

Run 10 plan based on 25 Nov Revised Plan and $\sqrt{s}=200$ 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, Physics declared (store 11340) $\sqrt{s}=200$ 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 (0556), End 10 week $\sqrt{s} = 200$ GeV/n Run, begin $\sqrt{s} = 62.4$ GeV/n setup
- Mar. ~~20~~ **19**, Begin 4 week $\sqrt{s} = 62.4$ GeV/n run
 - **Machine physics 19 March for stores ≥ 11954**
 - **PHENIX Physics 19 Mar for stores ≥ 11955**
 - **STAR Physics 22 March for stores ≥ 11976**
- Apr. 8, End 2.9 week $\sqrt{s} = 62.4$ GeV/n Run, begin $\sqrt{s} = 39$ GeV/n setup
- Apr. 9, Begin 1.5 week $\sqrt{s} = 39$ GeV/n run
 - Machine physics 9 April for stores ≥ 12119
 - PHENIX and STAR Physics 9 April for stores ≥ 12122
- Apr. 14, 24 hours APEX for n= 0.67 studies
- Apr. 22, End 1.9 week $\sqrt{s} = 39$ GeV/n Run
- Apr 22, Begin $\sqrt{s} = 7.7$ GeV/n setup (12 hr pol. switches)
- Apr 24 (fill 12238, 2300 hrs), Begin 4 week $\sqrt{s} = 7.7$ GeV/n run

- May 22 End 4 week $\sqrt{s} = 7.7$ GeV/n Run, begin $\sqrt{s} = 11.5$ GeV/n setup **(4-6 hr polarity switch, if necessary)**
- **May 23 – 28 IPAC (Kyoto)**
- **May 22 – Jun 3, Satogata is away**
- May 24, begin $\sqrt{s} = 11.5$ GeV/n for STAR
- Jun 7, end 2 week $\sqrt{s} = 11.5$ GeV/n run, begin $\sqrt{s} = 5$ GeV/n setup **(4-6 hr polarity switch, if necessary)**
- Jun 9, begin $\sqrt{s} = 5$ GeV development
- Jun 12, end 3 days at $\sqrt{s} = 5$ GeV/n
- Jun 13, Begin Cryo Warm-up
- Jun 14, Warm-up complete, Run 10 ends – **27.9 CRYO WEEKS**
- **Last Week of June – Commission EBIS with He beam to NSRL**

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Run 10 Au-Au Goals

4/27/10

- STAR

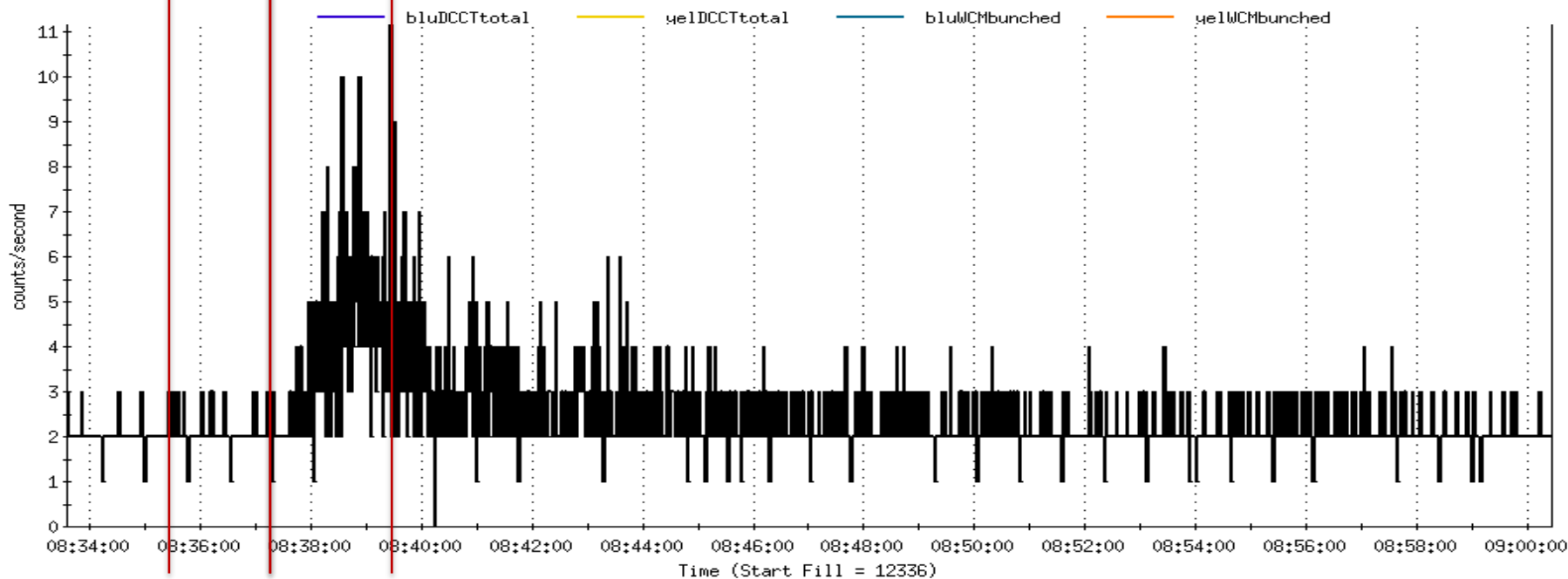
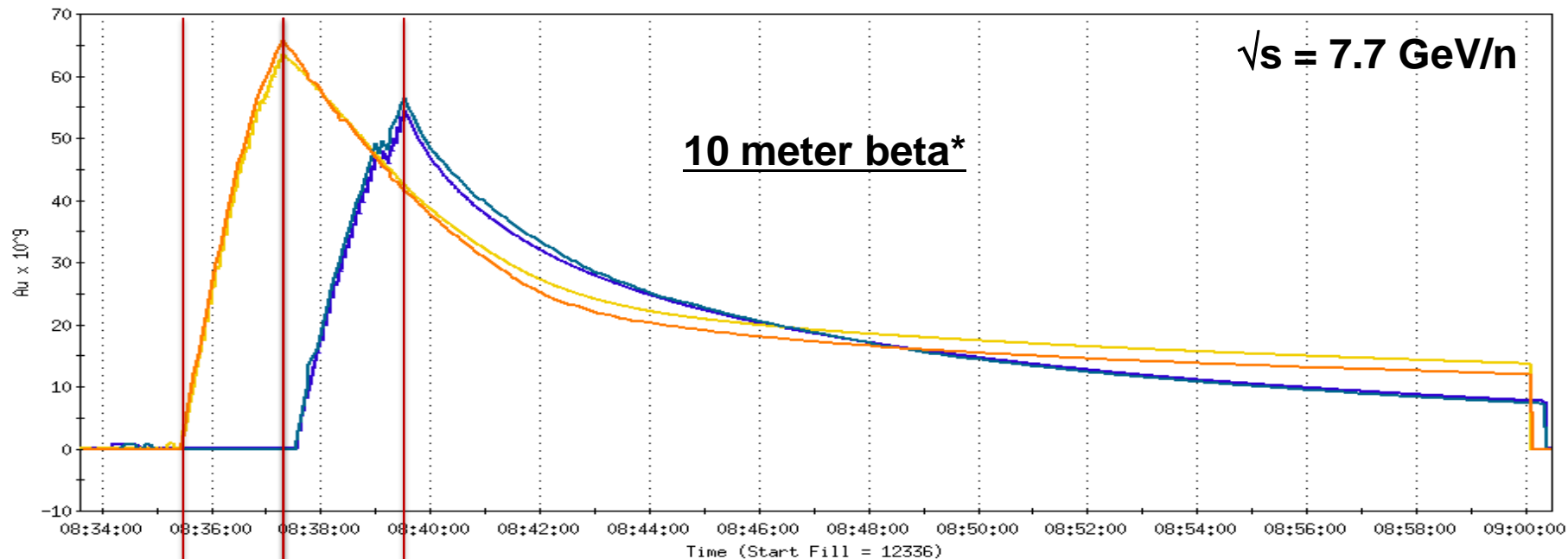
- $\sqrt{s} = 7.7 \text{ GeV/n}$

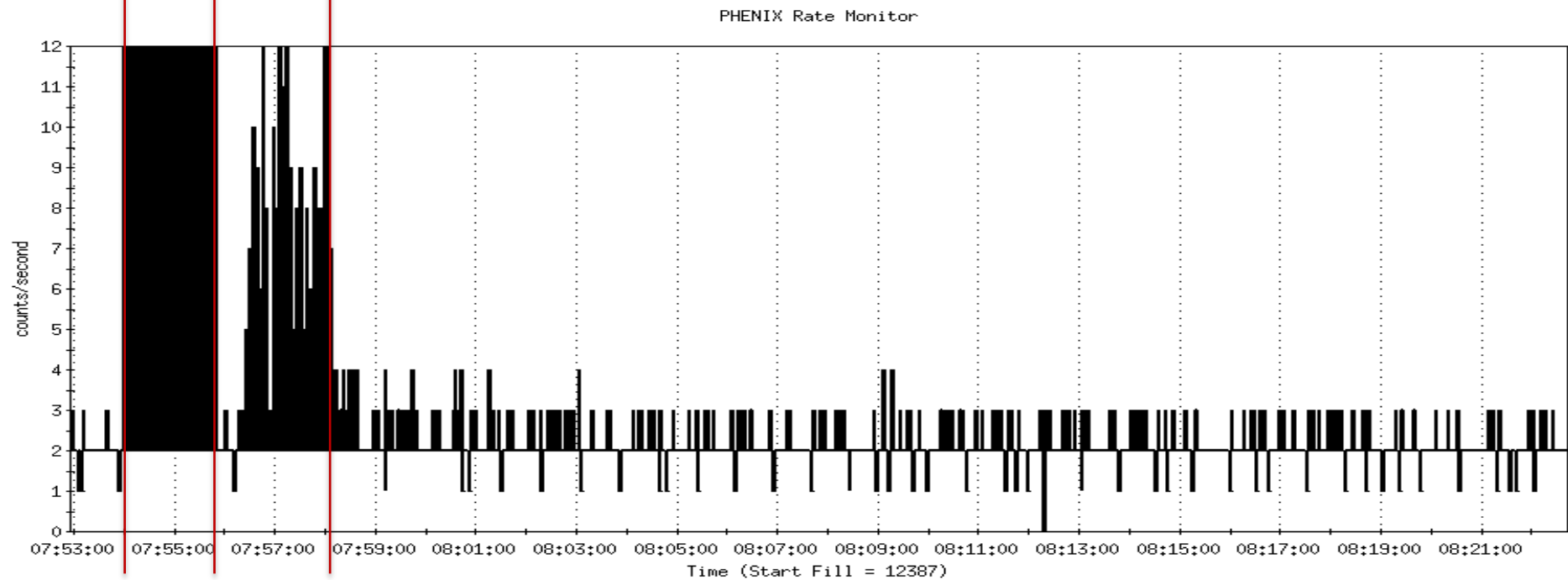
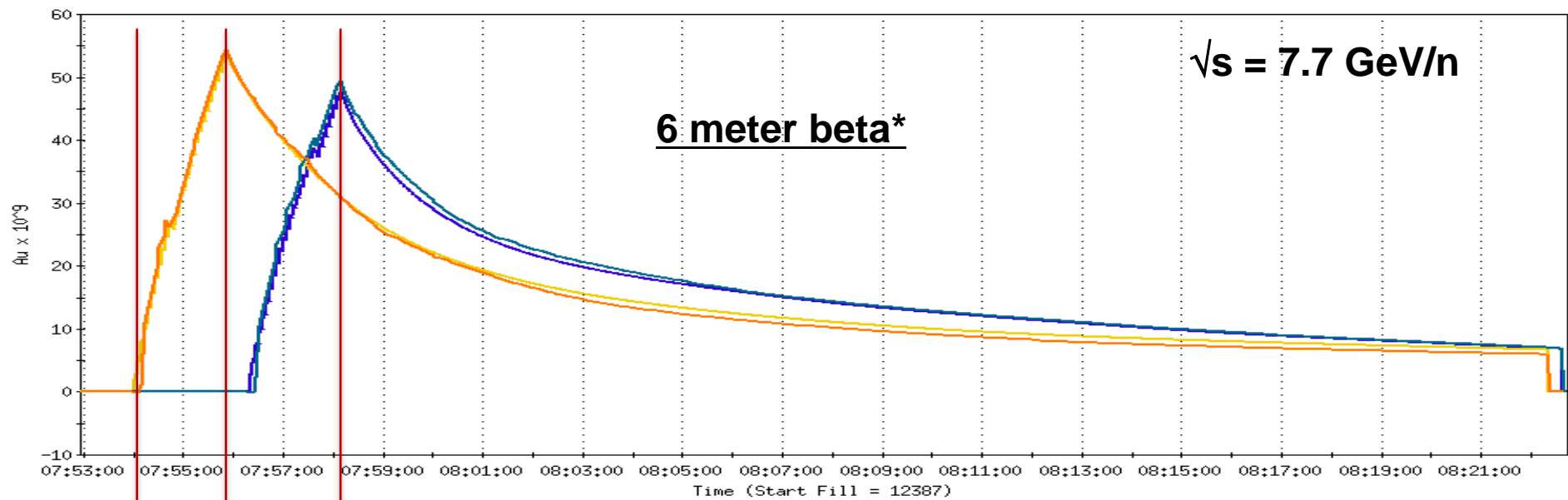
- Luminosity Sampled/Delivered = ?/? μb^{-1}
 - 5M Min-bias events

- PHENIX

- $\sqrt{s} = 7.7 \text{ GeV/n}$

- Luminosity Recorded/Delivered = ?/? μb^{-1}
 - 0.5M Min-bias events





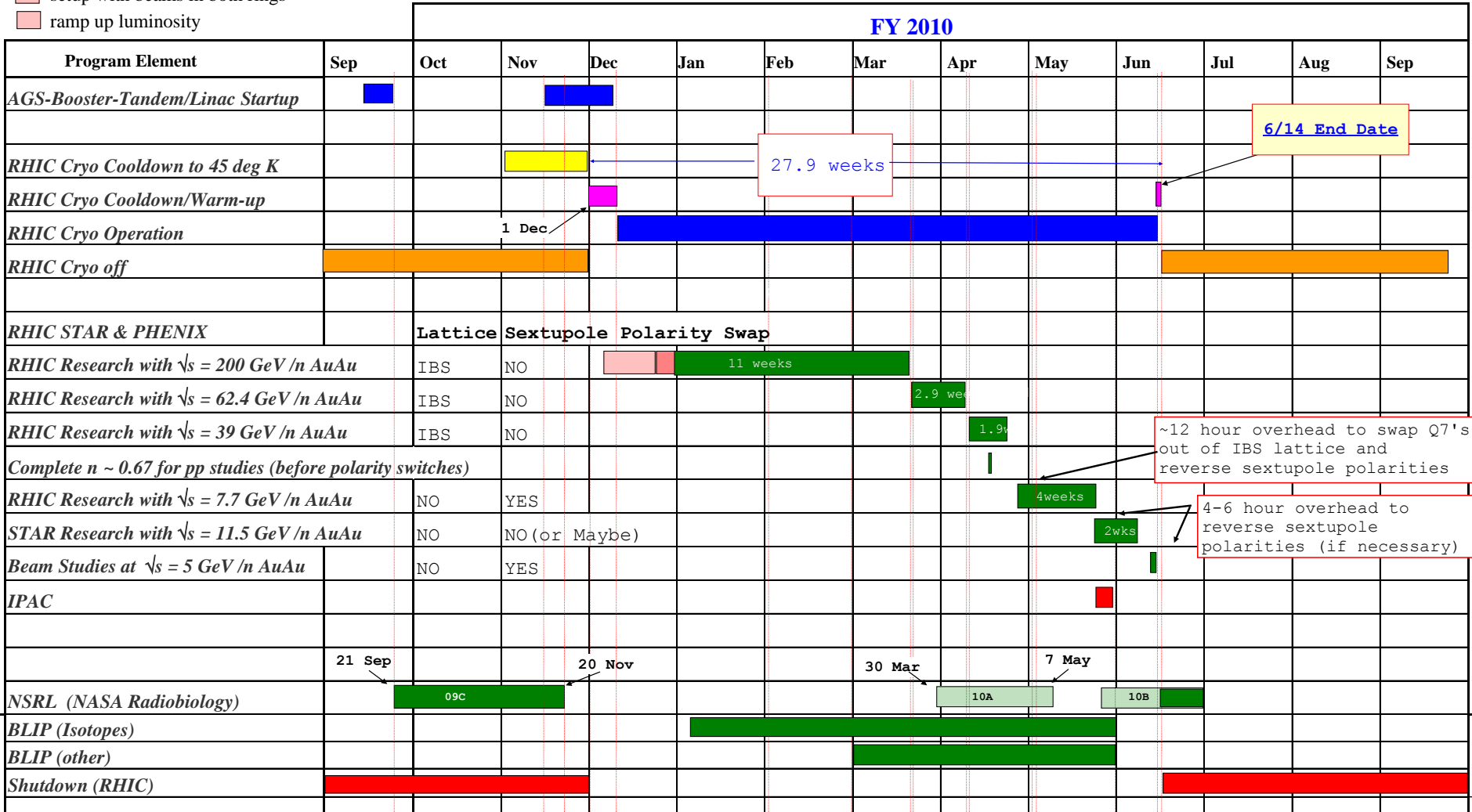
Some Issues

- Understanding beam lifetime
- Optimum store length
- Need new estimate for $\sqrt{s} = 11.5$ GeV/n event rate
- Should we still plan on $\sqrt{s} = 5$ GeV/n development?

C-A Operations-FY10

as run/planned

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



6/14 End Date

27.9 weeks

1 Dec

~12 hour overhead to swap Q7's out of IBS lattice and reverse sextupole polarities

4-6 hour overhead to reverse sextupole polarities (if necessary)

Table 6: Detailed plan for Run-10.

