

RUN 11 RHIC MACHINE/EXPERIMENTS MEETING

22 Mar 2011

Agenda: Open

RUN 11 RHIC MACHINE/EXPERIMENTS MEETING

DECISIONS

- 11/23/2010: Agreed to new APEX schedule, 12 hour sessions (0800-2400) every other week away from maintenance days.
- 2/25/2011: Beginning with physics store 15239, changed CNI Polarimeter analyzing power to agree with jet target polarization measurements ...18% lower than before.

PENDING DECISION (3/15/2011)

- If CR budget not favorably resolved, should we switch to 18 GeV AuAu or continue with 500 GeV pp?
 - STAR proposal – switch to 18 GeV AuAu on 28 March
 - PHENIX Proposal – continue with 500 GeV pp till ~ 14 April

Run 11 Plan based on PAC recommendation/ALD Guidance and 28.3 weeks cryo operation

3/22/10 update

- 3 Jan, Begin cool-down to 4.5K
- 8 Jan, Cool-down to 4.5K complete in both rings, preliminary setup begins
- ~11 Jan, 2 ½ weeks beam setup for $\sqrt{s} = 500$ GeV pp in RHIC begins.
- 15 Jan, power supply work/DX training complete
- 17 Jan, first successful ramp
- 19 Jan, 1st maint day
- ~~27~~ 24 Jan, 1 week Ramp-up with 8 hr/night beam to experiments
- ~~3~~ **11 Feb (machine and ~experiments), begin 10(?) week physics run ($\sqrt{s} = 500$ GeV pp)**
- 16 Feb, AGS Jump Quads in routine operation for RHIC injection
- 24 Feb, 9 MHz cavity in routine operation
- 7 Mar, cryo troubles, extended maintenance, 0900 hrs till 2000 hrs 14 Mar – lost 7.5 days
- 17 Mar, power distribution problem, extended maintenance, 1930 hrs till 0315 hrs 20 Mar – lost 3.3 days
- **28 March – 1 April, PAC 2011**
- ~~4~~ **18 March – 8 April Continuing Resolution Ends**
- **14 Apr(?), end 10 week physics run at $\sqrt{s} = 500$ GeV pp run**
- 14 Apr, begin 1 week setup for $\sqrt{s} = 200$ AuAu
- 21 Apr, begin 1 week Ramp-up with 8 hr/night beam to experiments
- **28 Apr, begin 8 week physics run at ($\sqrt{s} = 200$ AuAu)**
- **23 Jun, end 8 week $\sqrt{s} = 200$ AuAu run**
- 23 Jun, begin setup for $\sqrt{s} = 192$ GeV UU
- **30 Jun, begin 1½ week physics run ($\sqrt{s} = 192$ UU)**
- **4 July – completed 26 weeks of cryo operation, may be out of \$\$'s**
- **10 Jul, end 1½ week physics run at $\sqrt{s} = 192$ GeV**
- 10 Jul, begin setup for $\sqrt{s} = 18$ GeV AuAu
- **11 Jul, begin 1 week physics run ($\sqrt{s} = 18$ AuAu)**
- **18 Jul, end 1 week physics run at $\sqrt{s} = 18$ GeV**
- 20 Jul, warm-up complete (28.3 weeks)

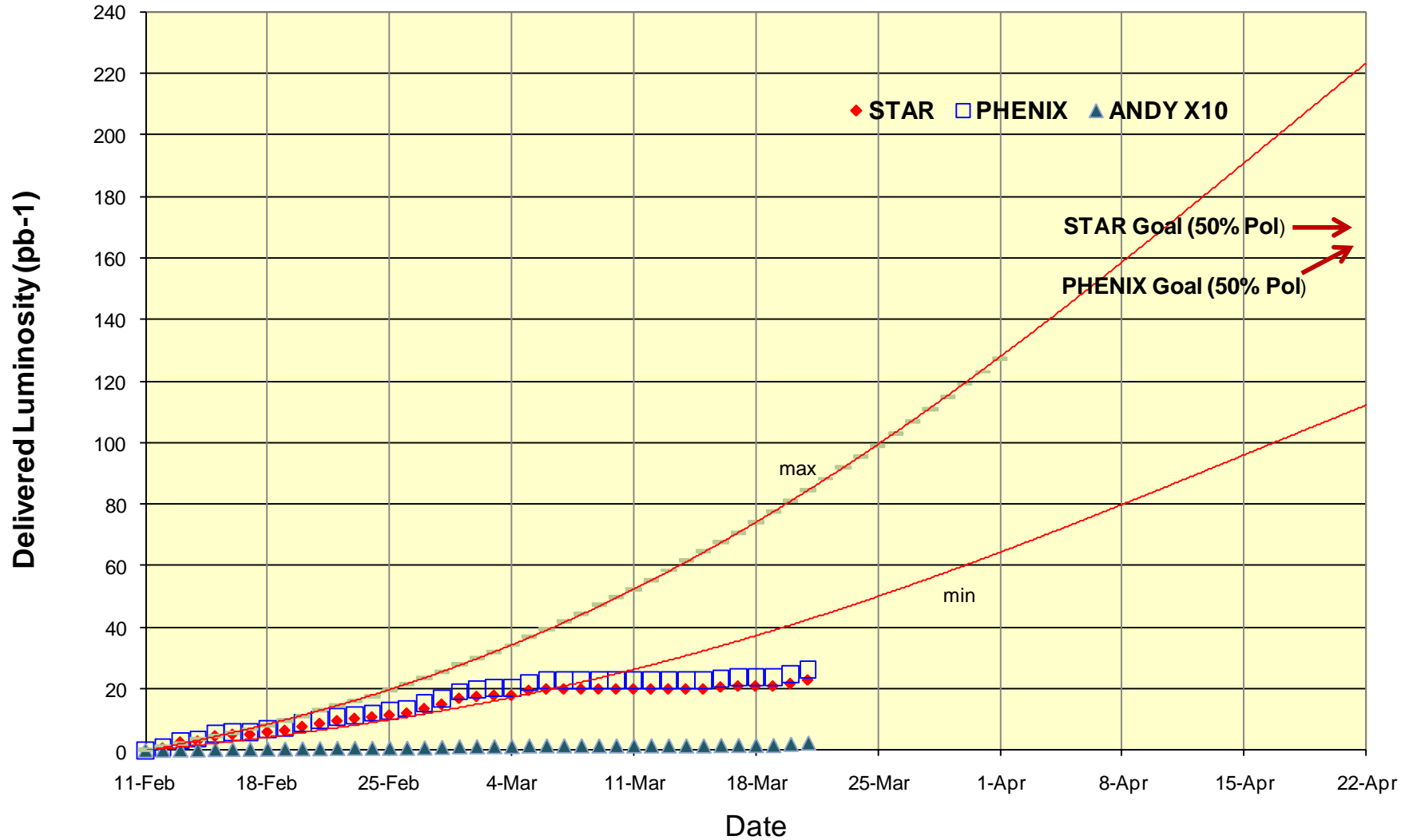
Possible additions:

