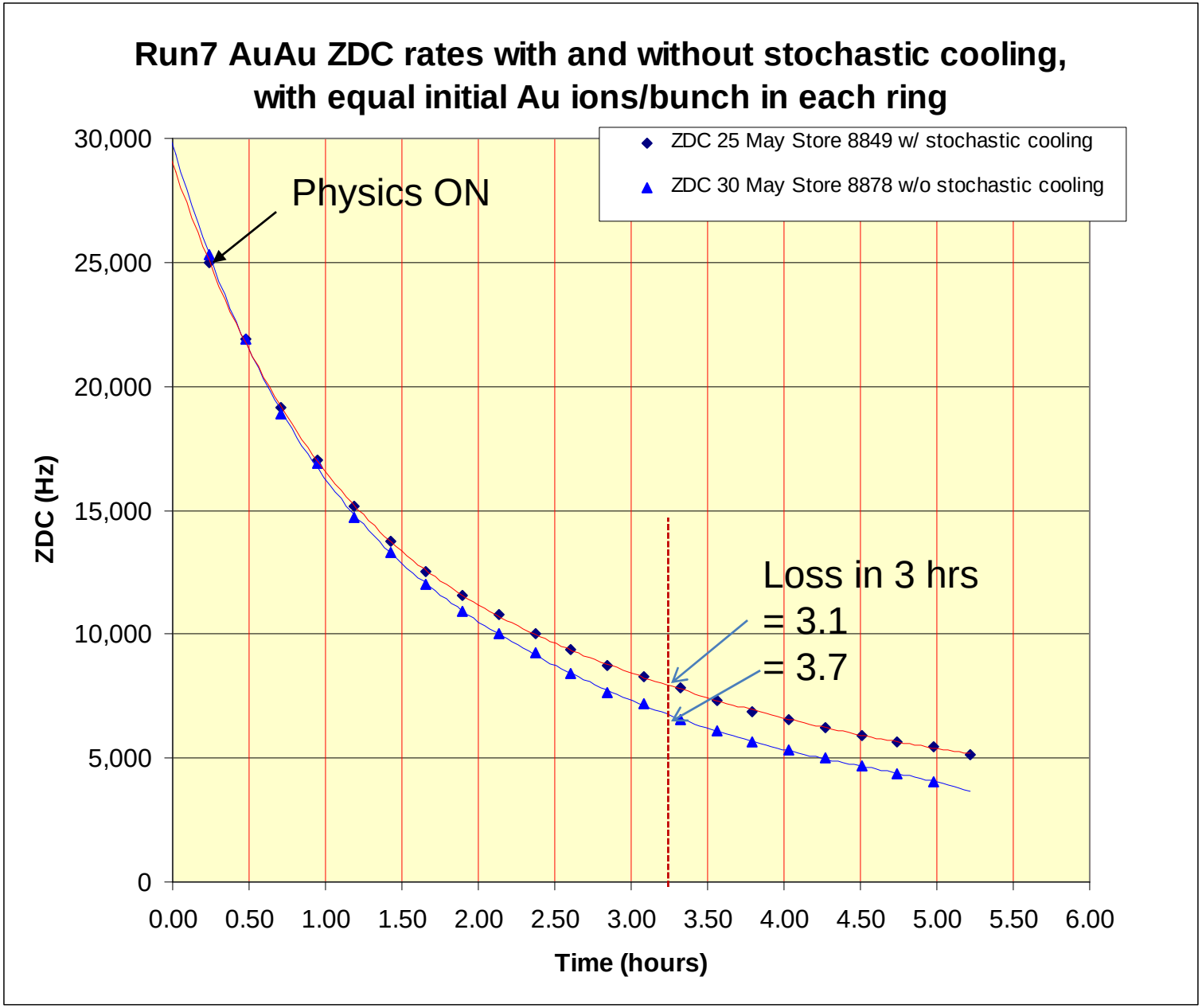


Run 7 Fill 8849 Injected Beam Statistics from ELOG

Blue = 103 bunches 1.23x10^9/bunch

Yellow= 103 bunches 1.15x10^9/bunch




Run7 AuAu ZDC rates with and without stochastic cooling,
with equal initial Au ions/bunch in each ring
ZDC 25 May Store 8849 w/ stochastic cooling
ZDC 30 May Store 8878 w/o stochastic cooling
Physics ON
Loss in 3 hrs
= 3.1
= 3.7
ZDC (Hz)
30,000
25,000
20,000
15,000
10,000
5,000
0
0.00
0.50
1.00
1.50
2.00
2.50
3.00
3.50
4.00
4.50
5.00
5.50
6.00
Time (hours)