PHENIX BUR

	$\sqrt{s_{NN}}$	weeks	events	comment
cooldown		2		
Au+Au start/rampup	200	3		
Au+Au physics	200	10		record 1.4nb ⁻¹
	62.4	3.5	350M	← (Actual 2.9 weeks, 660M)
	≈ 39	1.6	50M	← (Actual 1.9 weeks, 250M)
	27	4.5	25M	
p+p development	500	4		PHENIX ops as needed
p+p physics	22.4	1	2.5B	
warm-up		0.5		
TOTAL		30		

Table II: Detailed breakdown of Critical Point search and Beam Energy Scan

STAR BUR

Beam Energy	Event Rate	8-hr Days/ 1M Events	Events proposed	8-hr days proposed
5	0.8	45	100 k	5
7.7	3	11	5 M	56
11.5	10	3.7	5M	19
17.3	33	1.1	15M	16
27	92	0.4	33M	12
39	190	0.2	24M	5

Actual Average ZDC Rate ~1200 Hz



190

←

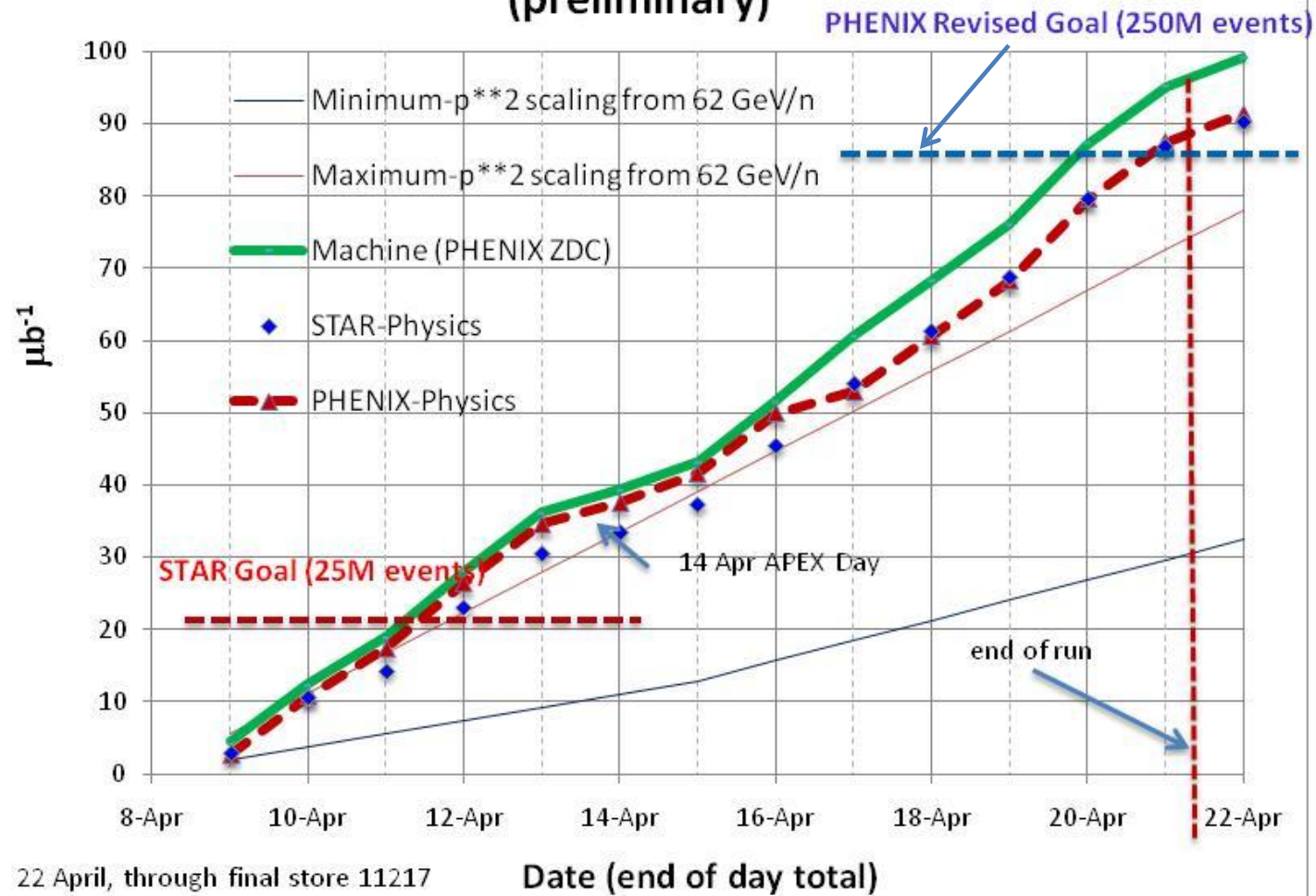
(Actual 1.9 weeks, ~250M)

Archive

Future Topics

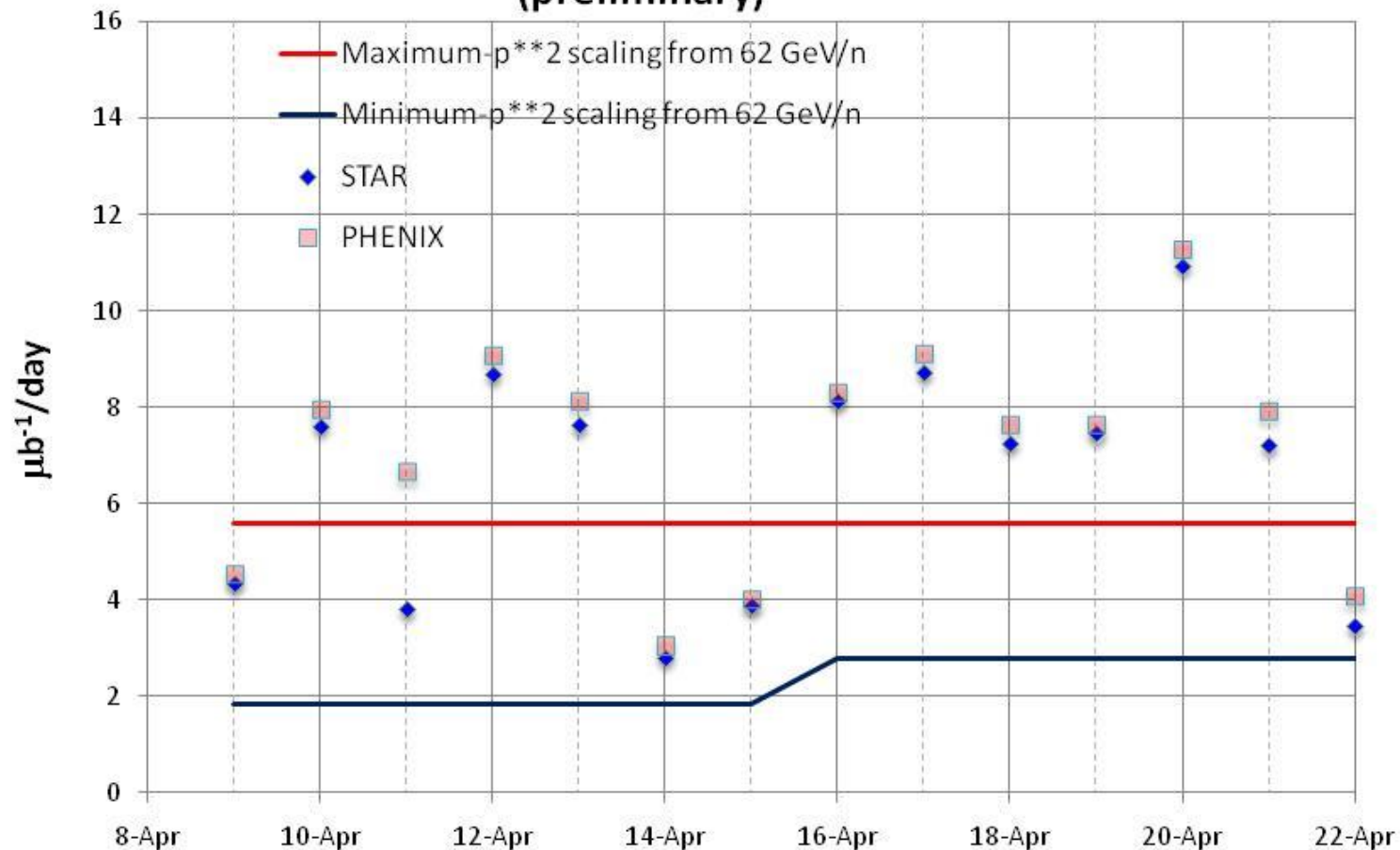
- Toward Smaller β^* - new quad triplets – D. Trbojevic

Run 10 $\sqrt{s} = 39$ GeV/n Au Delivered Luminosity (preliminary)



22 April, through final store 11217
preliminary

Run 10, $\sqrt{s} = 39$ GeV/n Au Delivered Luminosity per day (preliminary)

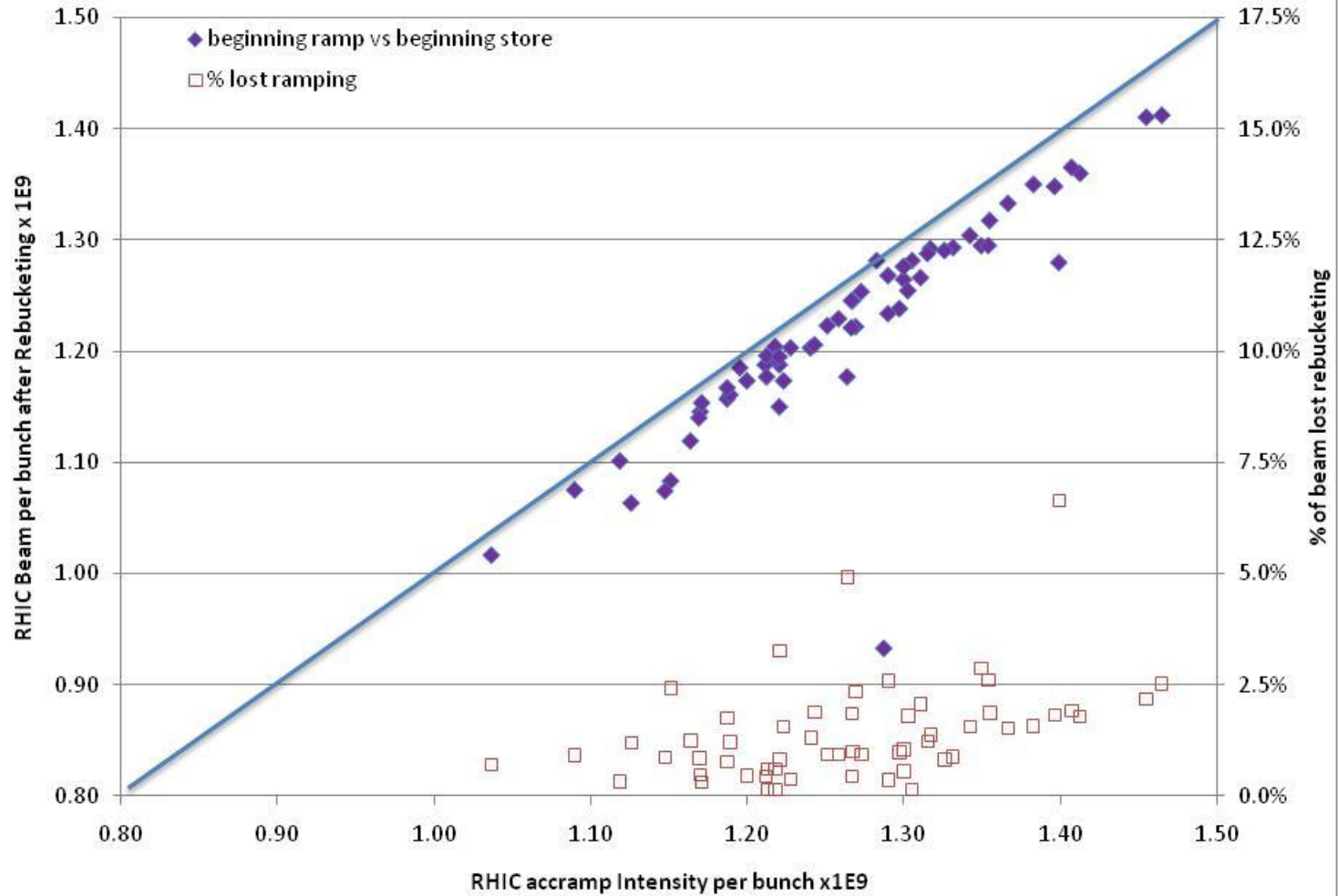


22 April, through final store 11217
preliminary

Date (end of day total)

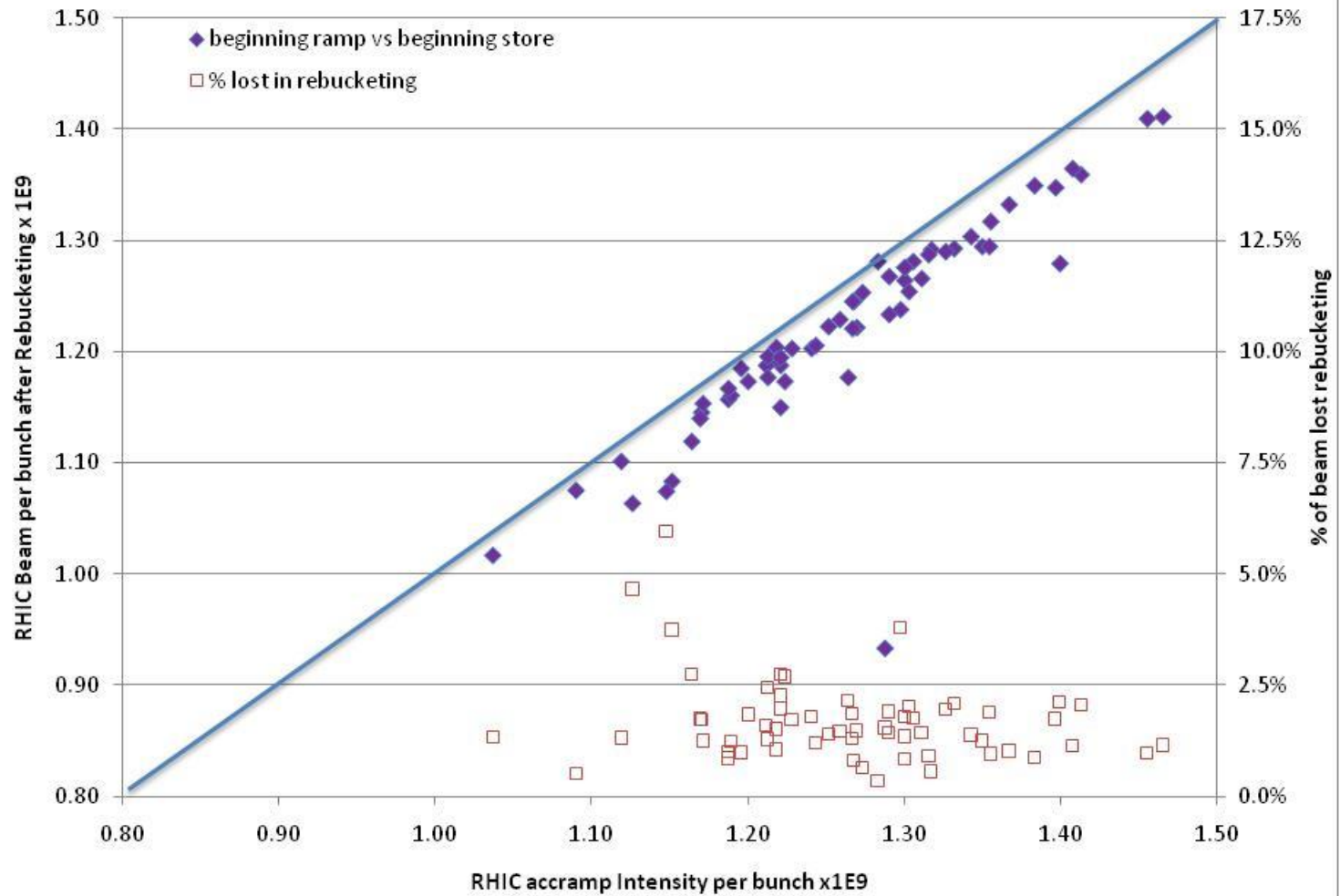
22 April, through final store 11217
preliminary