- Low energy test run

Run 11 250 x 250 GeV pp, Luminosity

thru fill 15316, 21 Mar

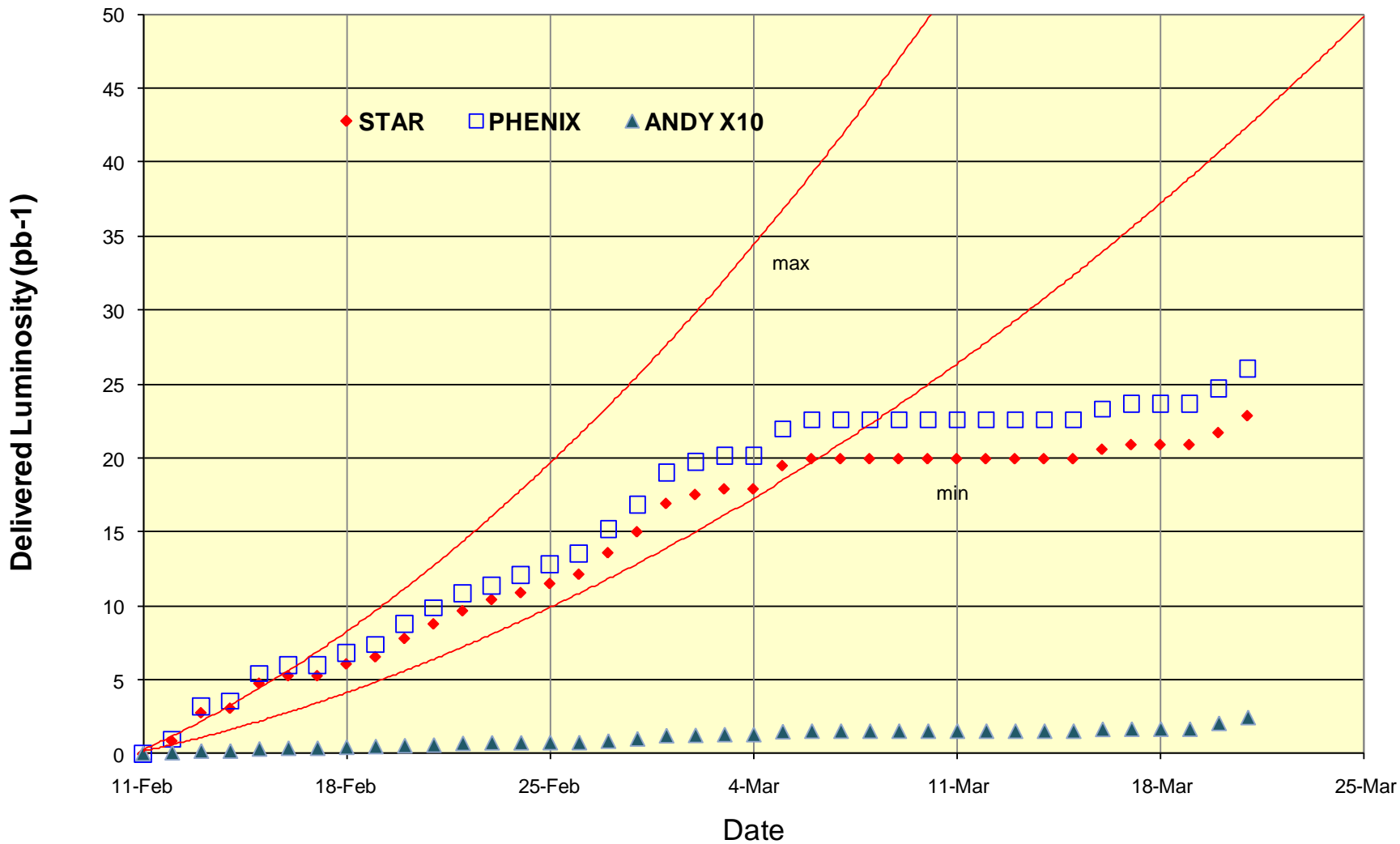
2.9 mb STAR, 2.7 mb PHENIX, 2.8 mb (not right) ANDY