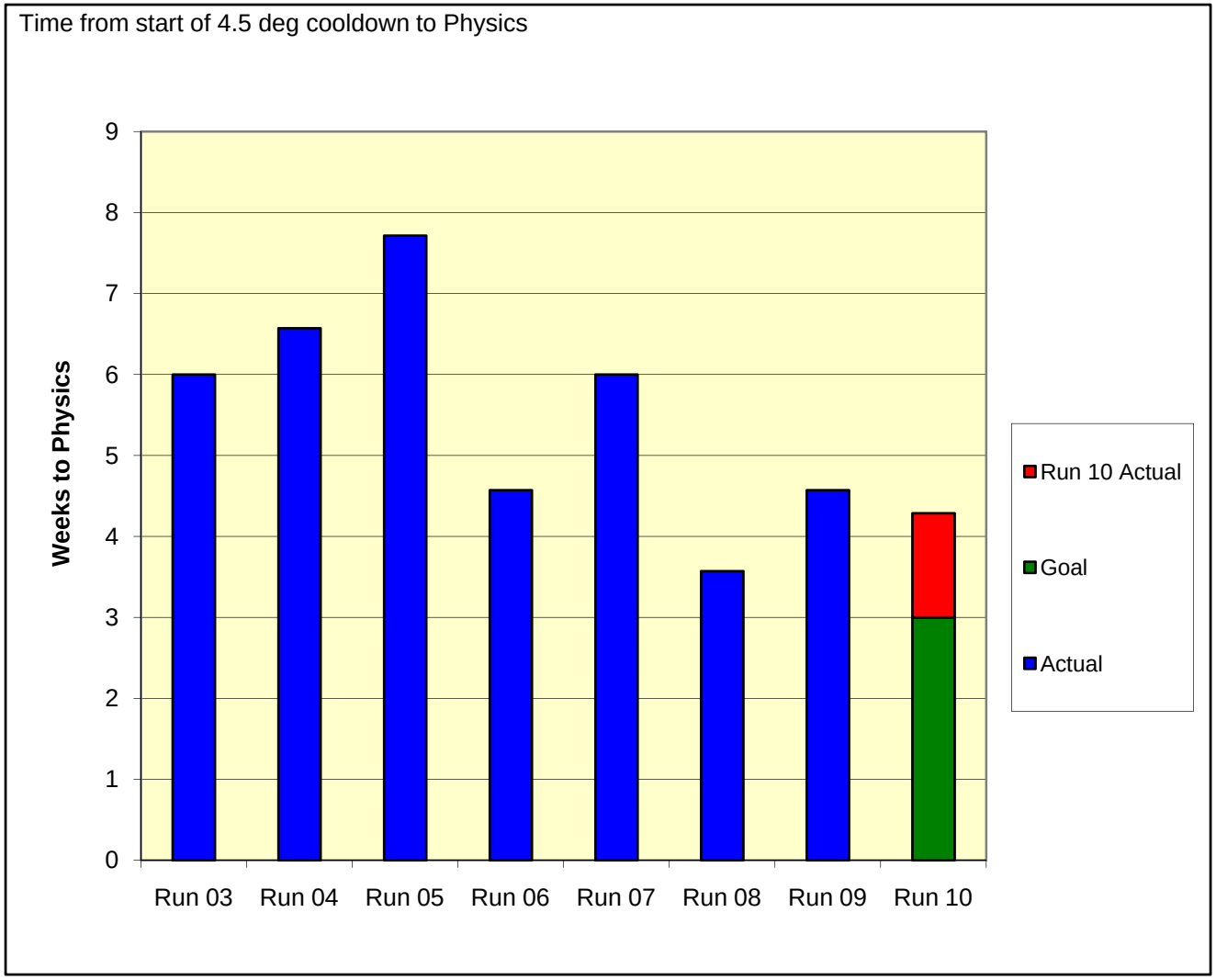
Revised Run 10 Plan, Nov 25, 2009

	Physics production or beam studies weeks	
$\sqrt{s_{NN}}$ (GeV)	25-cryoweek run	27-cryoweek run
200	10	10
62.4	4	4
39	1.5	1.5
27	0	0
18	0	0
11.5 @ STAR	0	2
7.7	4	4
Beam studies @ 5 GeV and @ $\nu \approx 0.67$	0.5	0.5