Run 10, 39 GeV AuAu



22 April, through final store 11217
preliminary

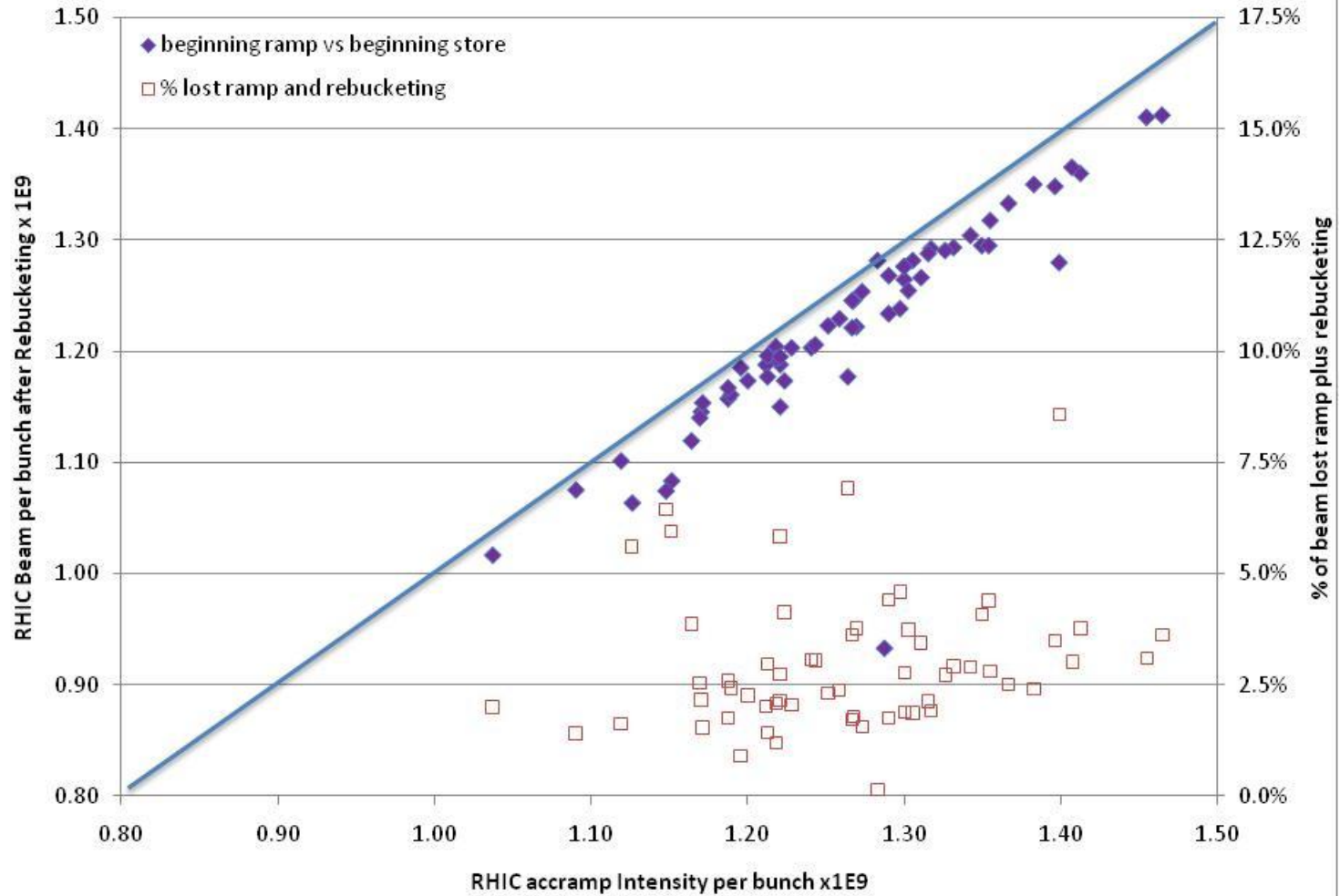
Run 10, 39 GeV AuAu



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preliminary

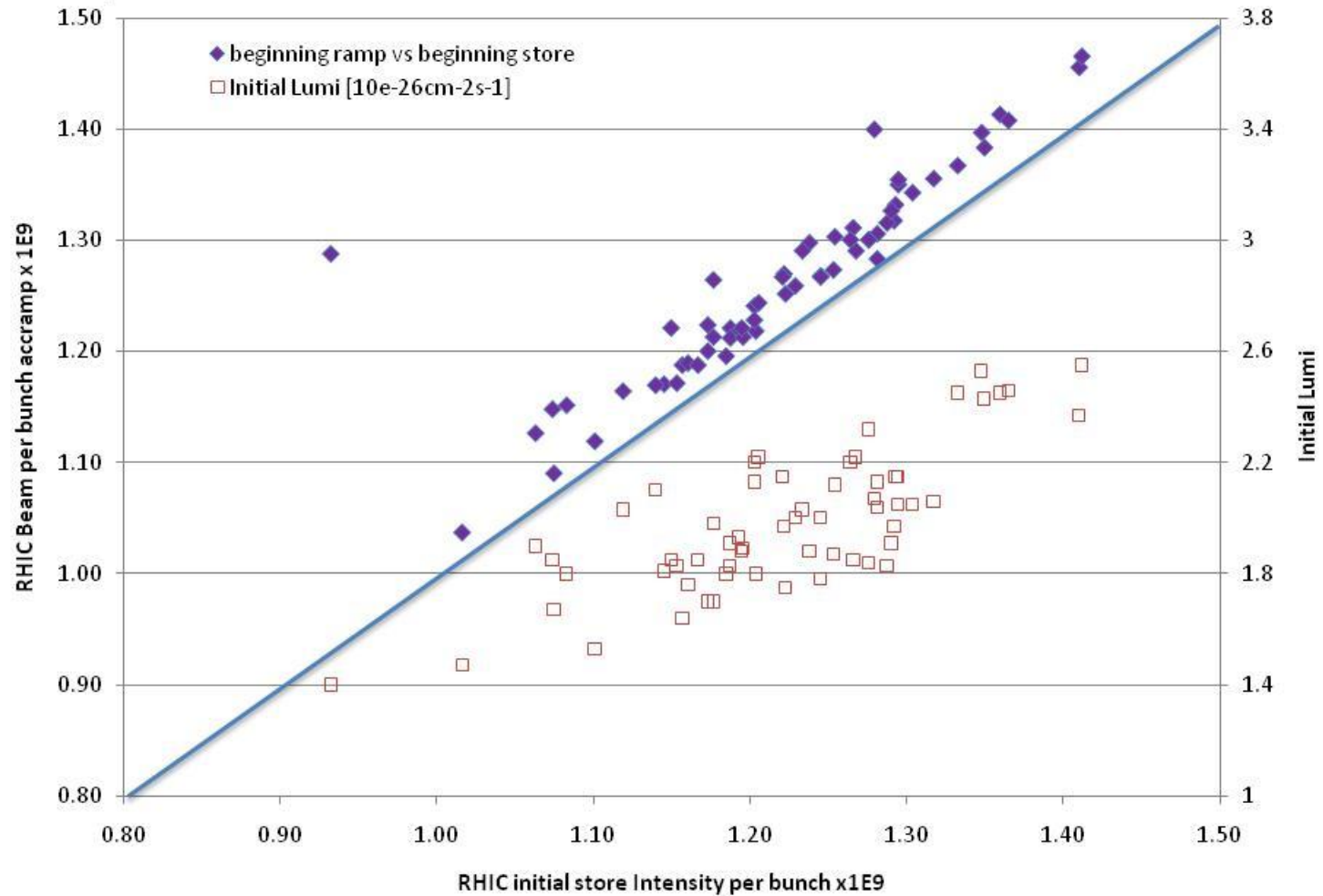
Run 10, 39 GeV AuAu



22 April, through final store 11217

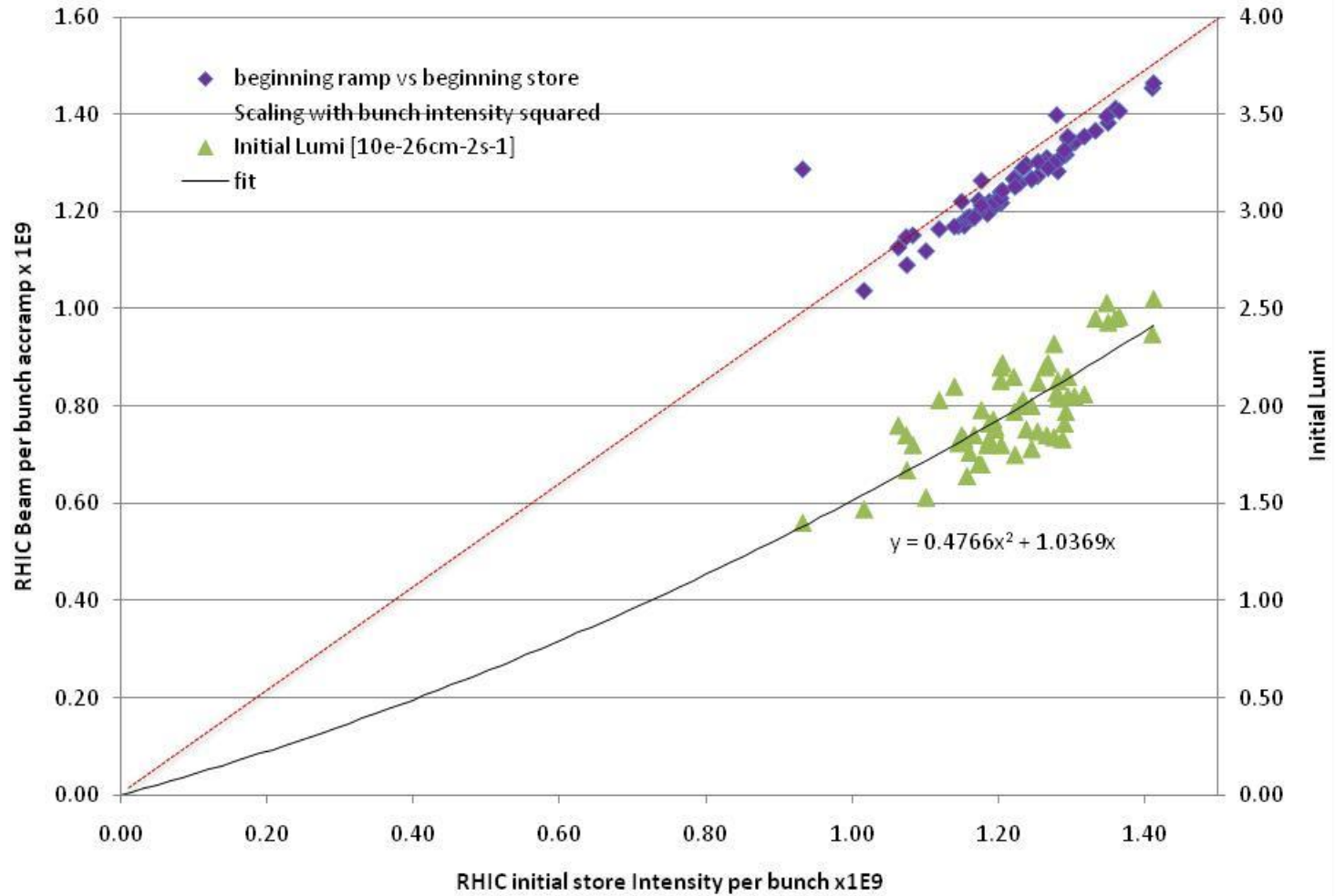
preliminary

Run 10, 39 GeV AuAu

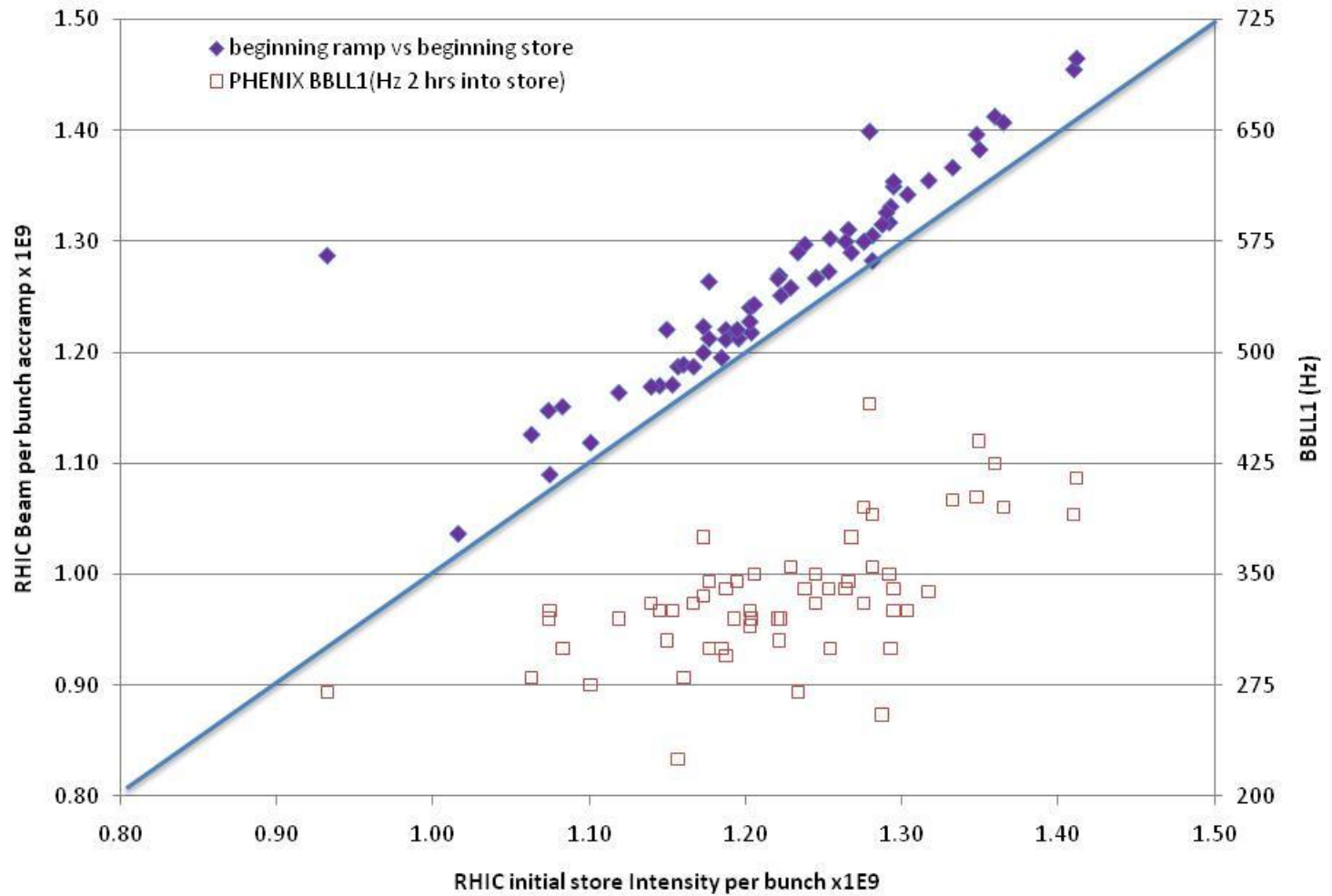


22 April, through final store 11217
preliminary

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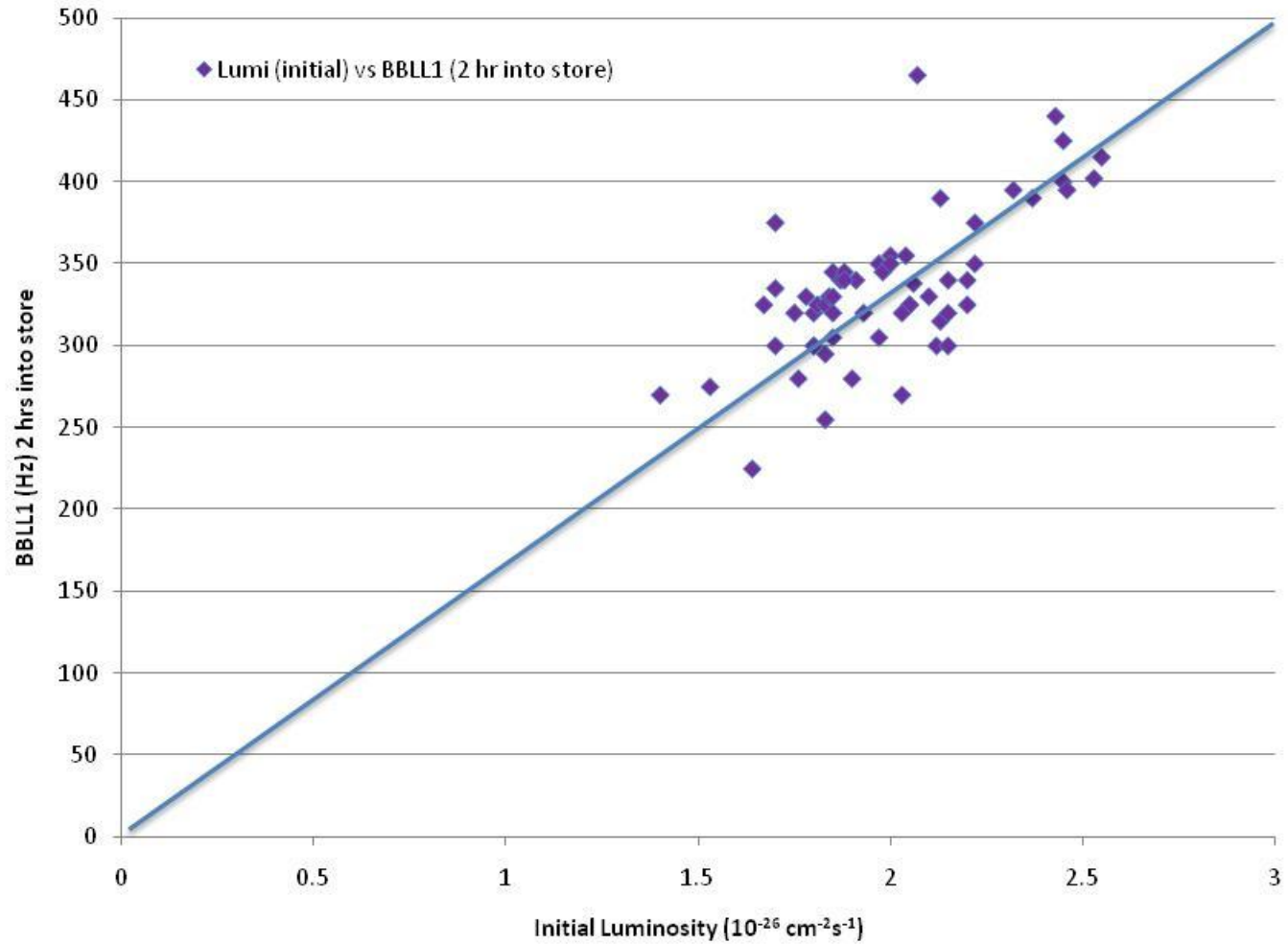


Run 10, 39 GeV AuAu



22 April, through final store 11217
preliminary

Run 10, 39 GeV AuAu



Run 10 Au-Au Goals, $\sqrt{s} = 39 \text{ GeV/n}$

4/13/10

- STAR

- $\sqrt{s} = 39 \text{ GeV/n}$

- Luminosity Sampled/Delivered = ?/? μb^{-1}

- 24M Min-bias events

- PHENIX

- $\sqrt{s} = 39 \text{ GeV/n}$

- Luminosity Recorded/Delivered = ?/? μb^{-1}

- 50M Min-bias events <30 cm vertex, (revised request 250M)