thru fill 15316, 21 Mar

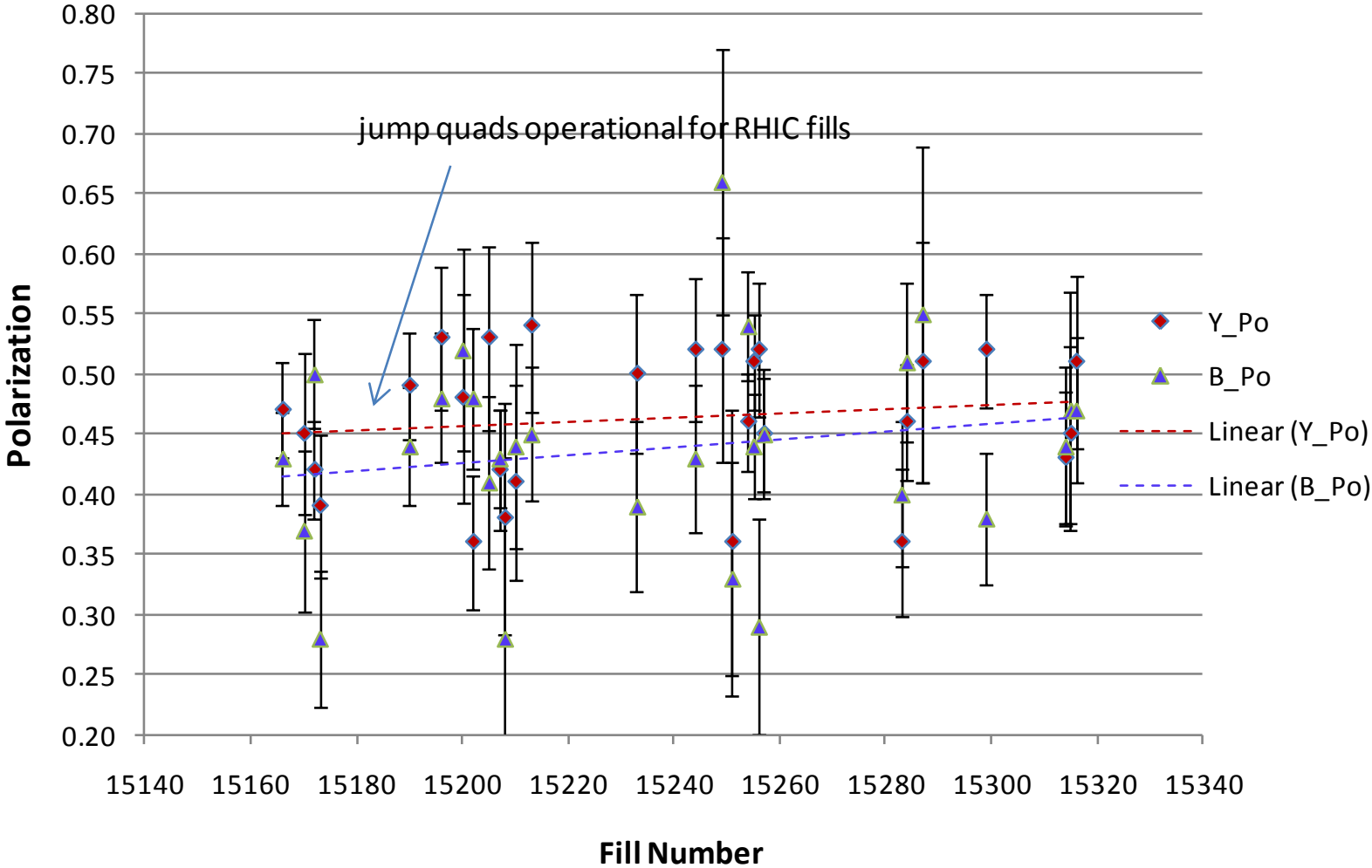
Run 11 250 x 250 GeV pp, Luminosity

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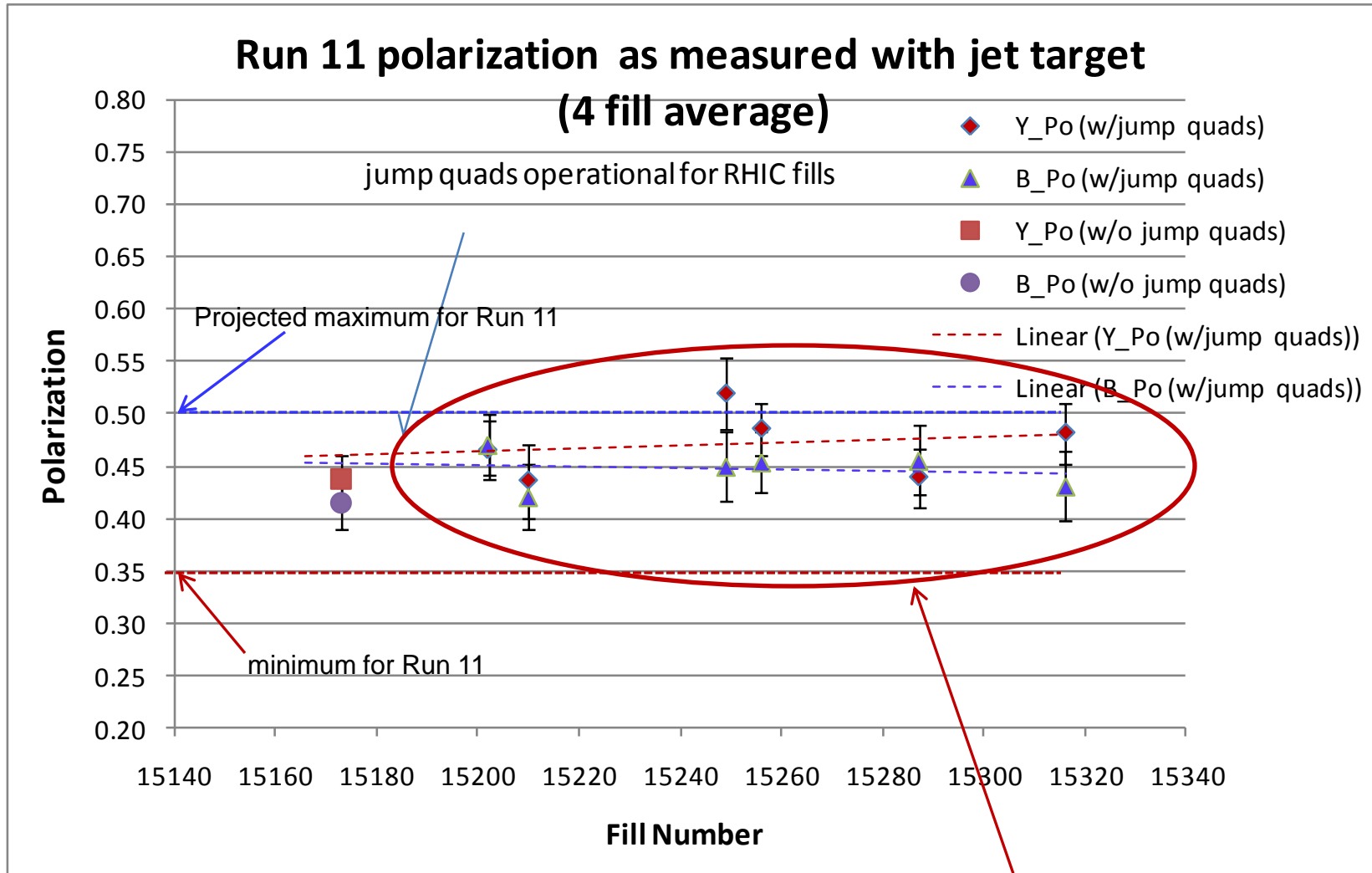


Fills 15166 through 15316 (21 Mar)