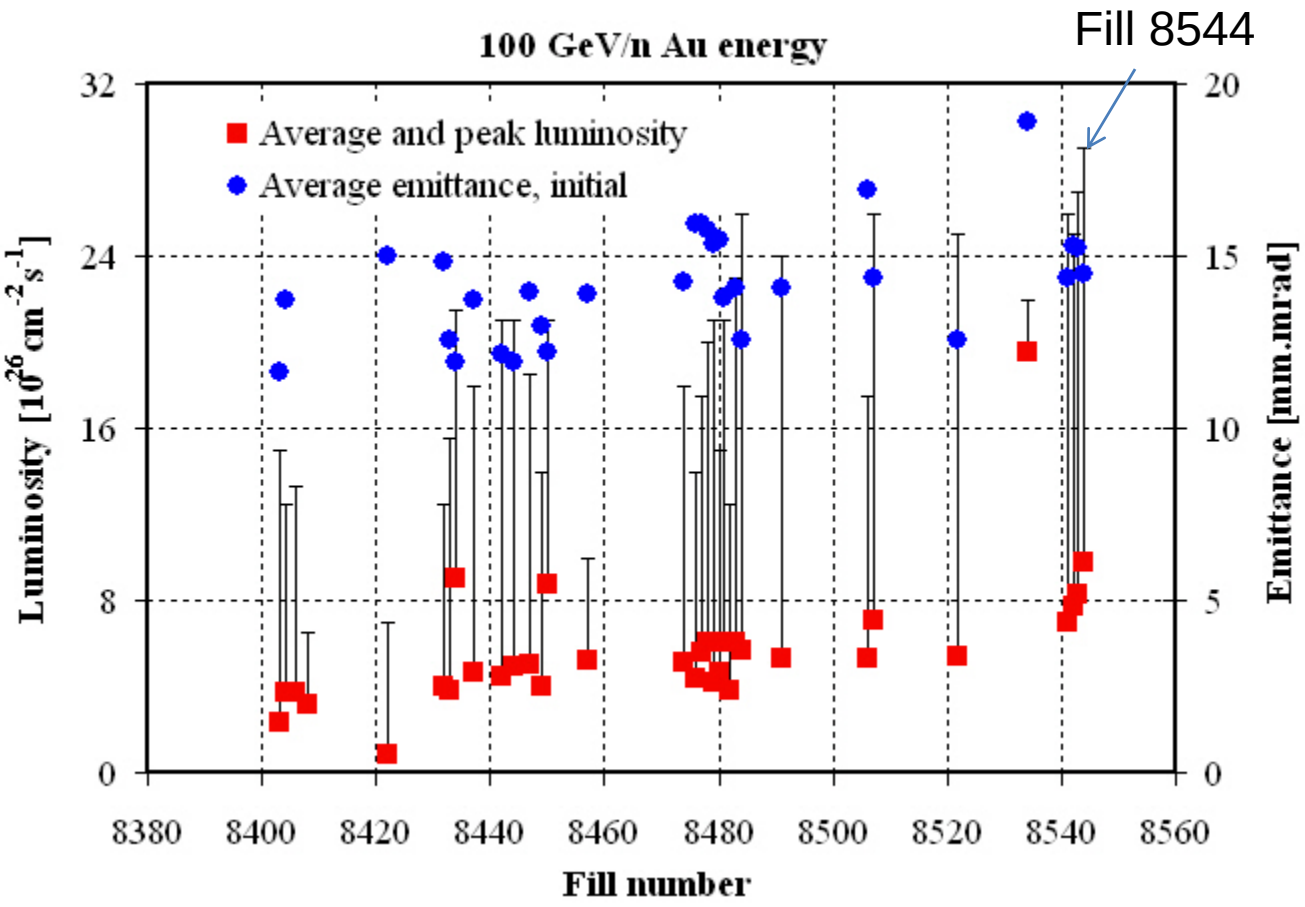
Run 10 Au-Au Goals

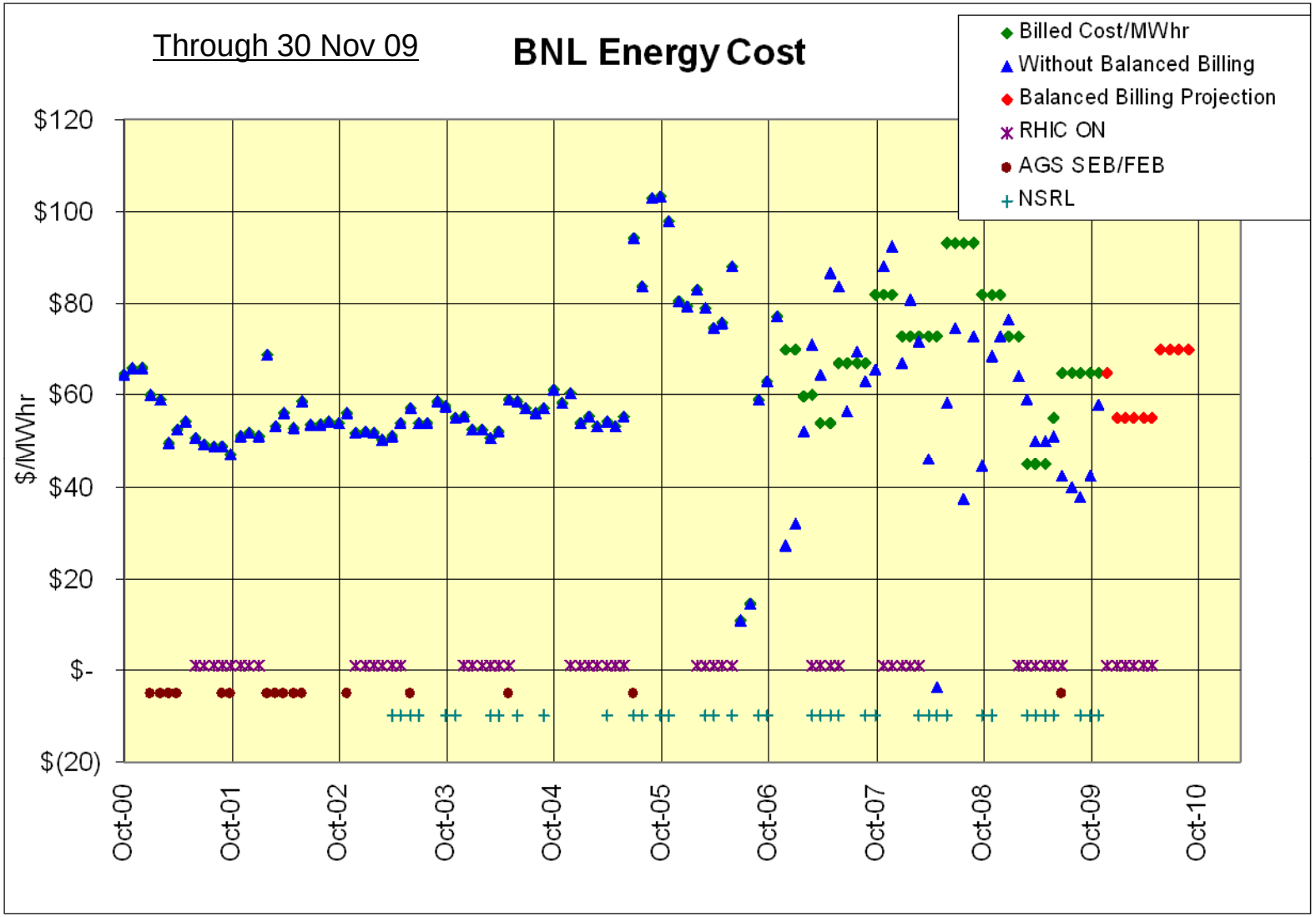
11/19/09

- STAR
  - $\sqrt{s}$ = 200 GeV/n
    - Luminosity Sampled/Delivered = 2/4 nb^{-1}
    - 250M Central Events
    - 300M Min-bias events
- PHENIX
  - $\sqrt{s}$ = 200 GeV/n
    - Luminosity Recorded/Delivered = 1.4/>6 nb^{-1}
    - Minimum Goal:
      - Luminosity Recorded/Delivered = 1.1/3.9 nb^{-1}


Time from start of 4.5 deg cooldown to Physics
Weeks to Physics
0
1
2
3
4
5
6
7
8
9
Run 03
Run 04
Run 05
Run 06
Run 07
Run 08
Run 09
Run 10
Run 10 Actual
Goal
Actual

Run 7


Fill 8544
100 GeV/n Au energy
Average and peak luminosity
Average emittance, initial
Luminosity [10^26 cm^-2 s^-1]
Emittance [mm.mrad]
Fill number
32
24
16
8
0
20
15
10
5
0
8380
8400
8420
8440
8460
8480
8500
8520
8540
8560