We should revisit Luminosity Projections

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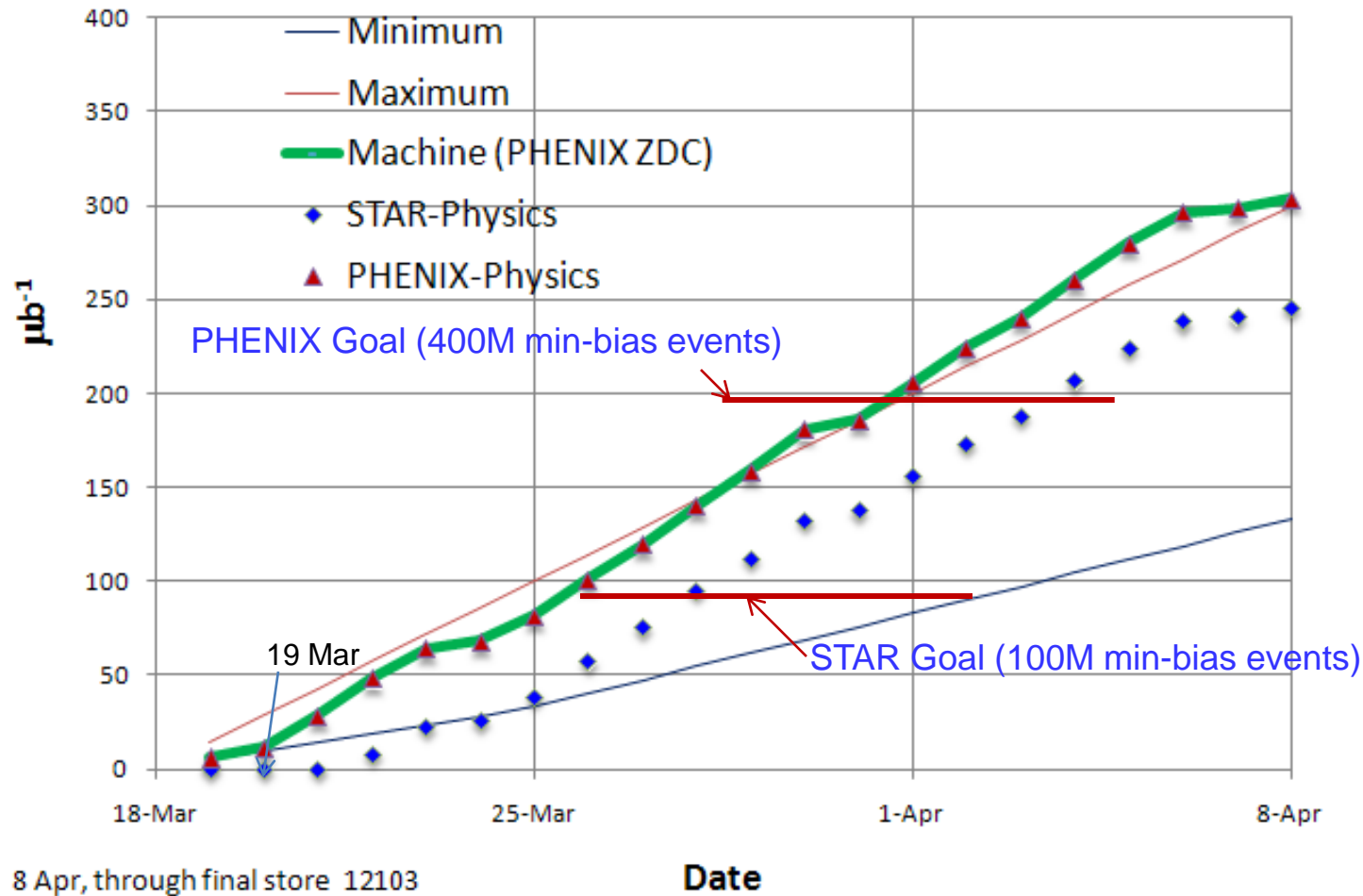
STAR BUR

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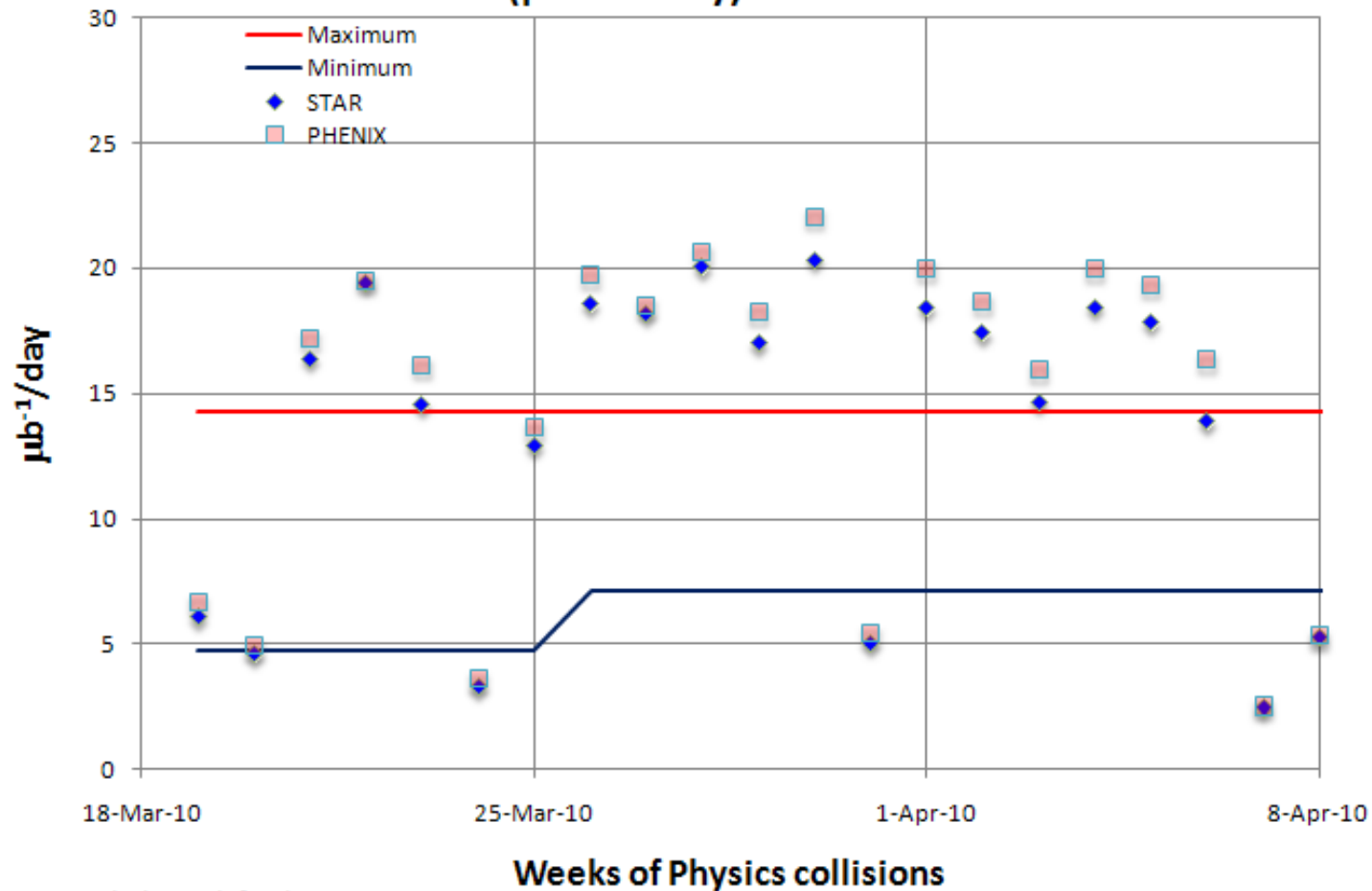
Actual Average ZDC Rate ~1200 Hz →



Run 10 31 x 31 GeV/n Au Delivered Luminosity (preliminary)



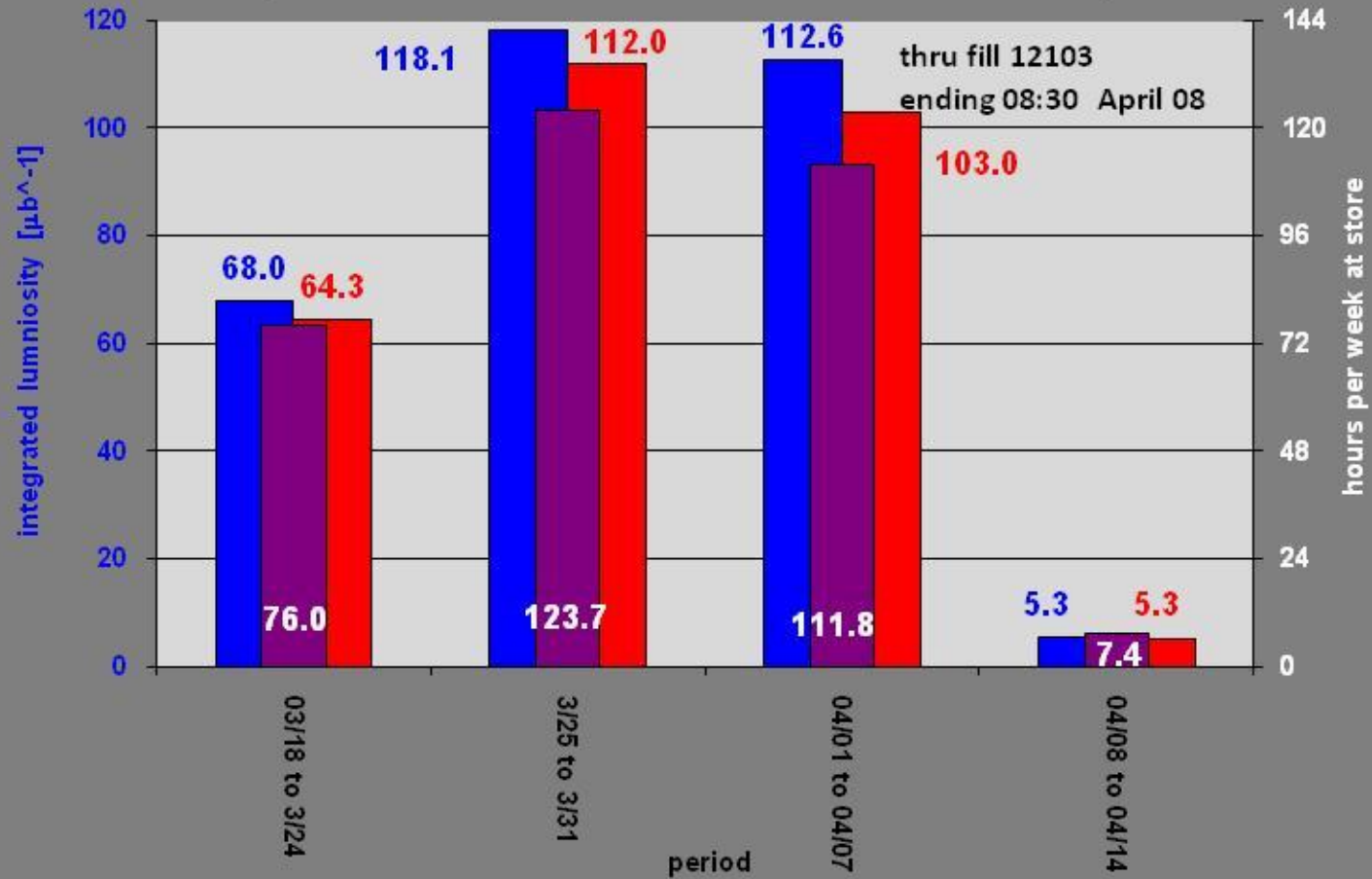
Run 10, 31 x 31 GeV/n Au Delivered Luminosity per day (preliminary)