Run 11 polarization as measured with the jet target

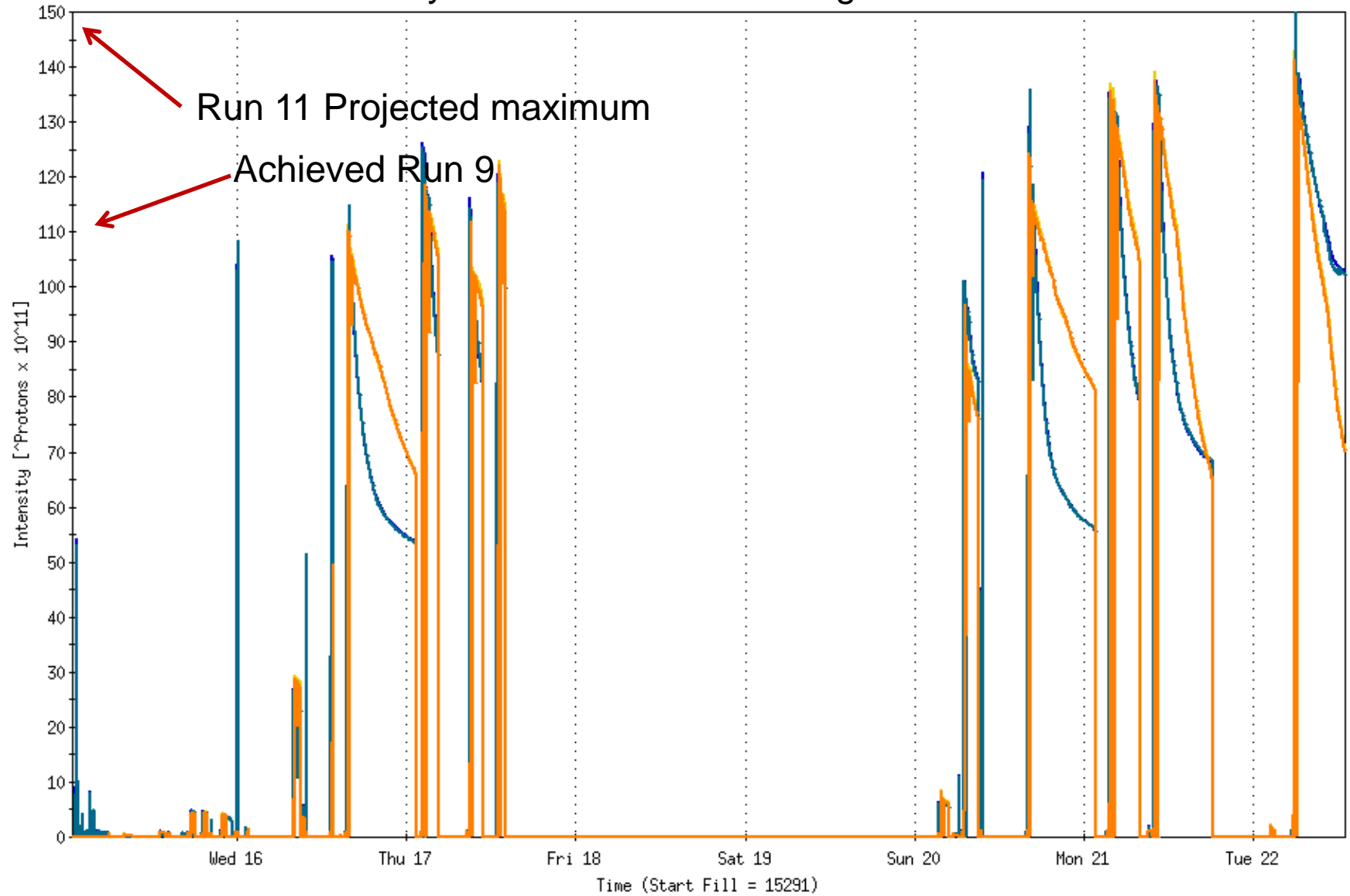


Fills 15166 through 15316 (21 Mar)



Blue average = $44.8 \pm 1.3\%$
Yellow Average = $47.1 \pm 1.2\%$

Physics Stores 15291 through 15322



bluDCCTtotal (C)

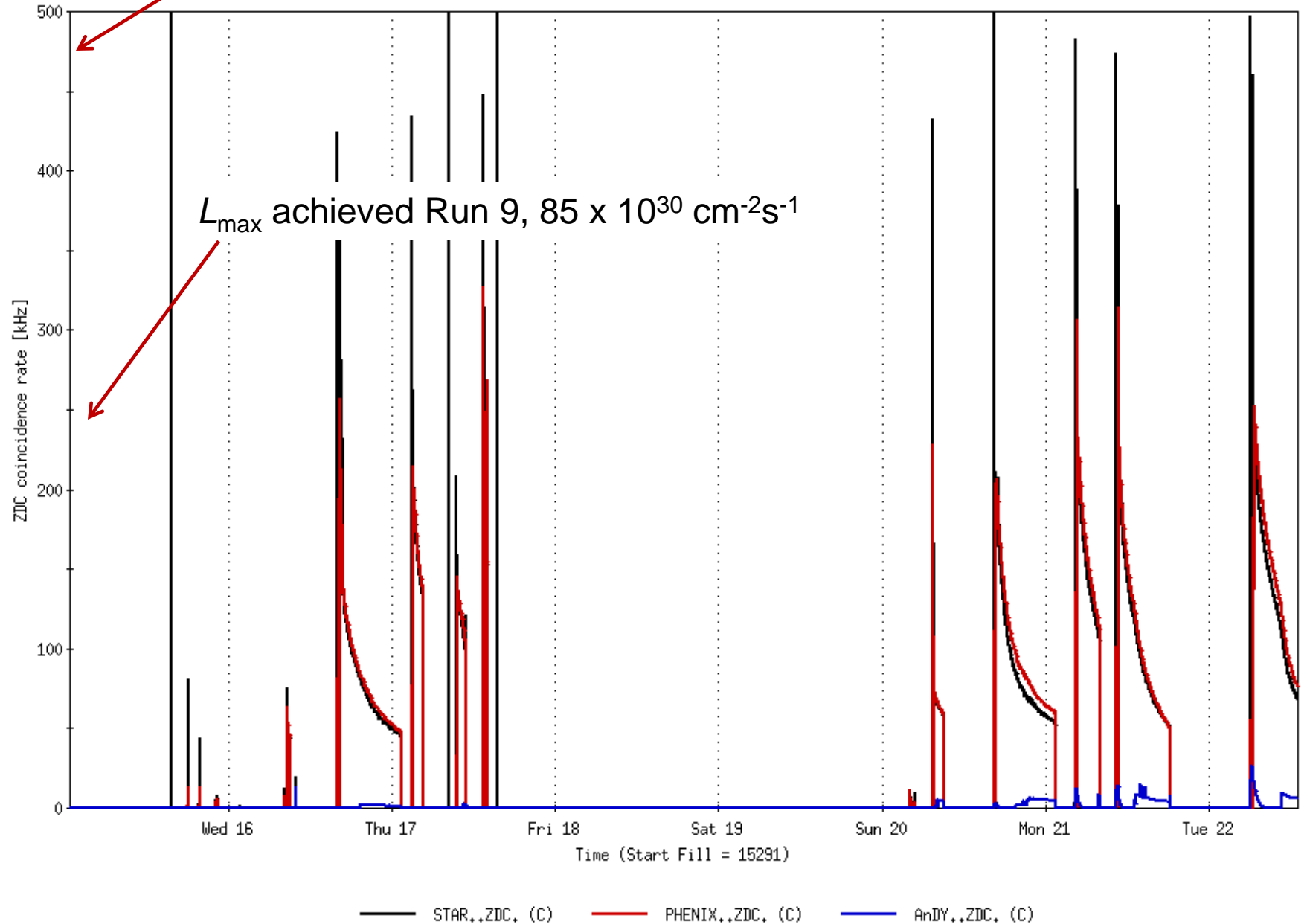
yelDCCTtotal (C)

bluWCMbunched (C)