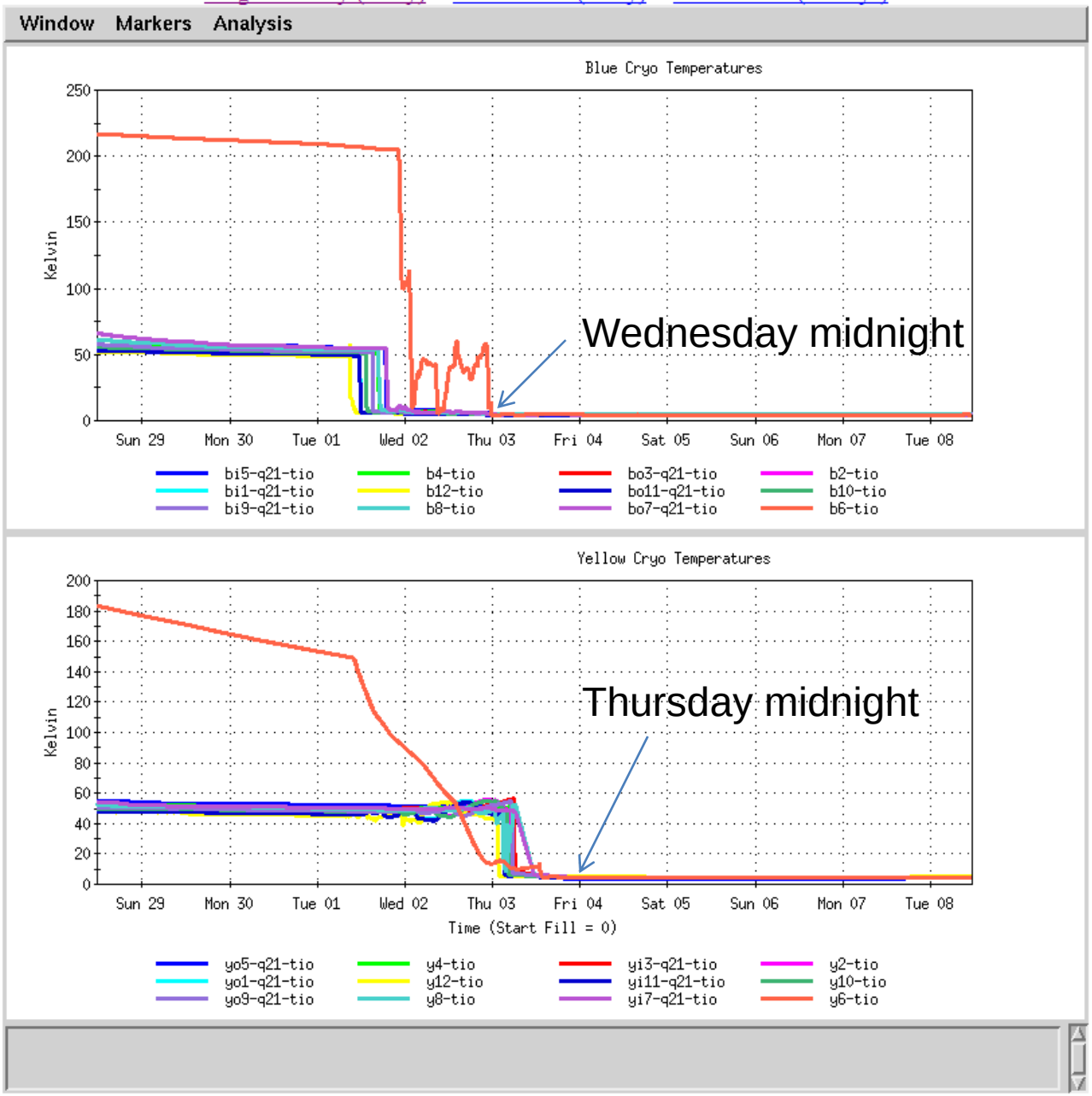

Through 30 Nov 09
BNL Energy Cost
Billed Cost/MWhr
Without Balanced Billing
Balanced Billing Projection
RHIC ON
AGS SEB/FEB
NSRL
$/MWhr
$120
$100
$80
$60
$40
$20
$-
$(20)
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10

Run 10 Setup

- Oct. 5, N2 scrubbing
- Oct. 30, Temp. Control devices in and ready (required for 45 K wave cooldown).
- Nov. 2, 45 K wave begins.
- Nov. 12, AGS Testing.
- Nov. 12-13, APEX Workshop
- Nov. 16, beam setup in Booster and AGS
- Nov. 16-20, RHIC Dry Run
- Nov 22, Beam extracted from AGS to W dump

Cryogenic Blue & Yellow Rings (14 days)

Ring Summary (1 day) Sector Plots (1 day) Sector Plots (14 days)