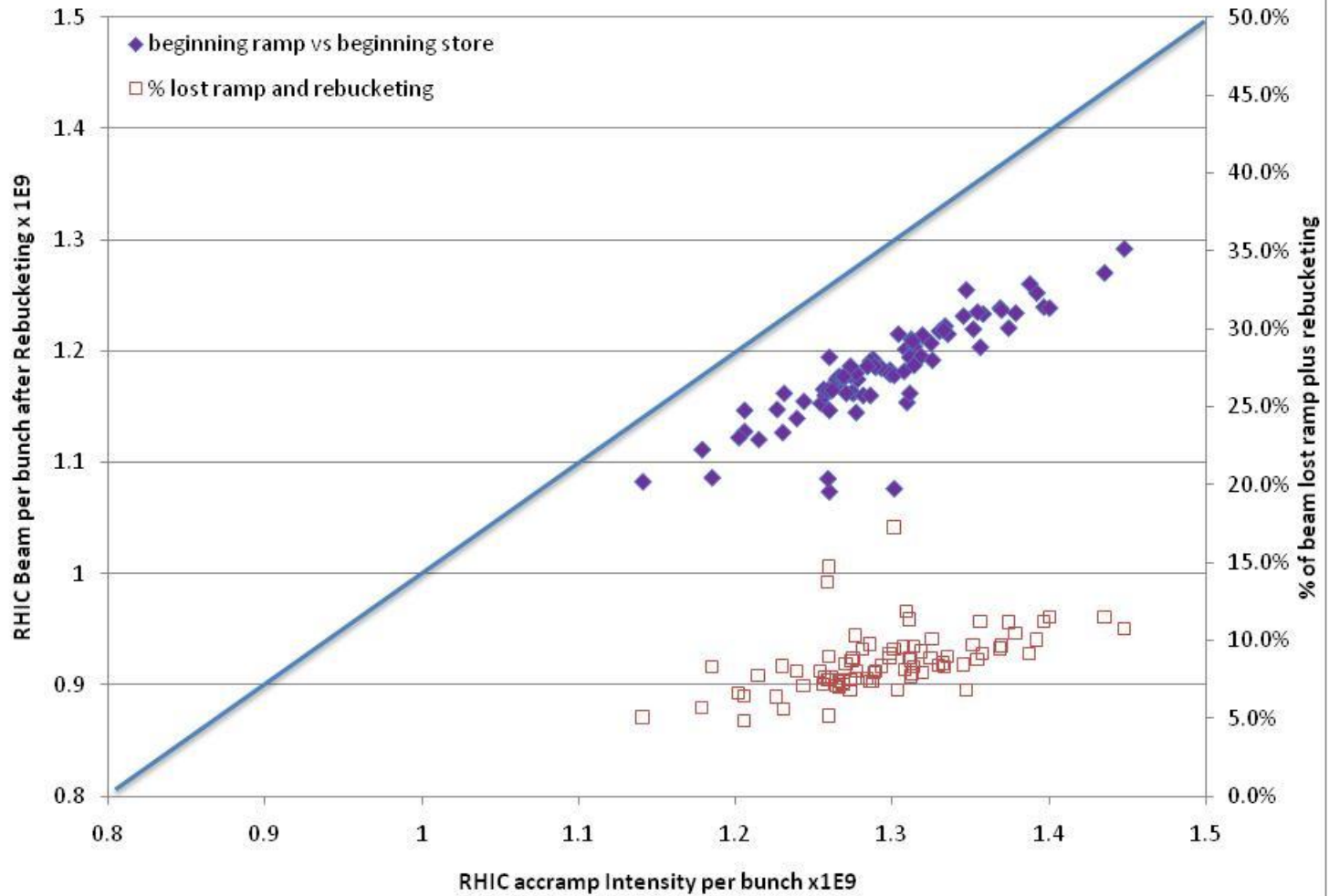
8 April, through final store 12103

Run 10 (AuAu) -- Integrated Luminosity by week

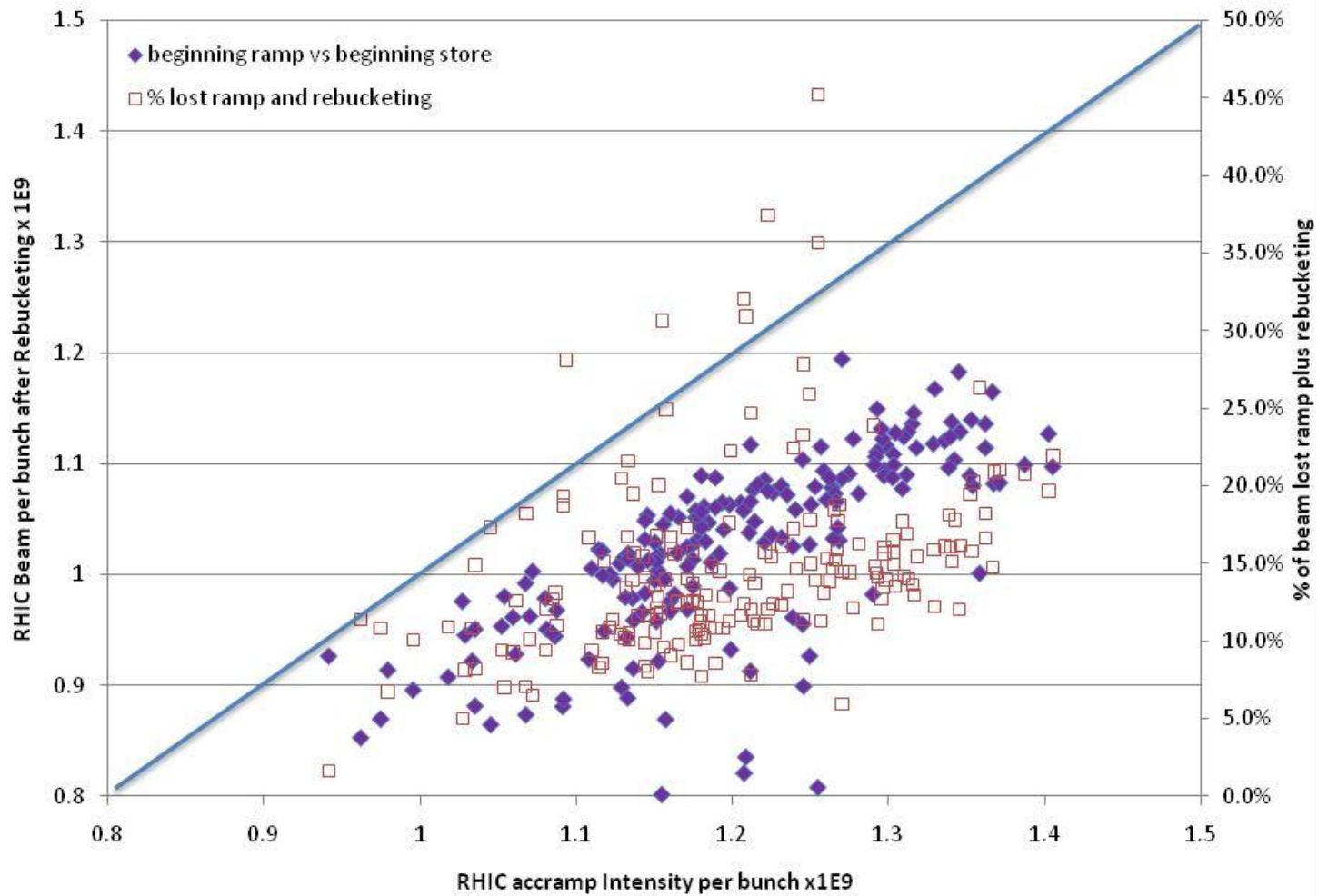
$\sqrt{s} = 62 \text{ GeV/n}$
final



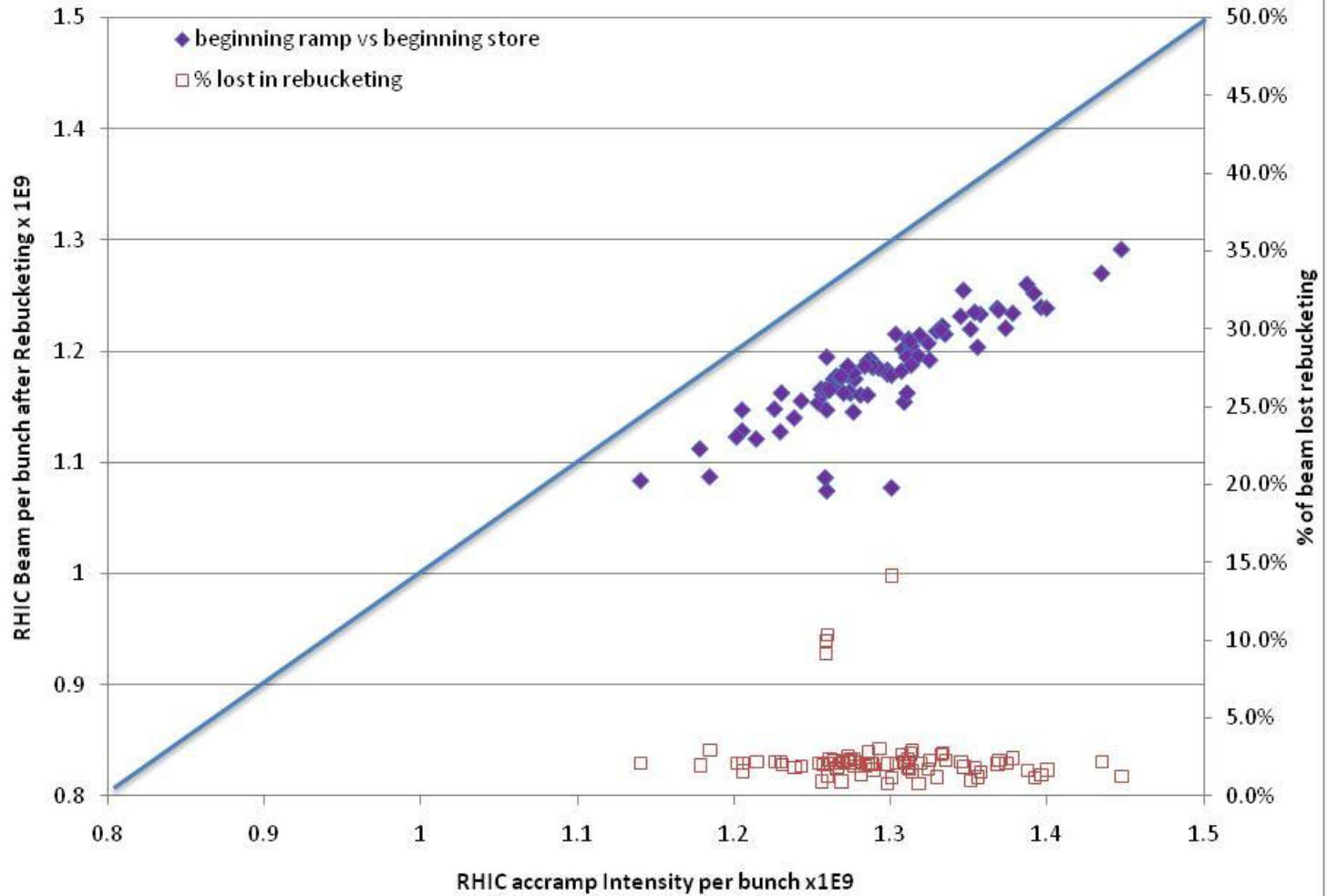
Run 10, 62 GeV AuAu



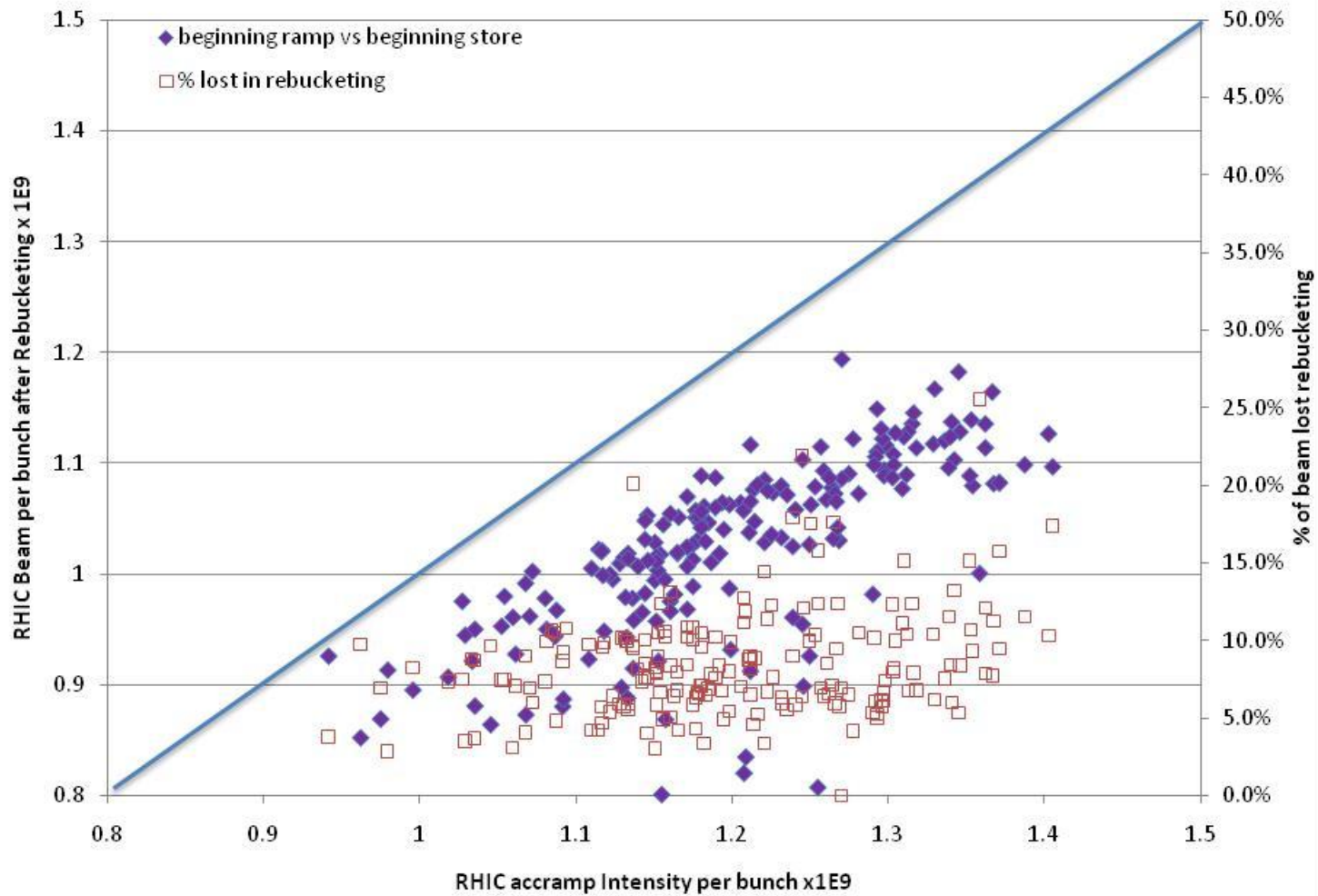
Run 10, $\sqrt{s} = 200$ GeV AuAu



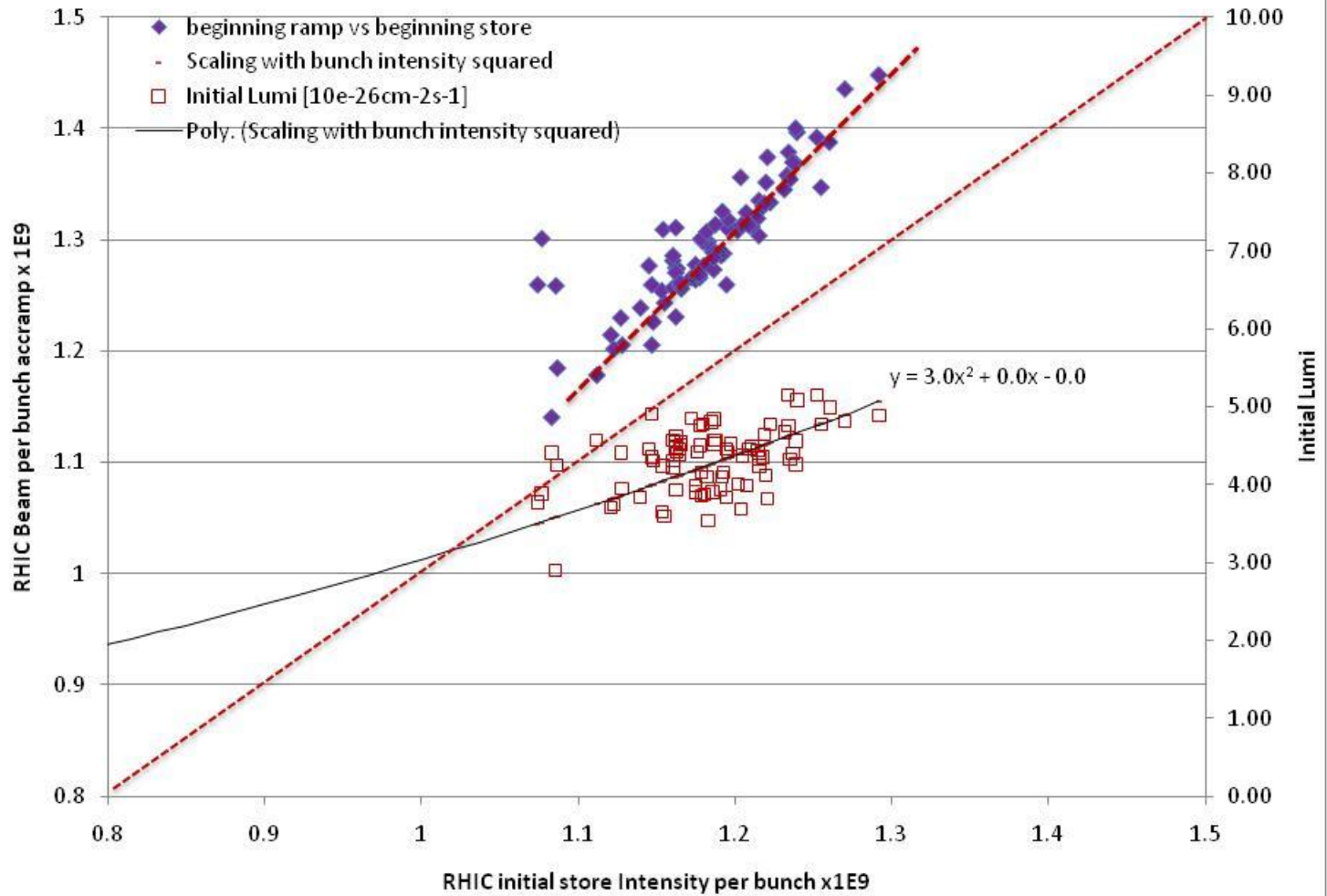
Run 10, 62 GeV AuAu



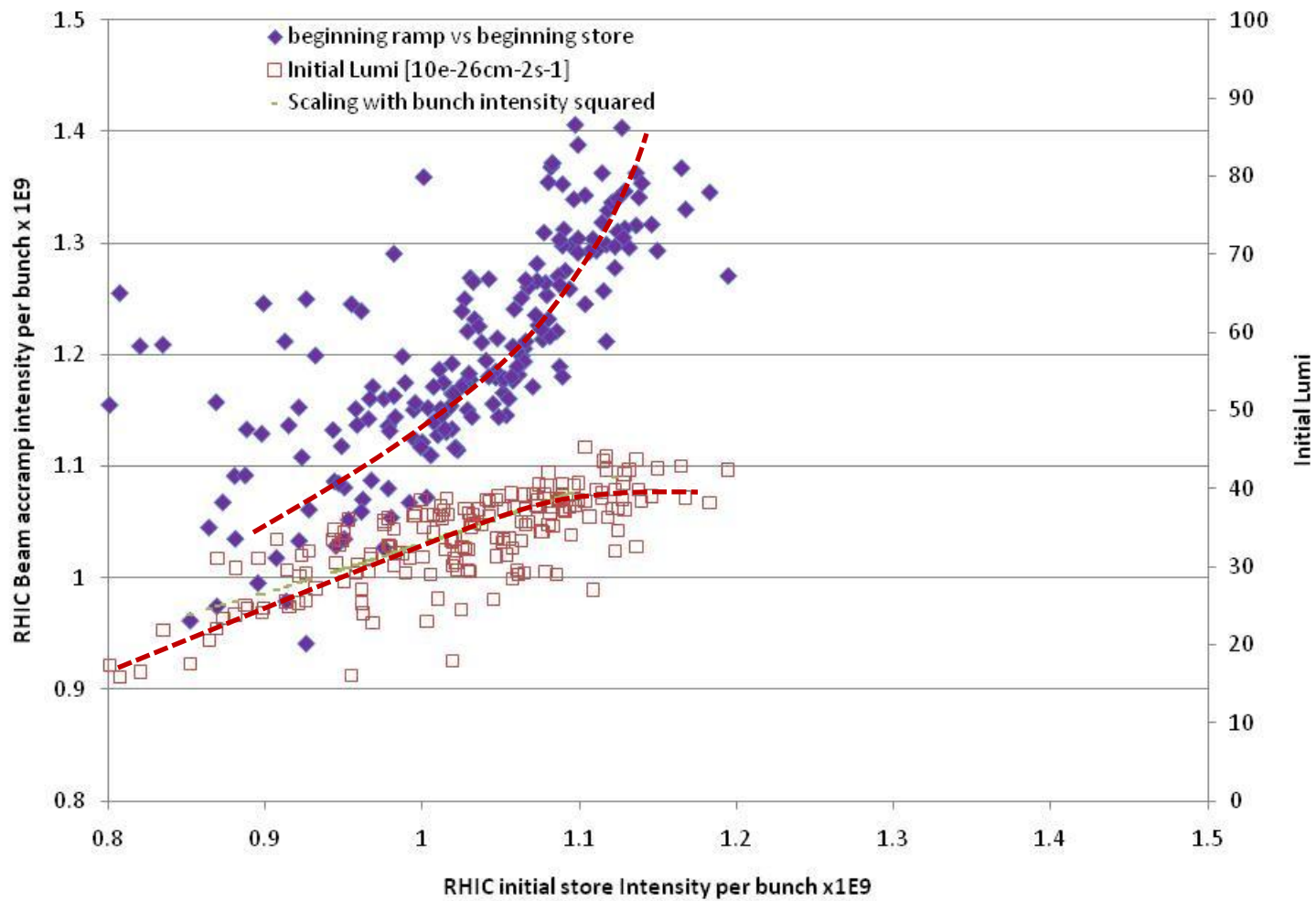
Run 10, $\sqrt{s} = 200$ GeV AuAu



Run 10, 62 GeV AuAu



Run 10, $\sqrt{s} = 200$ GeV AuAu



Run 10 Au-Au Goals

3/30/10

- STAR

- $\sqrt{s} = 62 \text{ GeV/n}$

- Luminosity Sampled/Delivered = ?/90 μb^{-1}

- 100M Min-bias events