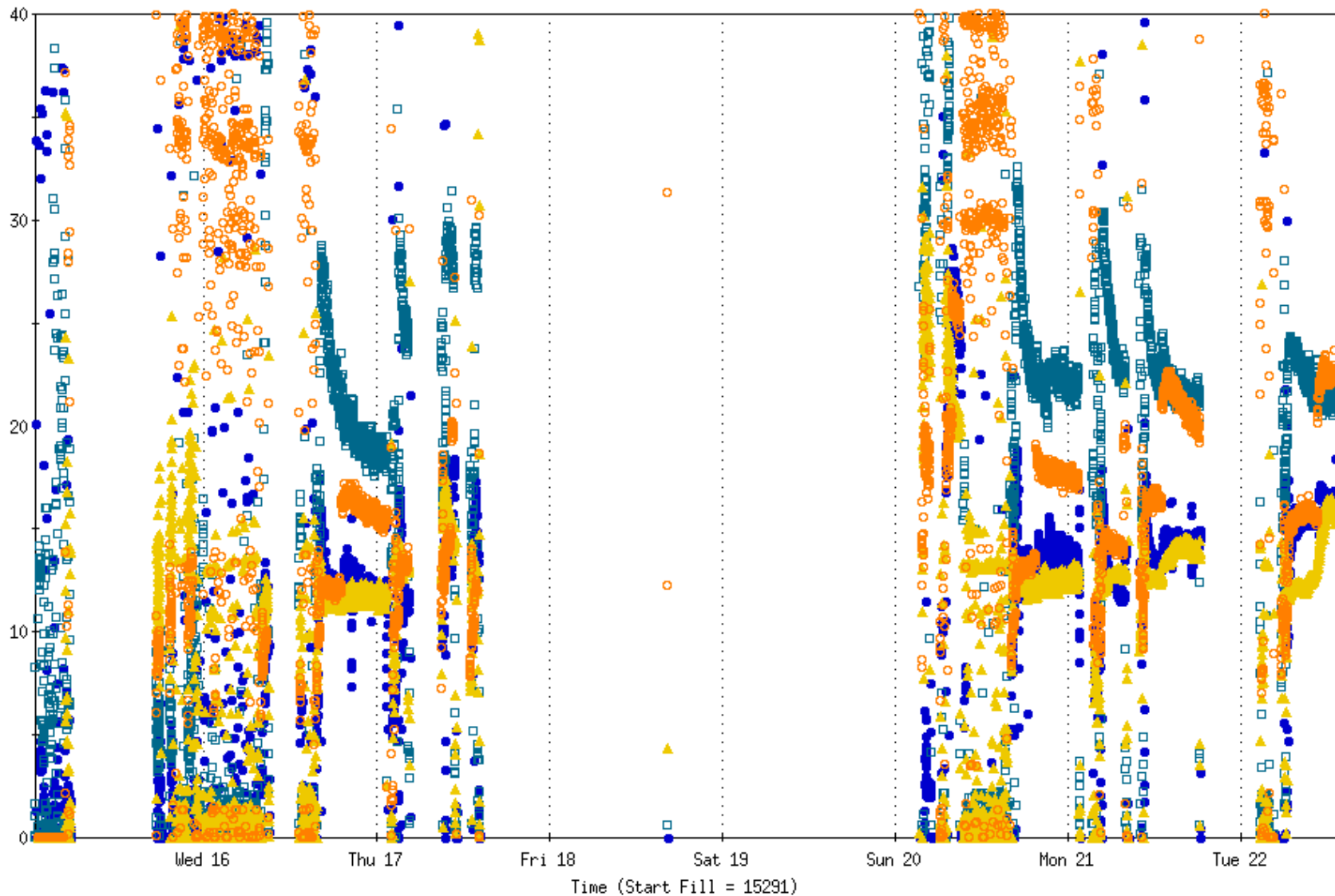
yelWCMbunched (C)

Physics Stores 15291 through 15322

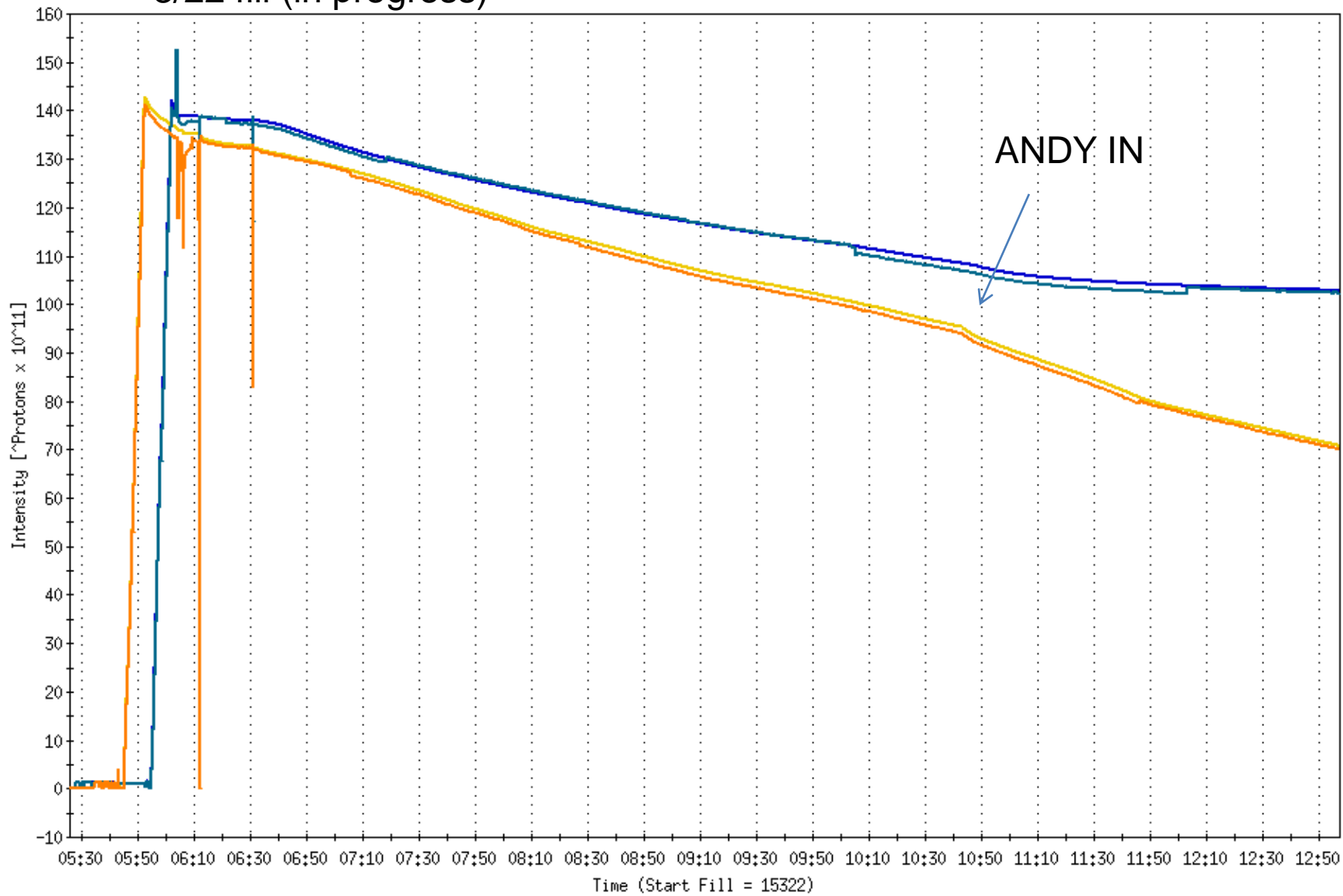
$L_{\max} = 170 \times 10^{30} \text{ cm}^{-2}\text{s}^{-1}$ (projection with 2.8 mb xsection)