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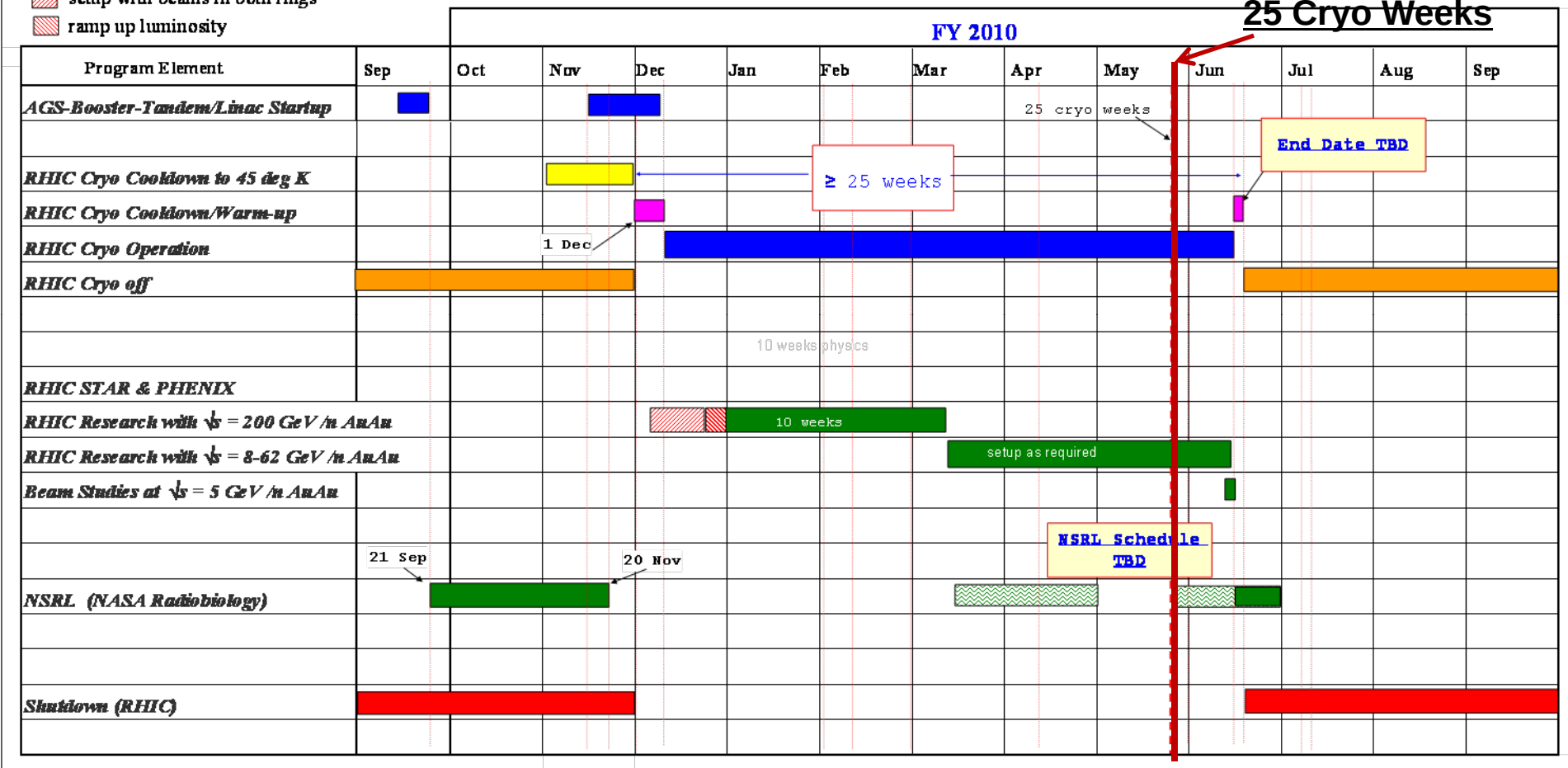
6 Jan 10