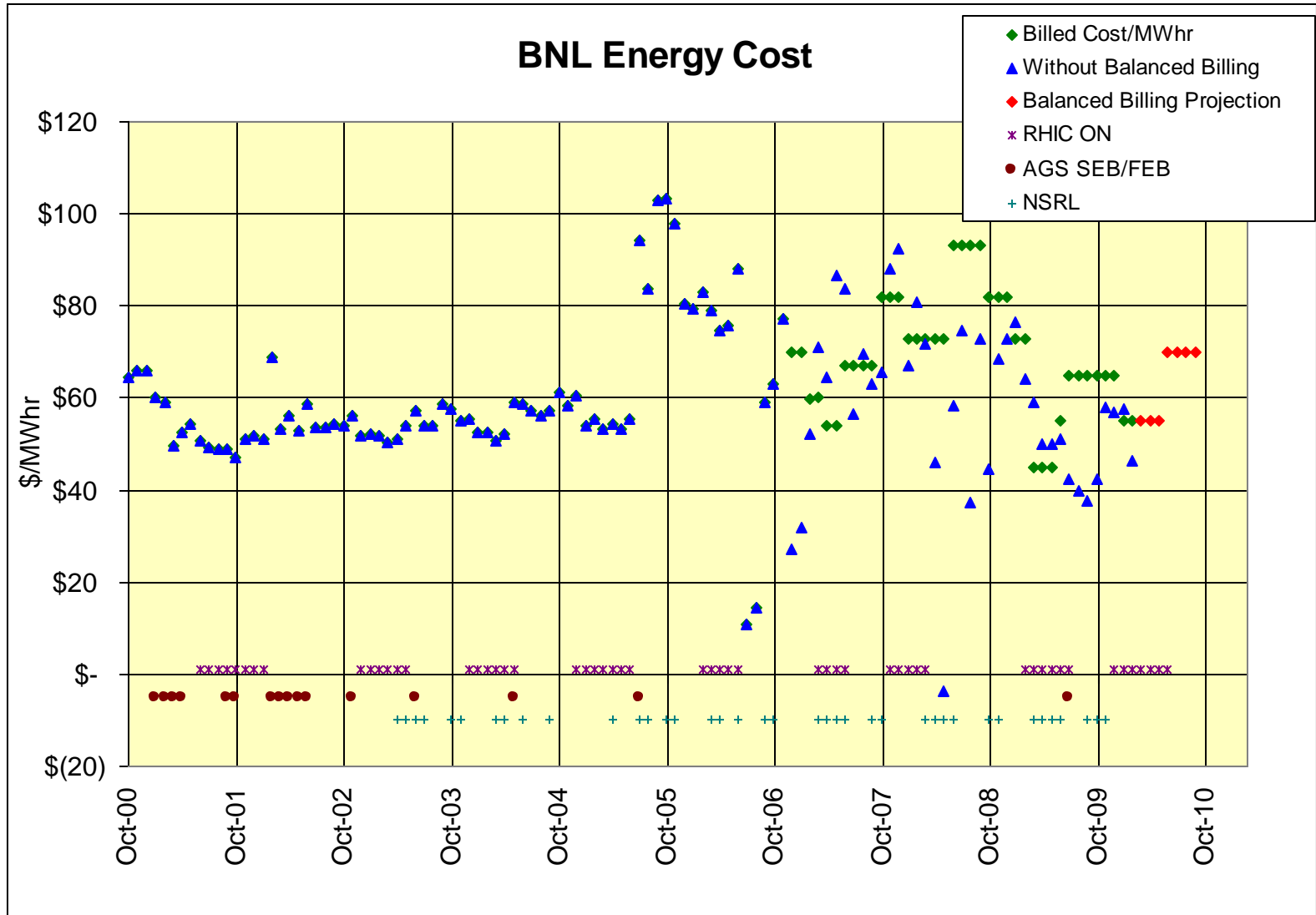
- PHENIX

- $\sqrt{s} = 62 \text{ GeV/n}$

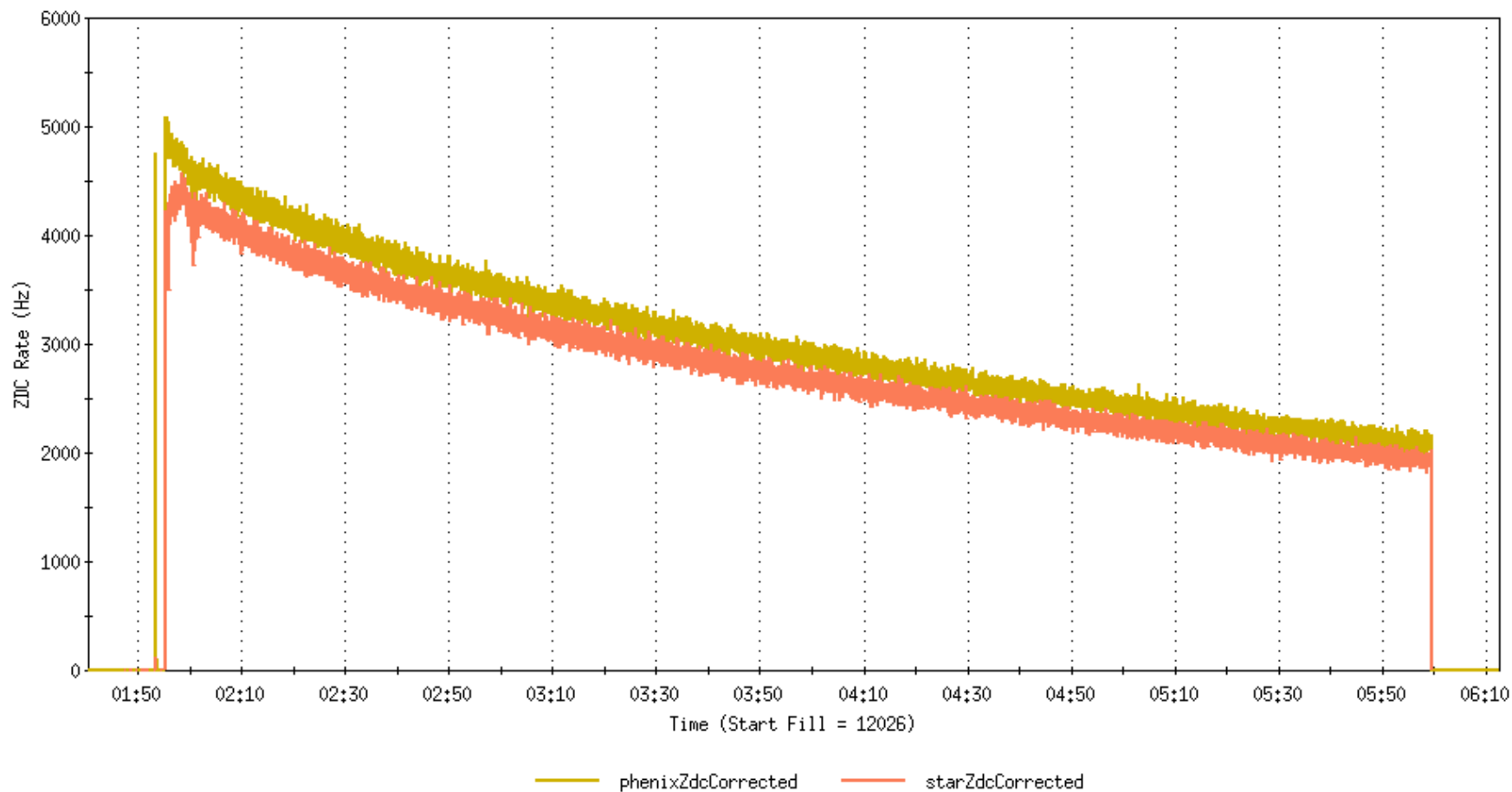
- Luminosity Recorded/Delivered = 64/193 μb^{-1}

- 400M Min-bias events

Through Feb 2010

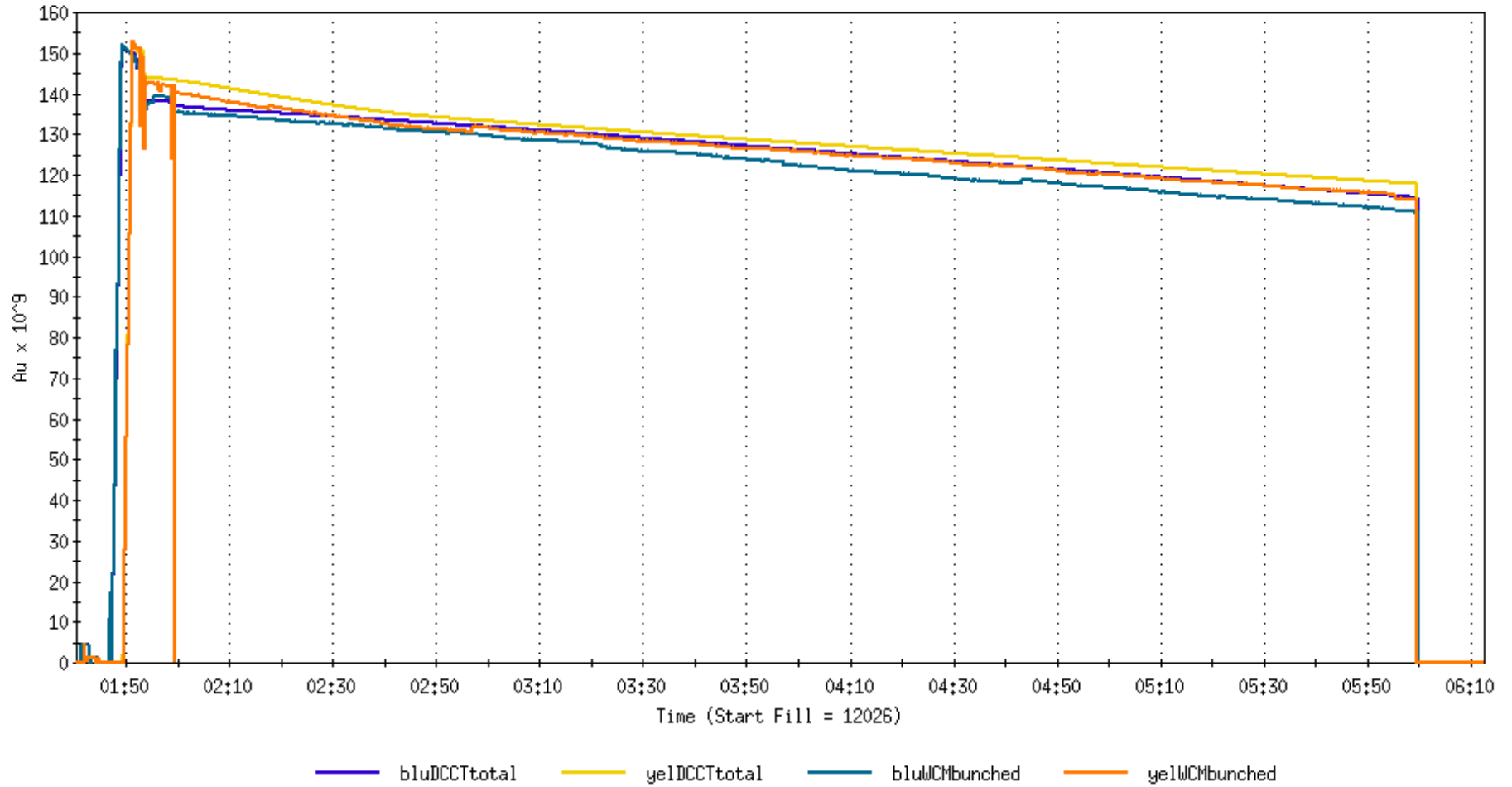


First Store Monday, 29 March, Store 12026

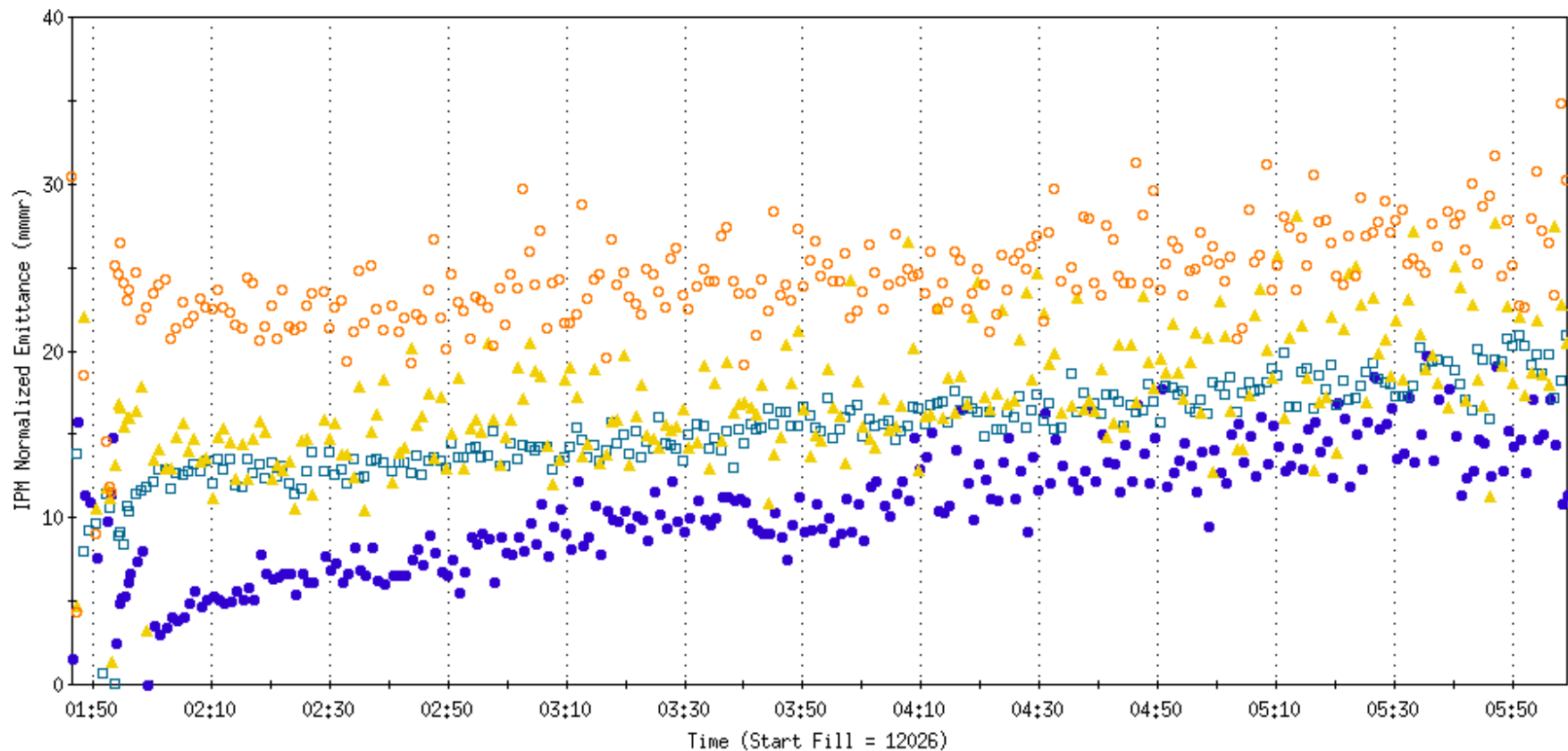


First Store Monday, 29 March, Store 12026

RHIC - DCCT total beam & WCM bunched beam

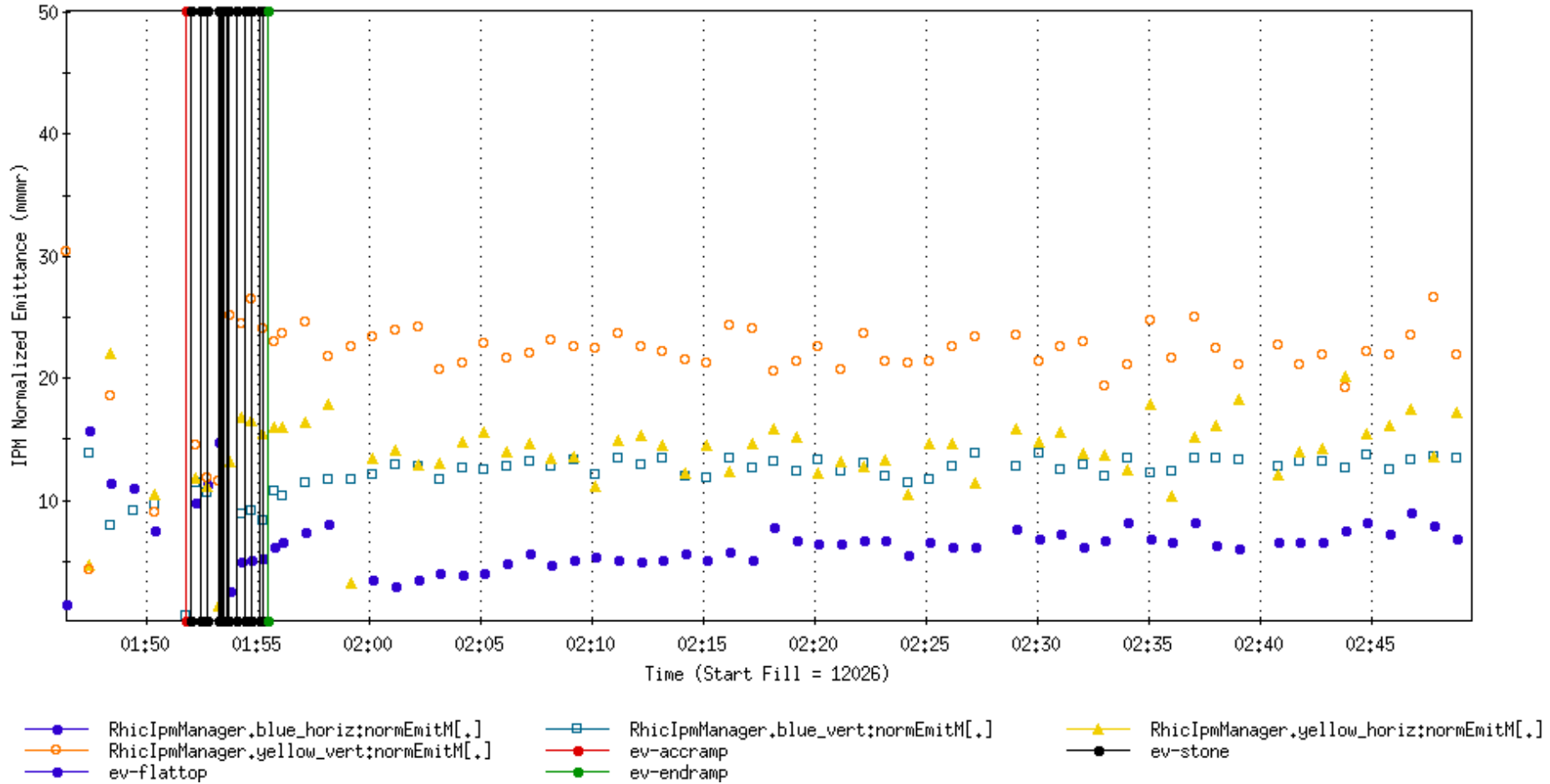


First Store Monday, 29 March, Store 12026

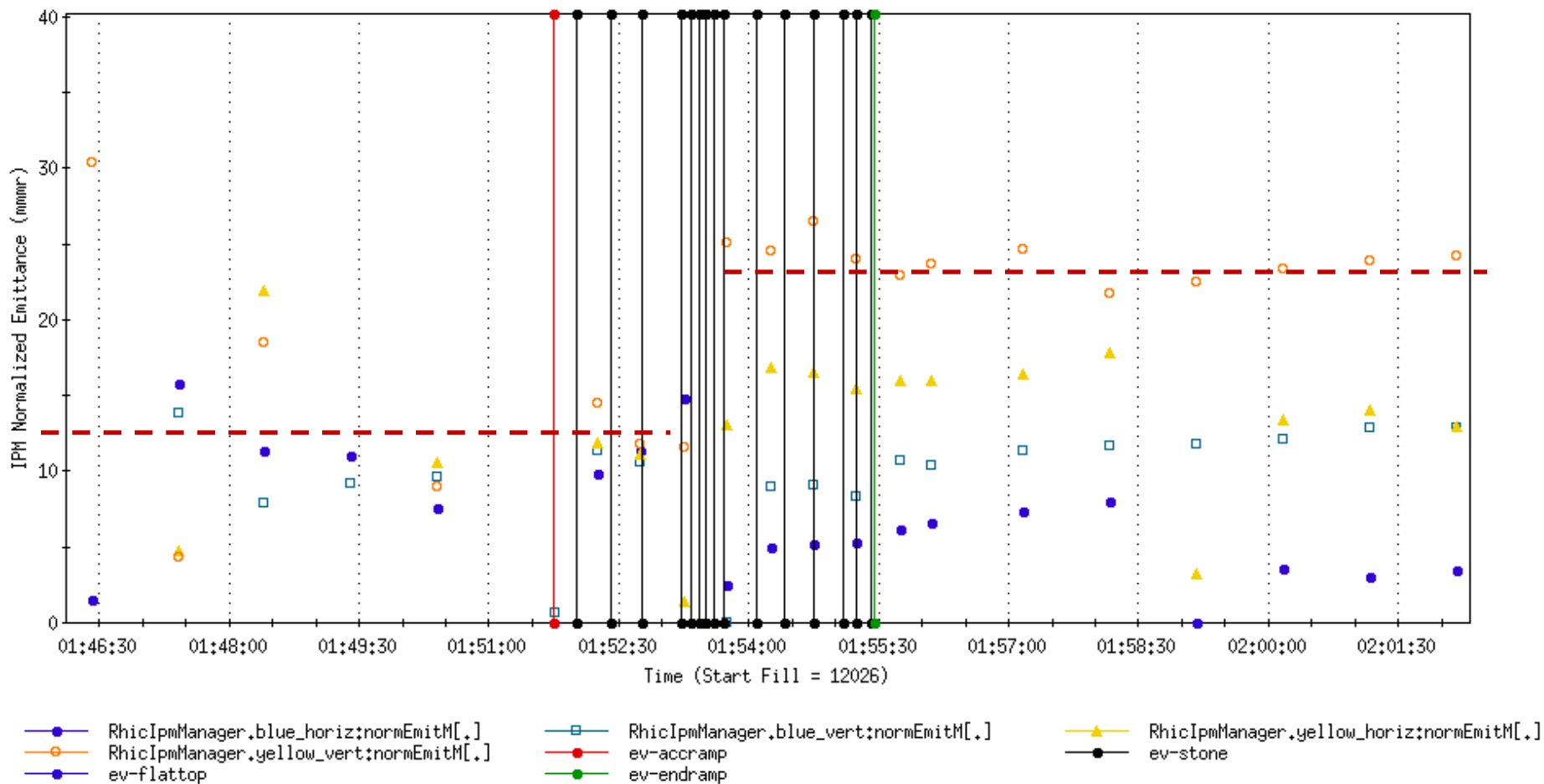


- RhicIpmManager.blue_horiz;normEmitM[.]
- ▲ RhicIpmManager.yellow_horiz;normEmitM[.]
- RhicIpmManager.blue_vert;normEmitM[.]
- RhicIpmManager.yellow_vert;normEmitM[.]