Physics Stores 15291 through 15322

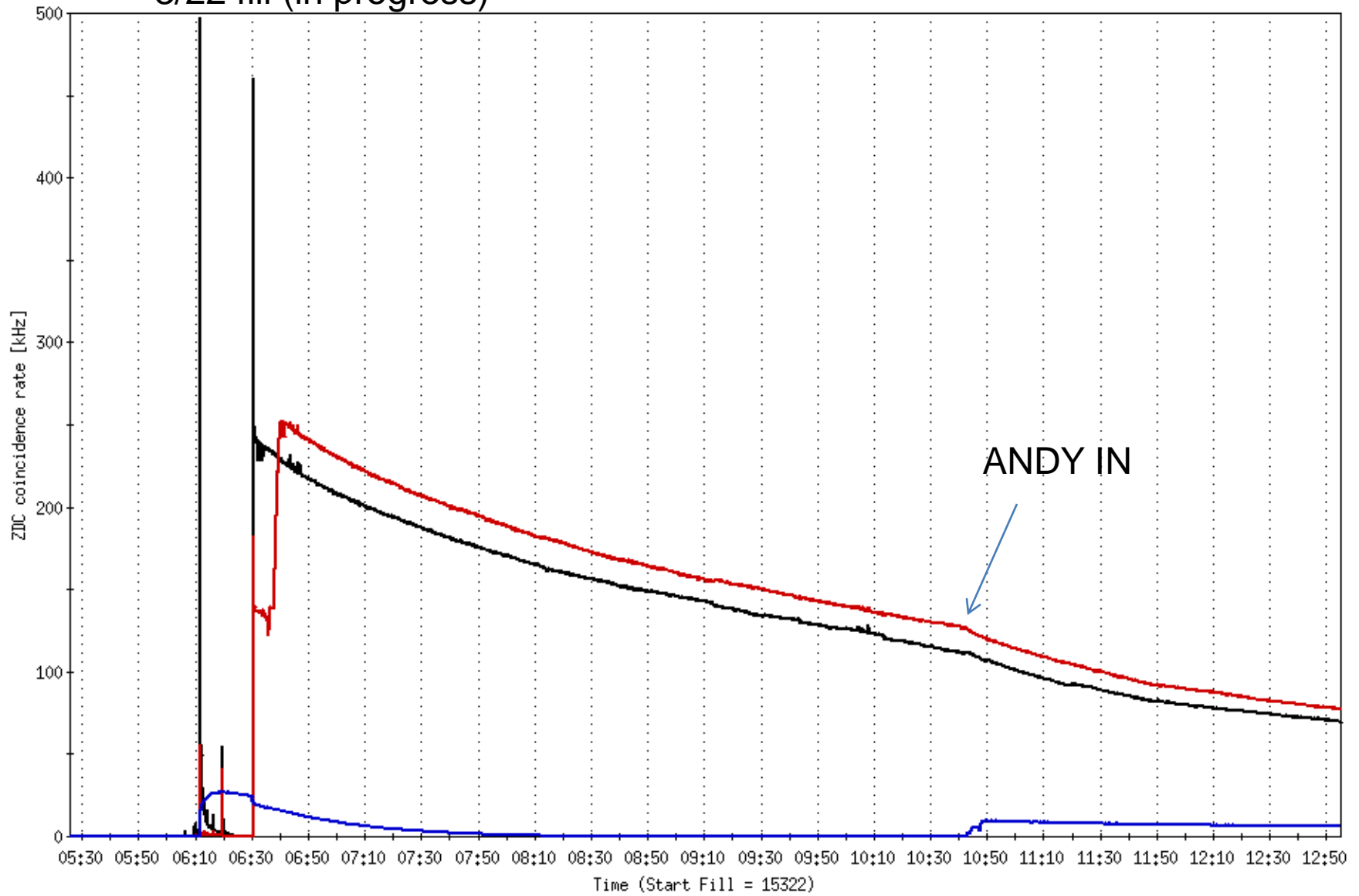


3/22 fill (in progress)