C-A Operations-FY10

As Run/Planned

concurrent with RHIC
setup with beams in both rings
ramp up luminosity



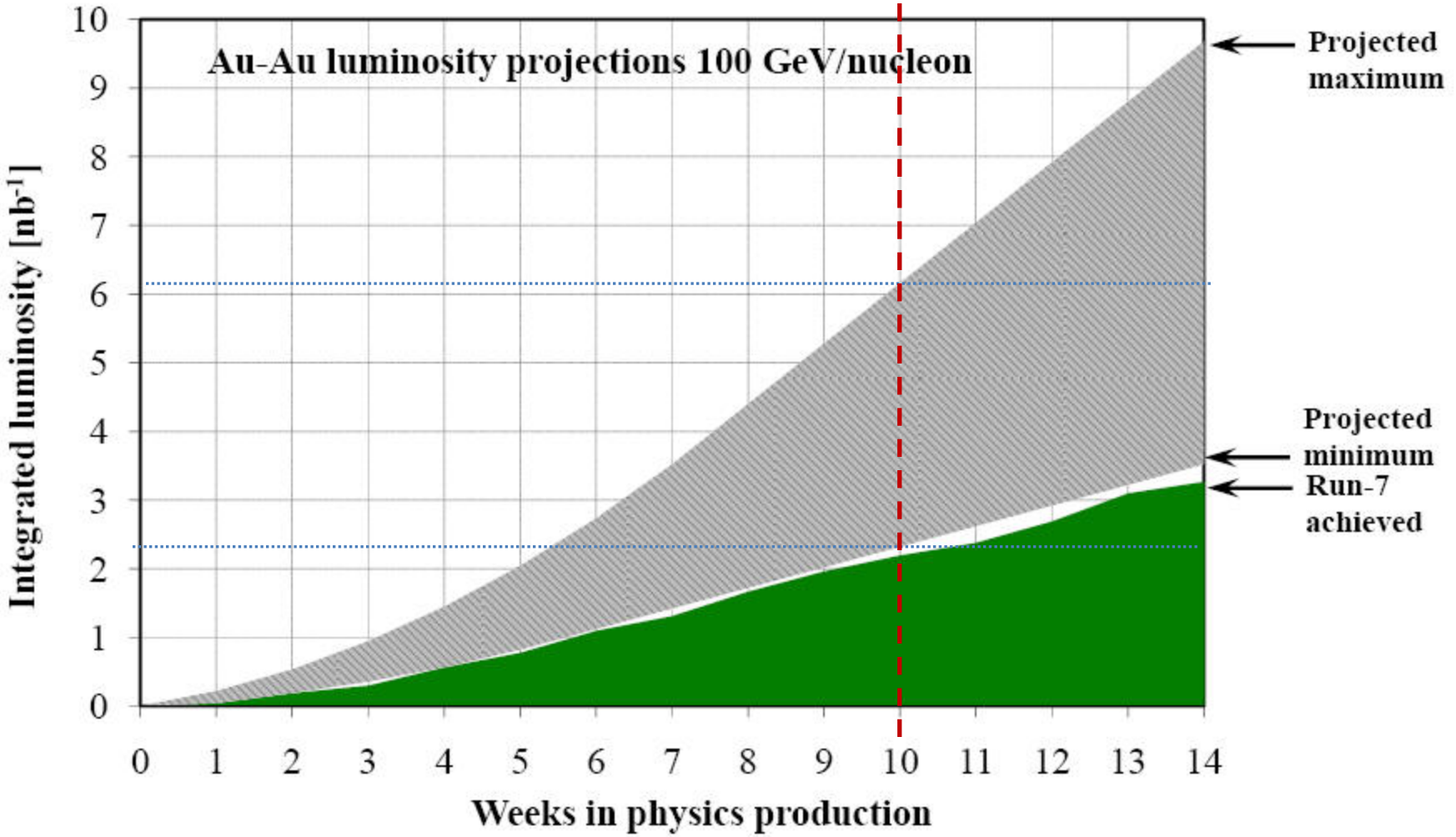


Figure 2: Projected minimum and maximum integrated luminosities for gold-gold collisions at 100 GeV beam energy, assuming linear weekly luminosity ramp-up in 6 weeks for the minimum and 8 weeks for the maximum.