First Store Monday, 29 March, Store 12026

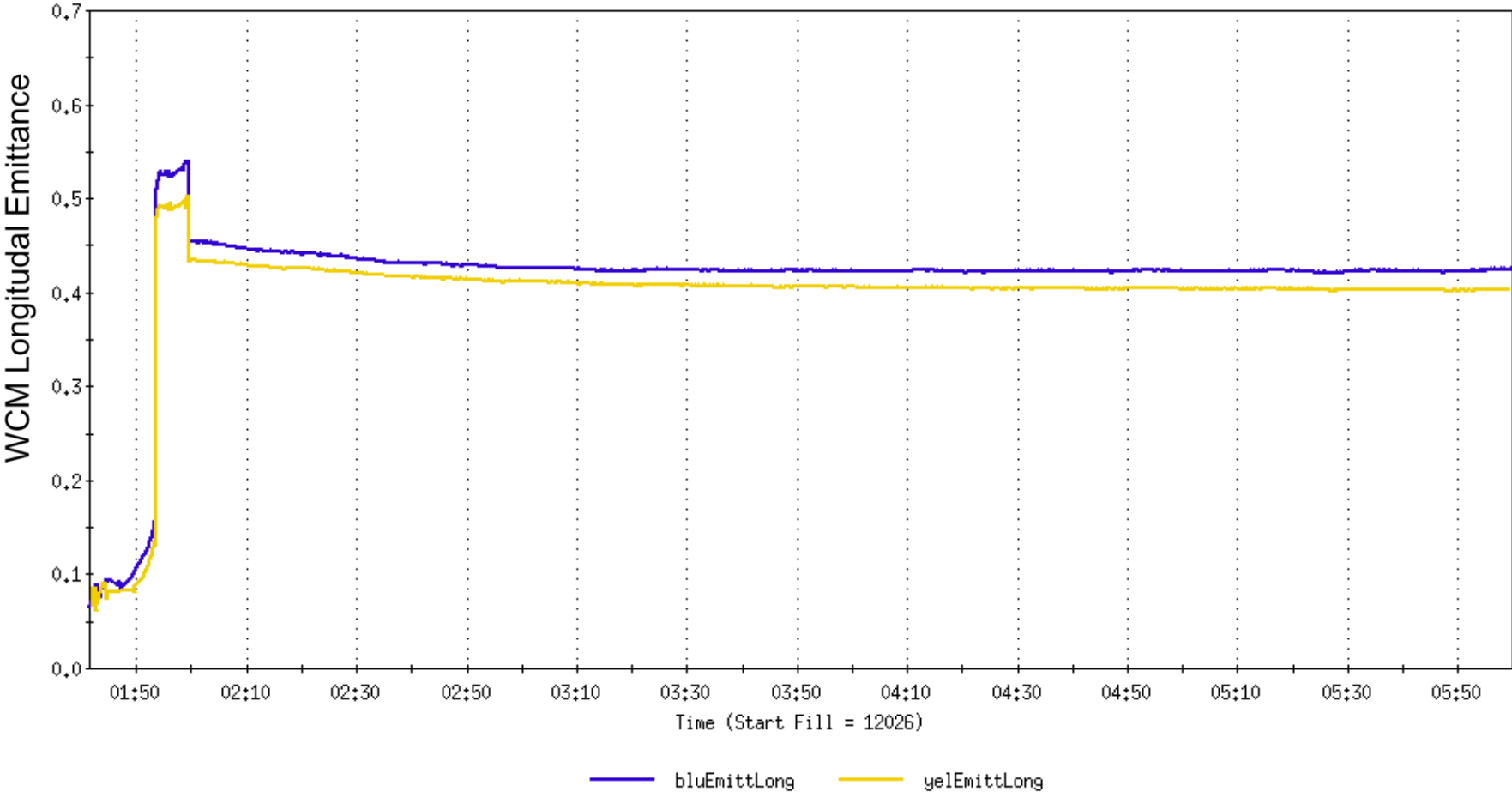


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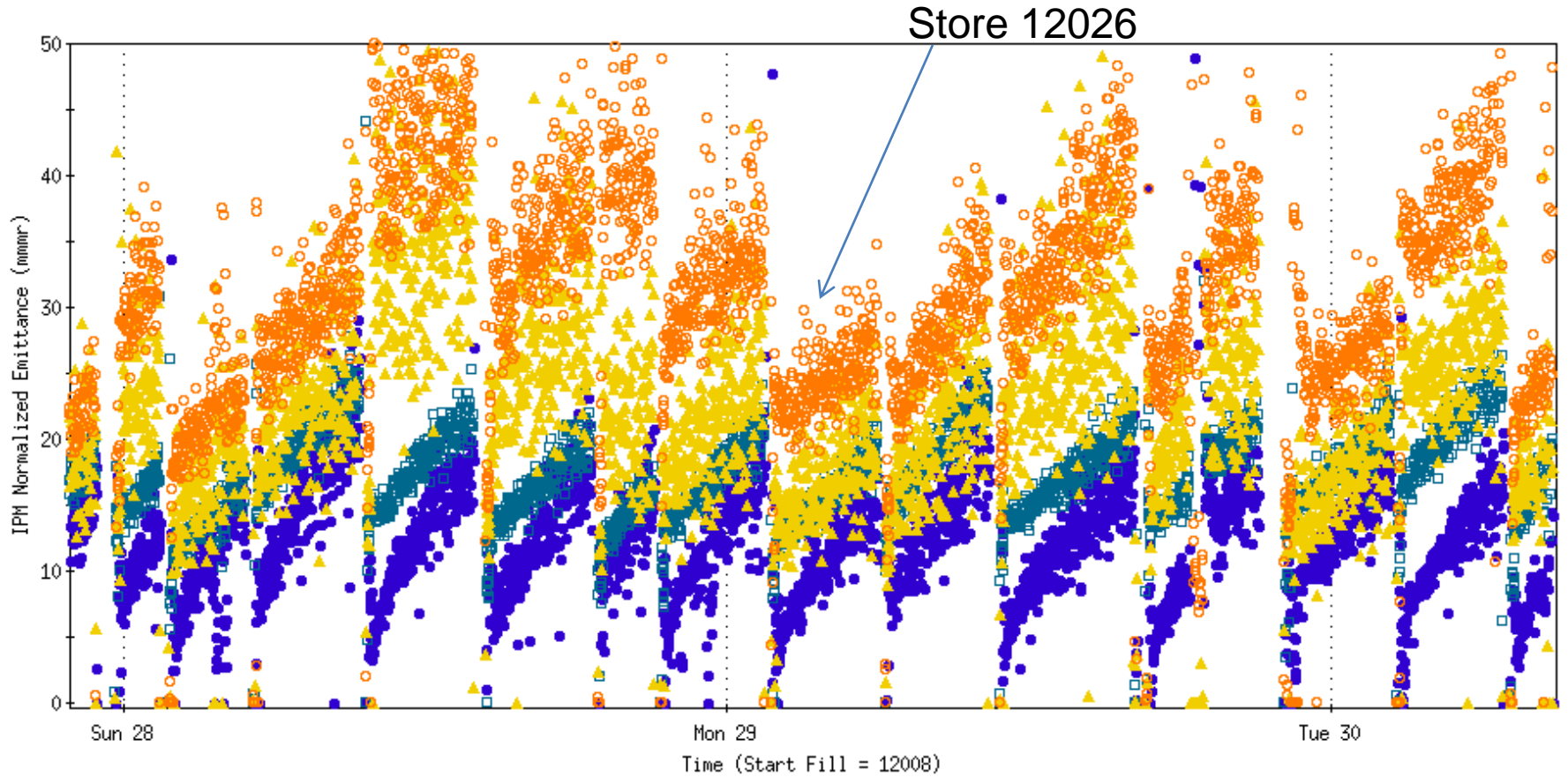


First Store Monday, 29 March, Store 12026

Long Emitt from WCM

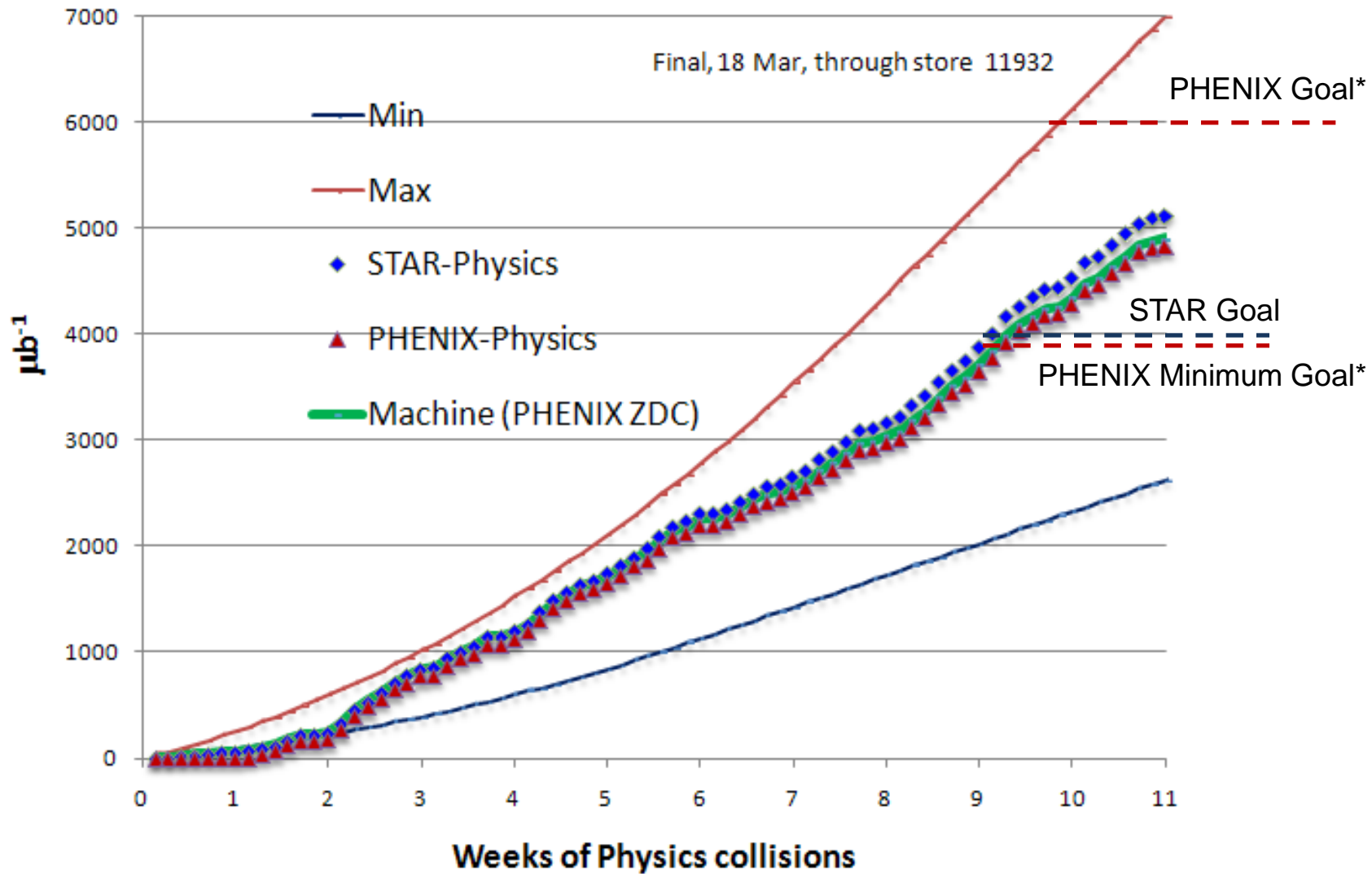


31 x 31 GeV/n Au horiz and vert emittances



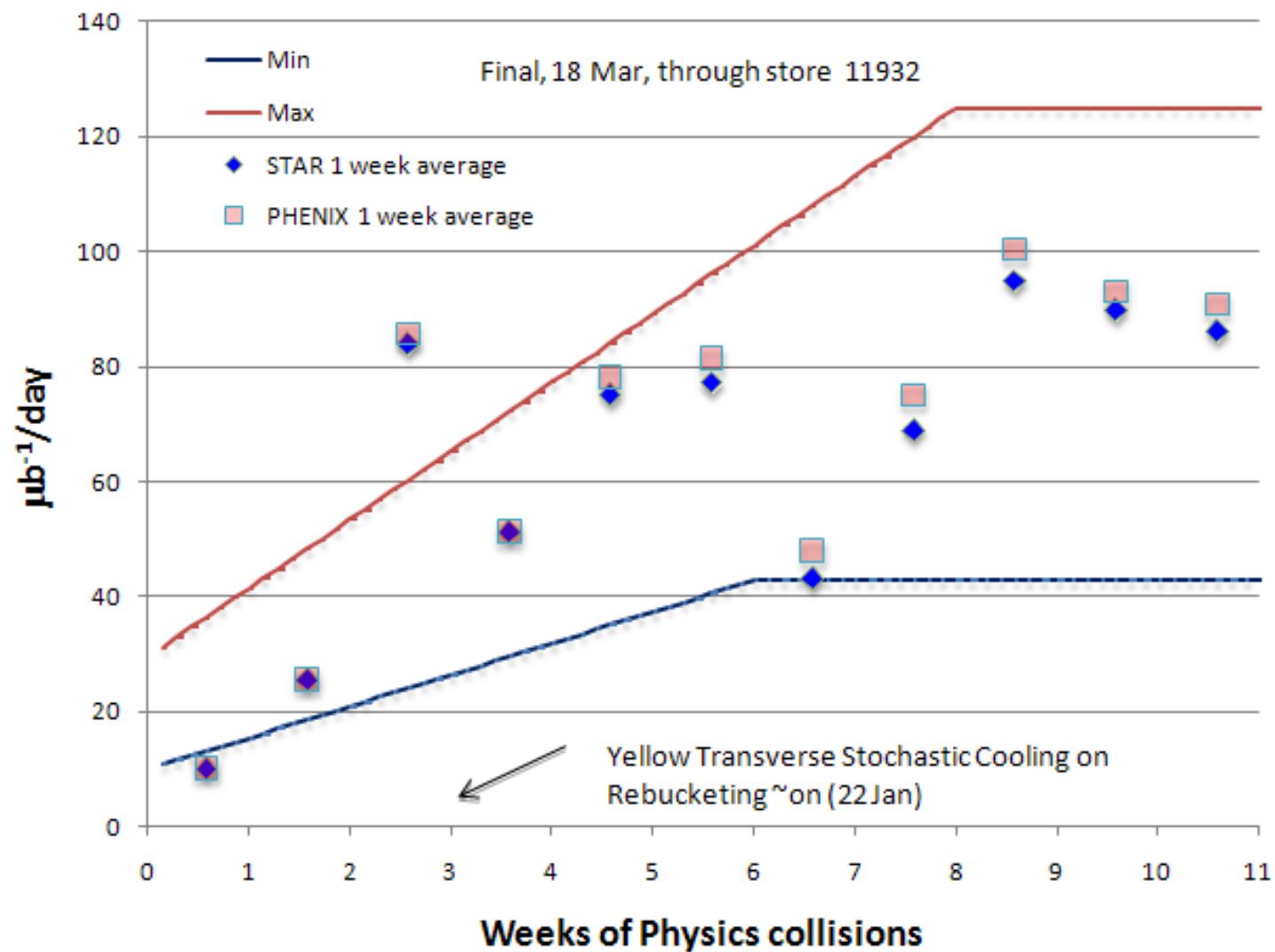
- RhicIpmManager.blue_horiz;normEmitM[.]
- RhicIpmManager.blue_vert;normEmitM[.]
- RhicIpmManager.yellow_horiz;normEmitM[.]
- RhicIpmManager.yellow_vert;normEmitM[.]