bluDCCTtotal yeIDCCTtotal bluWCMbunched yeIWCMbunched

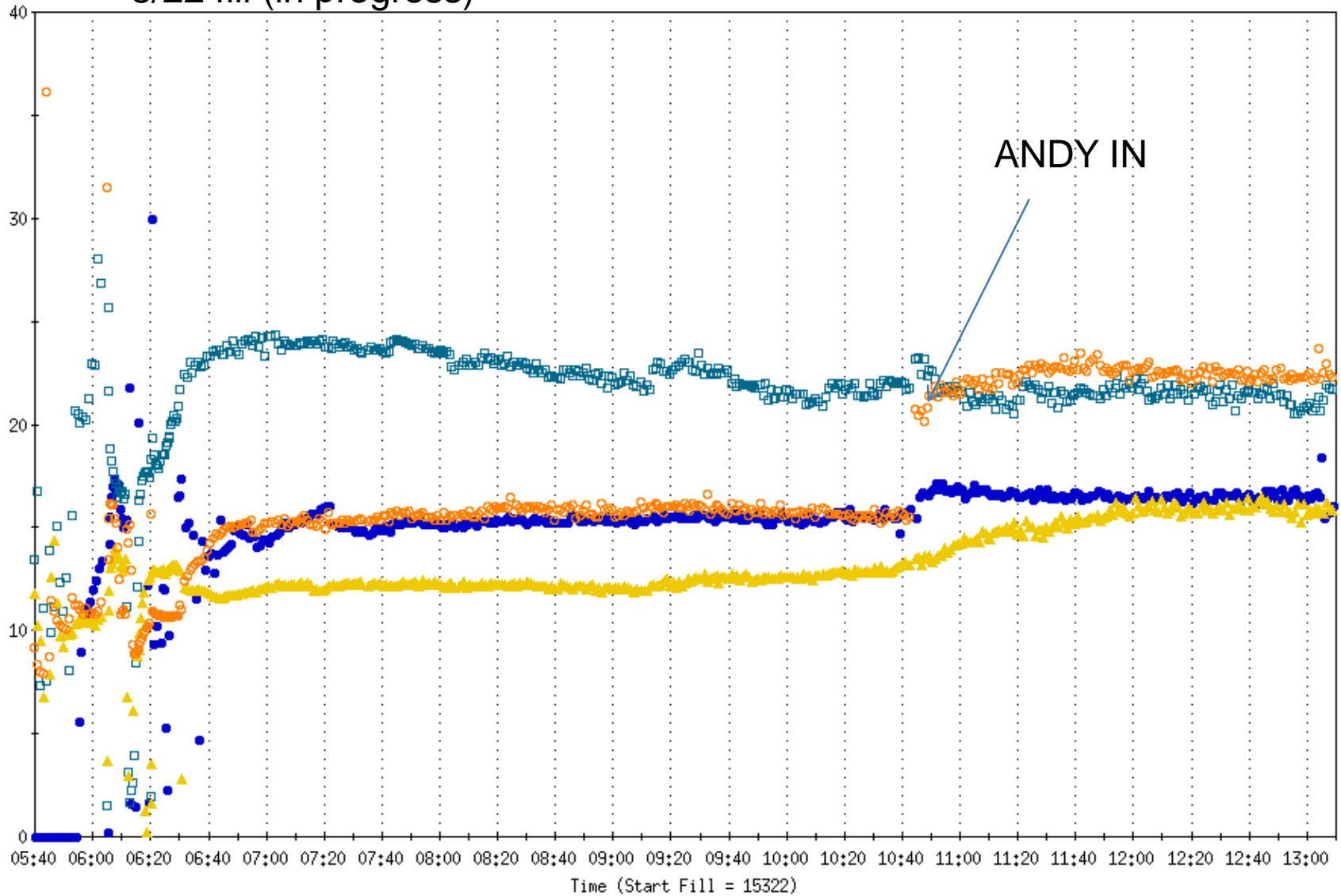
3/22 fill (in progress)



— STAR..ZDC. — PHENIX..ZDC. — AnDY..ZDC.

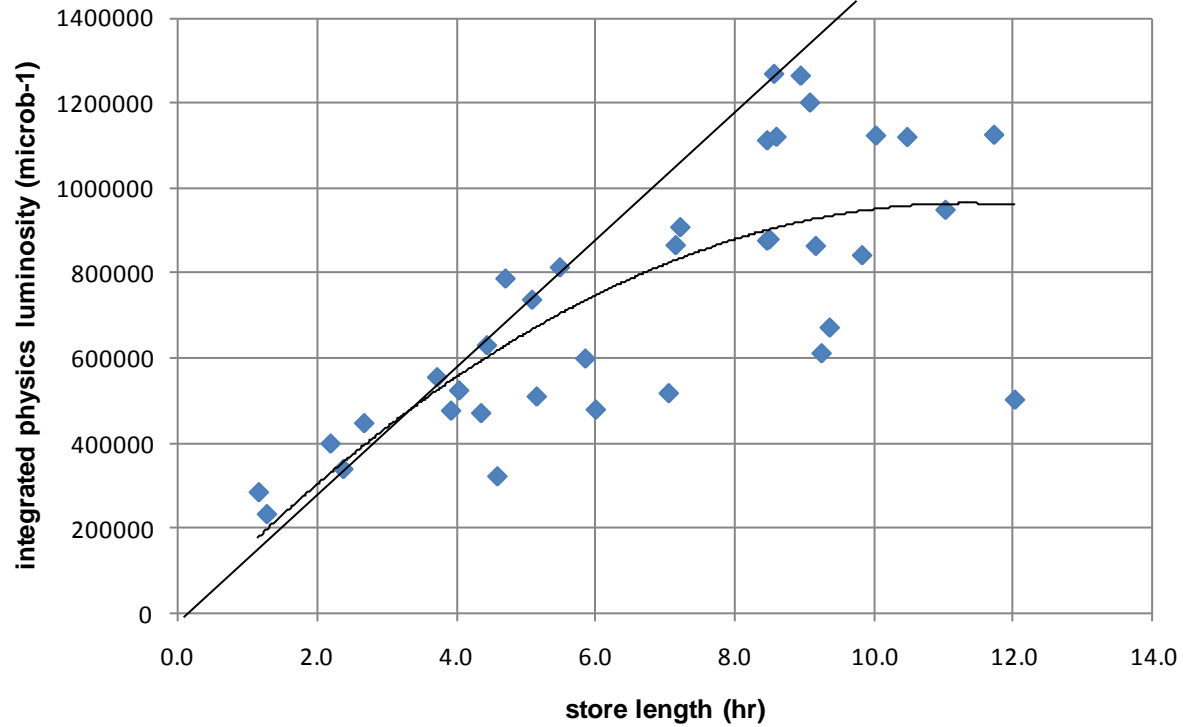
3/22 fill (in progress)

Horizontal and vertical emittance



● RhicIpmManager.blue_horiz;normEmitM[.] □ RhicIpmManager.blue_vert;normEmitM[.]
▲ RhicIpmManager.yellow_horiz;normEmitM[.] ○ RhicIpmManager.yellow_vert;normEmitM[.]