Run 10 100 x 100 GeV/n Au Delivered Luminosity



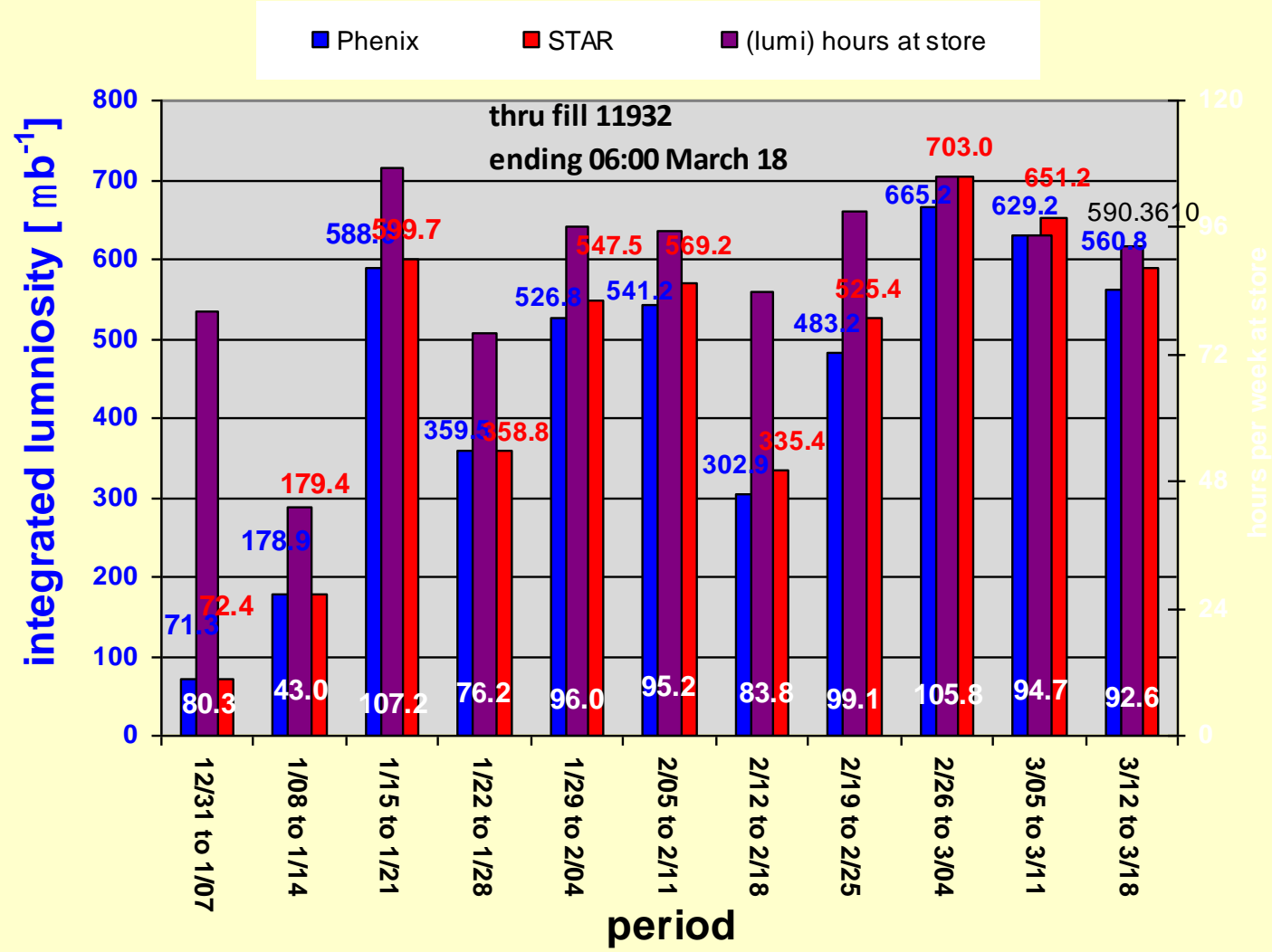
* With 20 cm sigma IR diamond

Run 10 100 x 100 GeV/n Au Delivered Luminosity per day

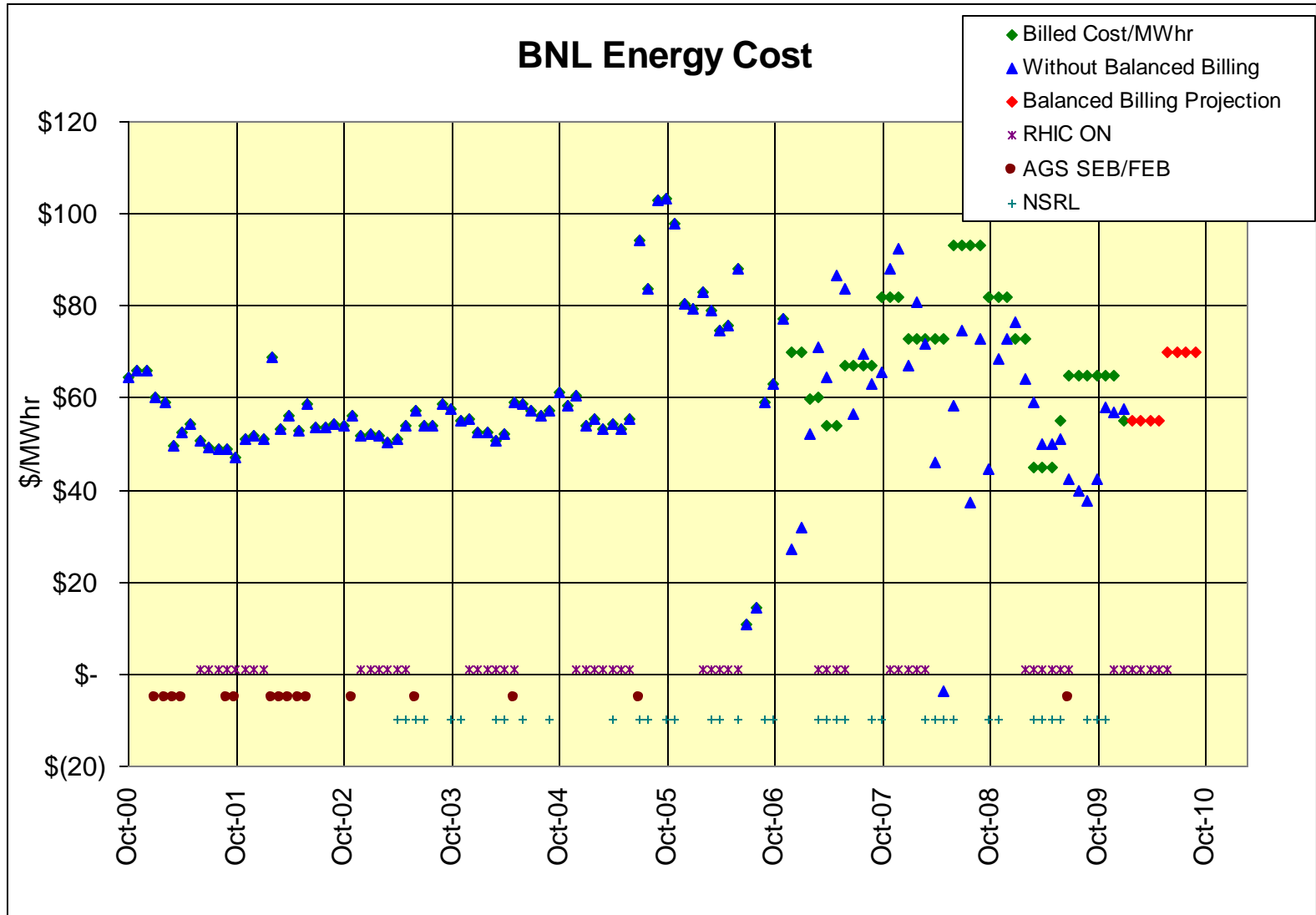


Average hours per week at store = 88.5

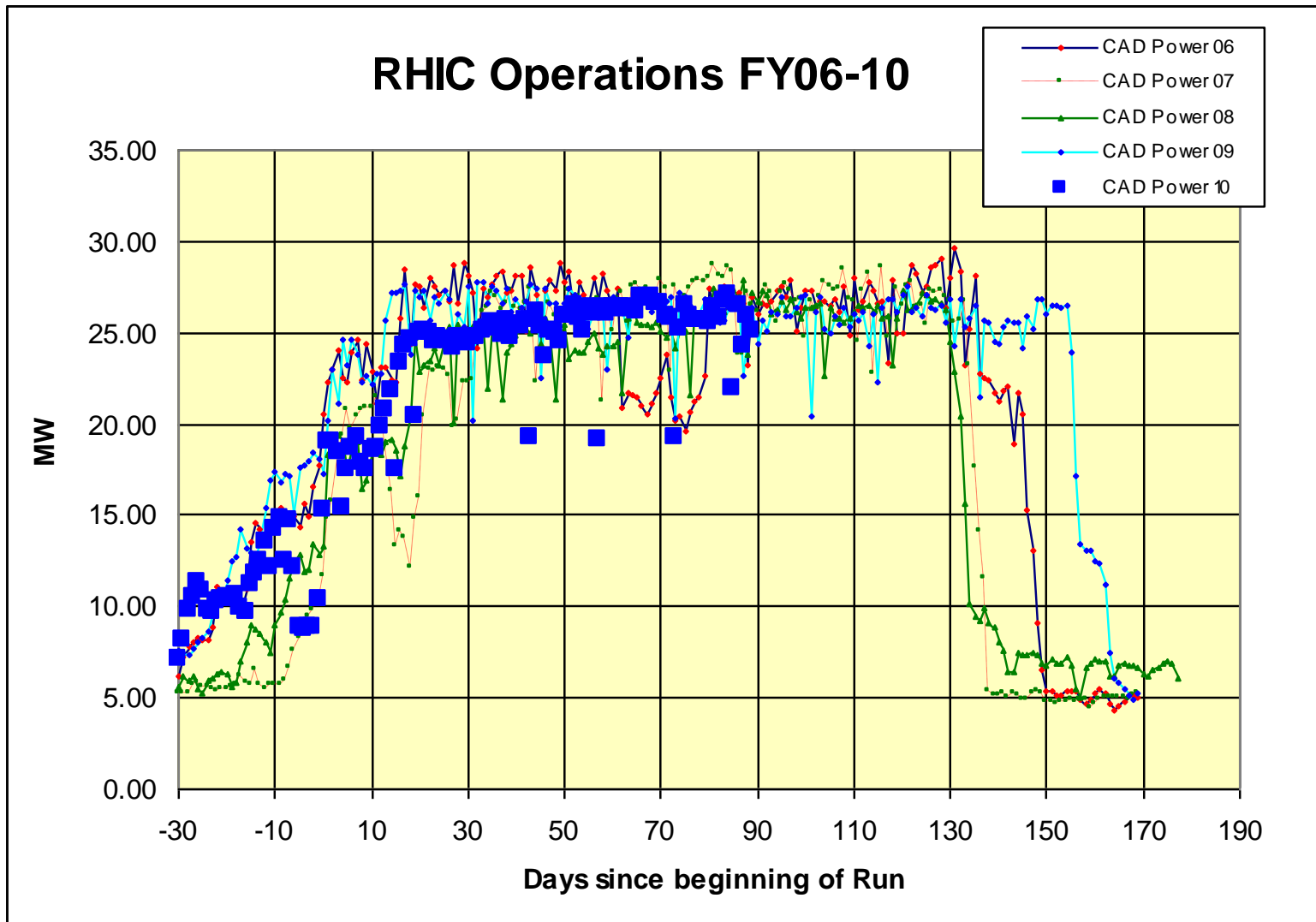
Run 10 (AuAu) -- Integrated Luminosity by week



Through Jan 2010



Through 2/28/10



31 Dec 1st Physics Store 11340, 0.6 m β^* No cooling or rebucketing, STAR 3.2 μb^{-1} , 2.6 hr store

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

18 Jan Physics Store 11489, 0.6 m β^* No cooling or rebucketing, STAR 22.6 μb^{-1} , 3.9 hr store

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

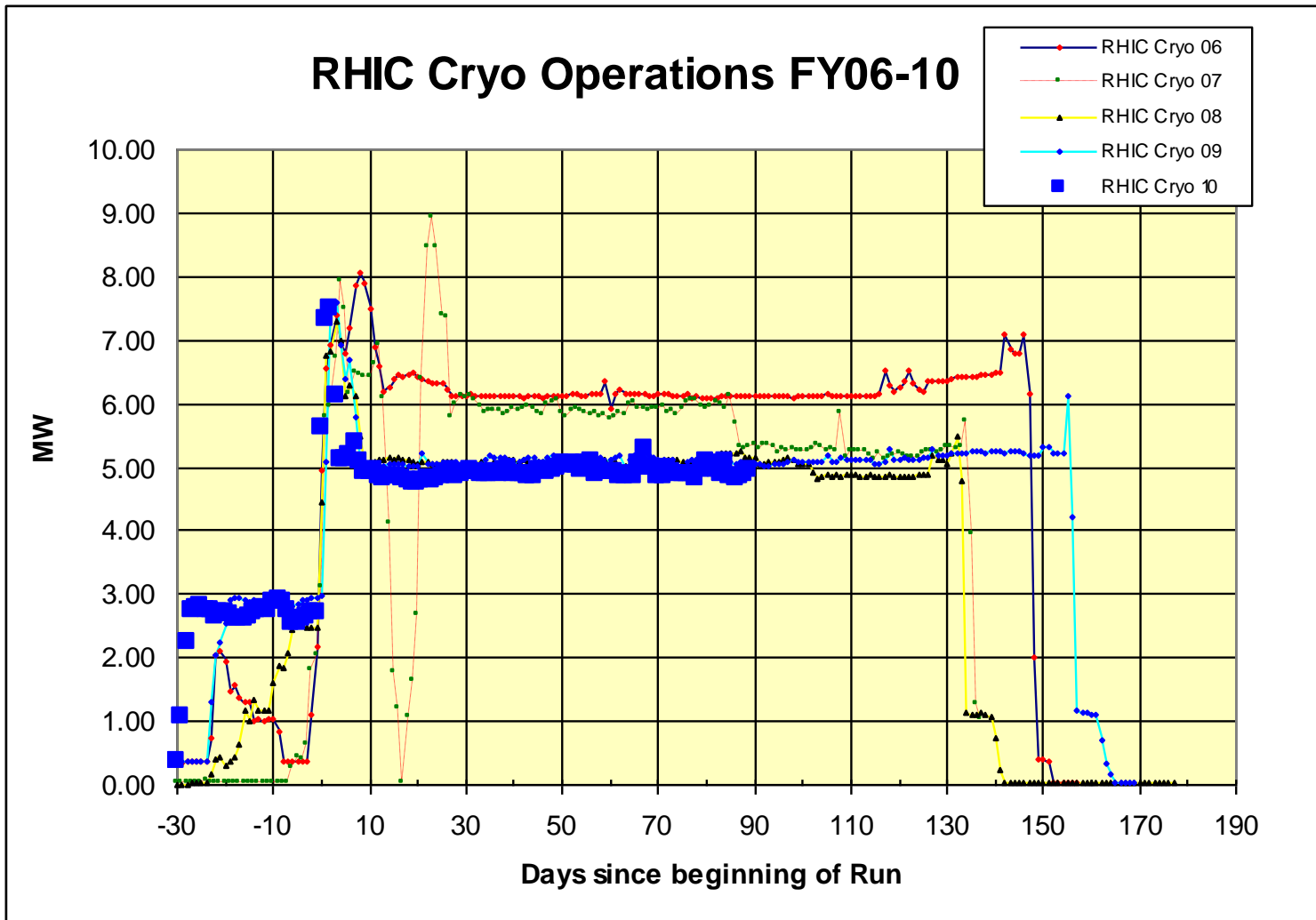
28 Feb Physics Store 11824, 0.7 m β^* with some cooling and with rebucketing, STAR 32.7 μb^{-1} , 3.9 hr store

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

2 Mar Physics Store 11834, 0.7 m β^* with some cooling and with rebucketing, STAR 29.4 μb^{-1} , 3.9 hr store)

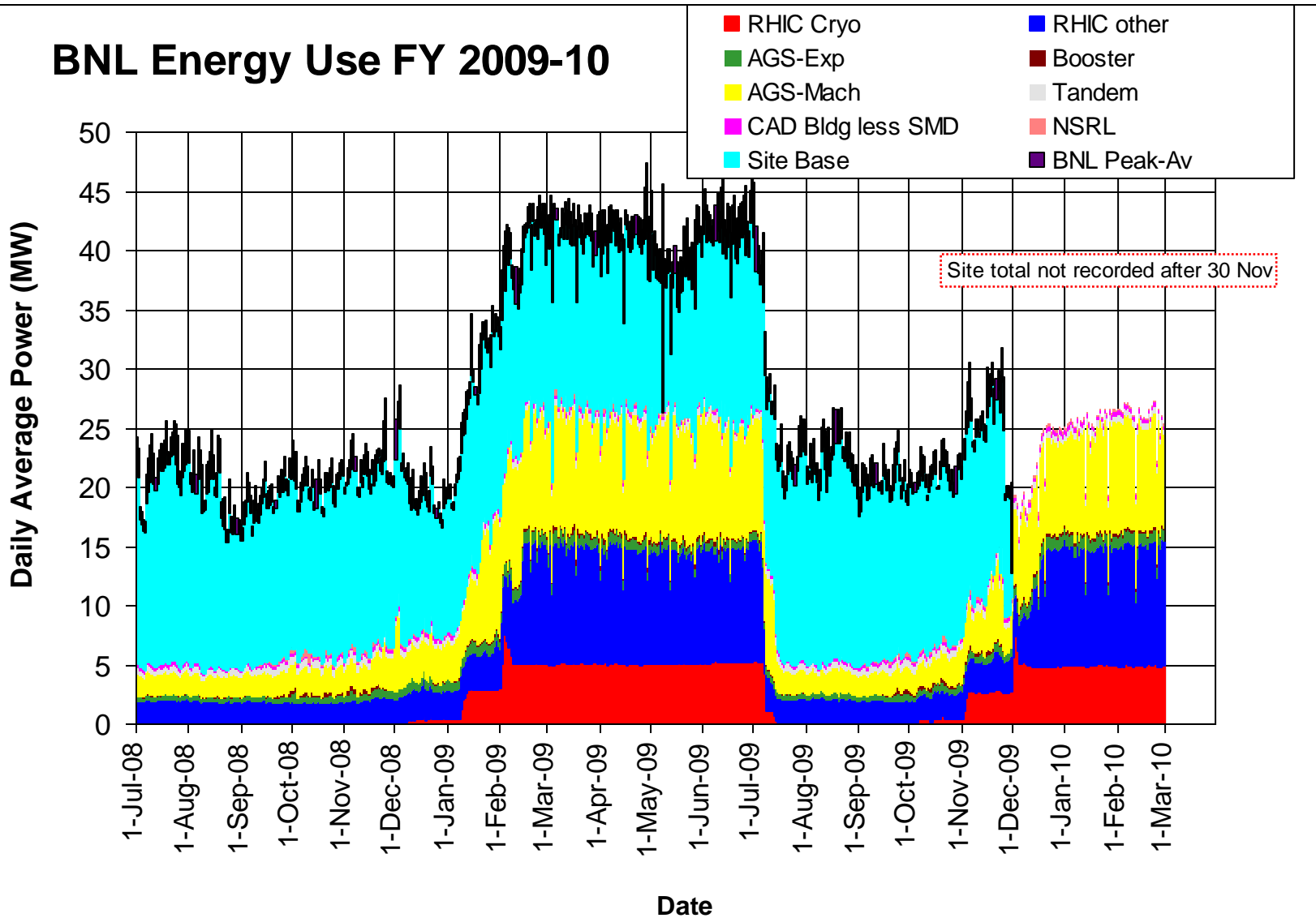
Ring	Bunches/Cycles	Avg Bunch in RHIC (10 ⁶ ions)	Avg Efficiency XCBM to RHIC	XCBM to Uxf1	<i>Uxf1 to Wxf</i>	<i>Wxf to Arc</i>	<i>Arc to RHIC</i>
Blue	111/28	1354	0.927	0.990	<i>0.965</i>	<i>1.003</i>	<i>0.968</i>
Yellow	111/28	1377	0.931	0.990	<i>0.964</i>	<i>0.989</i>	<i>0.987</i>

Through 2/28/10



Through 2/28/10

BNL Energy Use FY 2009-10



Revised Run 10 Plan, Nov 25, 2009

$\sqrt{s_{NN}}$ (GeV)	Physics production or beam studies weeks	
	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 @ $v \approx 0.67$	0.5	0.5

Run 10 Au-Au Goals

11/19/09

- STAR

- $\sqrt{s} = 200 \text{ GeV/n}$

- Luminosity Sampled/Delivered = 2/4 nb⁻¹
 - 250M Central Events
 - 300M Min-bias events

- PHENIX

- $\sqrt{s} = 200 \text{ GeV/n}$

- 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