store length vs integrated lumi



Old information

Through 13 Mar 2011

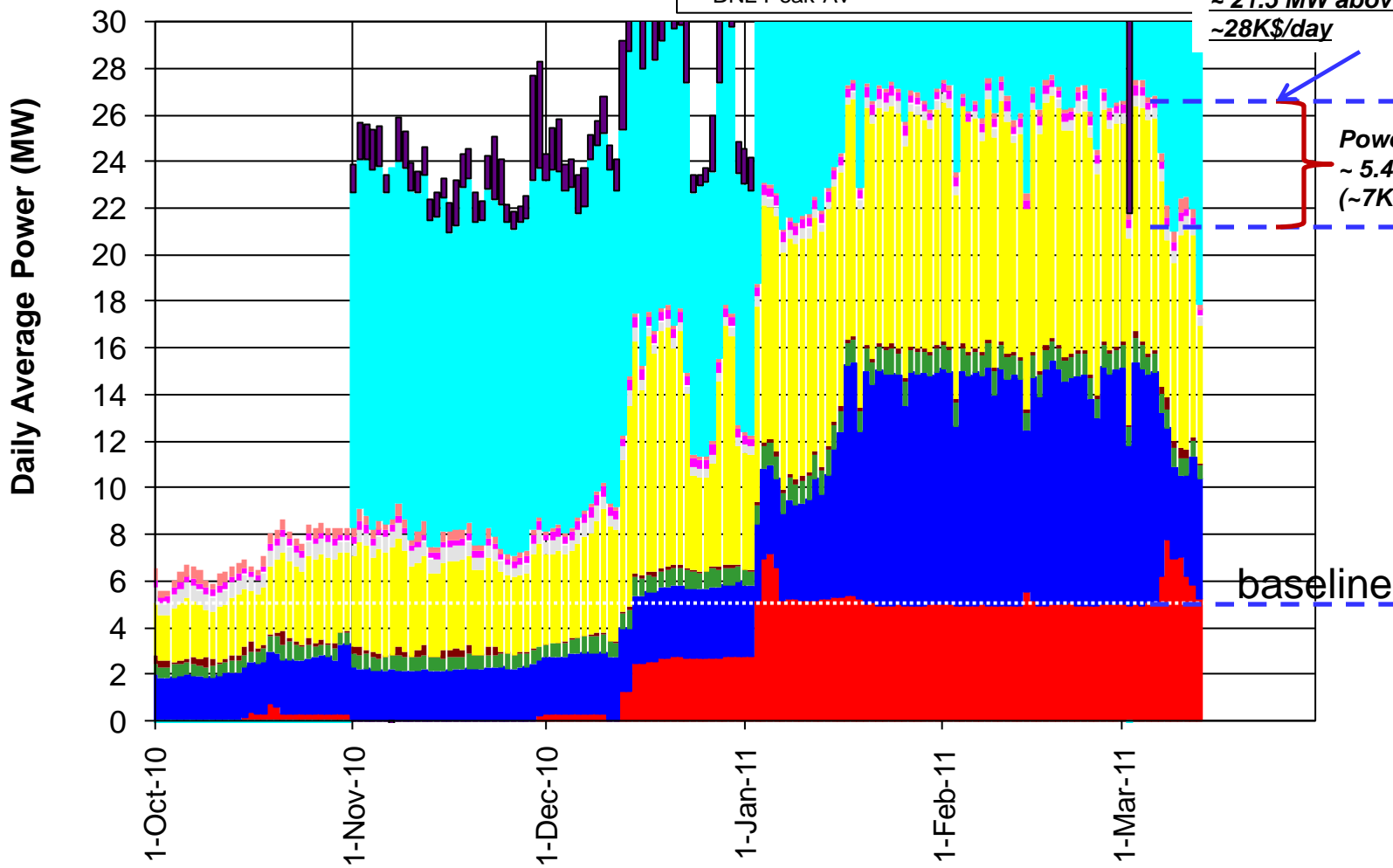
BNL Energy Use FY 2011

- RHIC Cryo
- Booster
- CAD Bldg less SMD
- BNL Peak-Av
- RHIC other
- AGS-Mach
- NSRL
- AGS-Exp
- Tandem
- Site Base

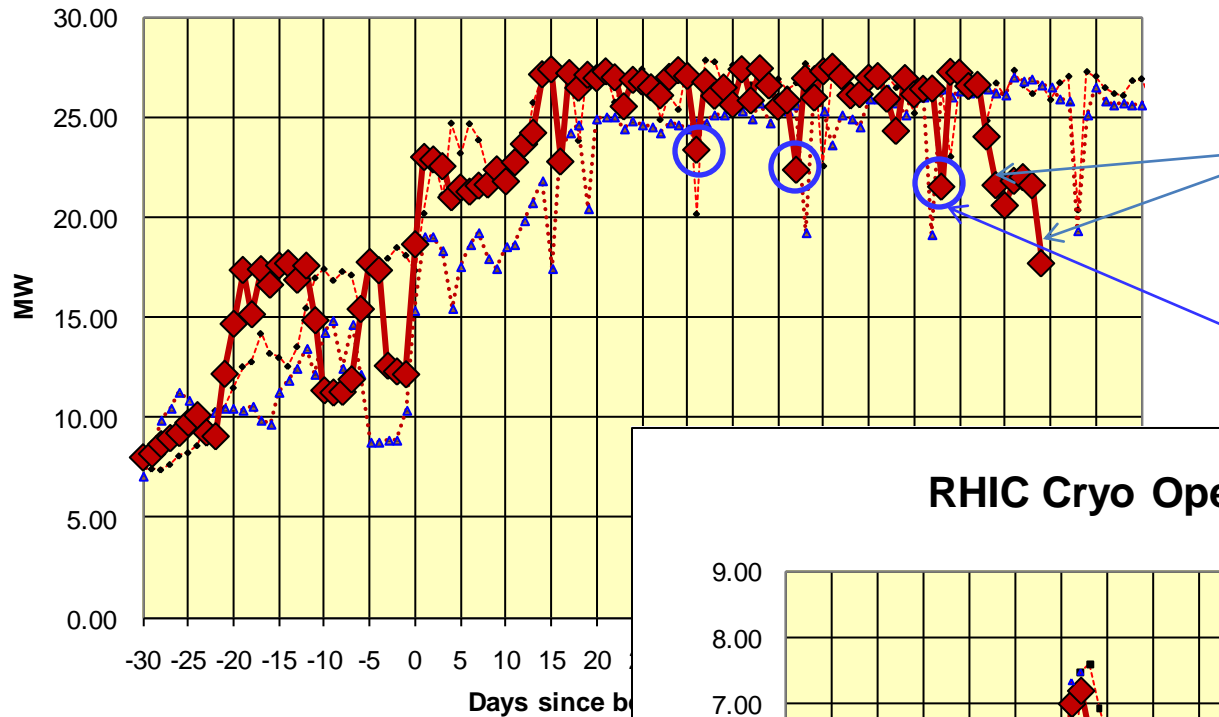
*~ 21.5 MW above baseline
~28K\$/day*

*Power savings
~ 5.4 MW/day
(~7K\$/day)*

baseline



RHIC Operations FY09-11

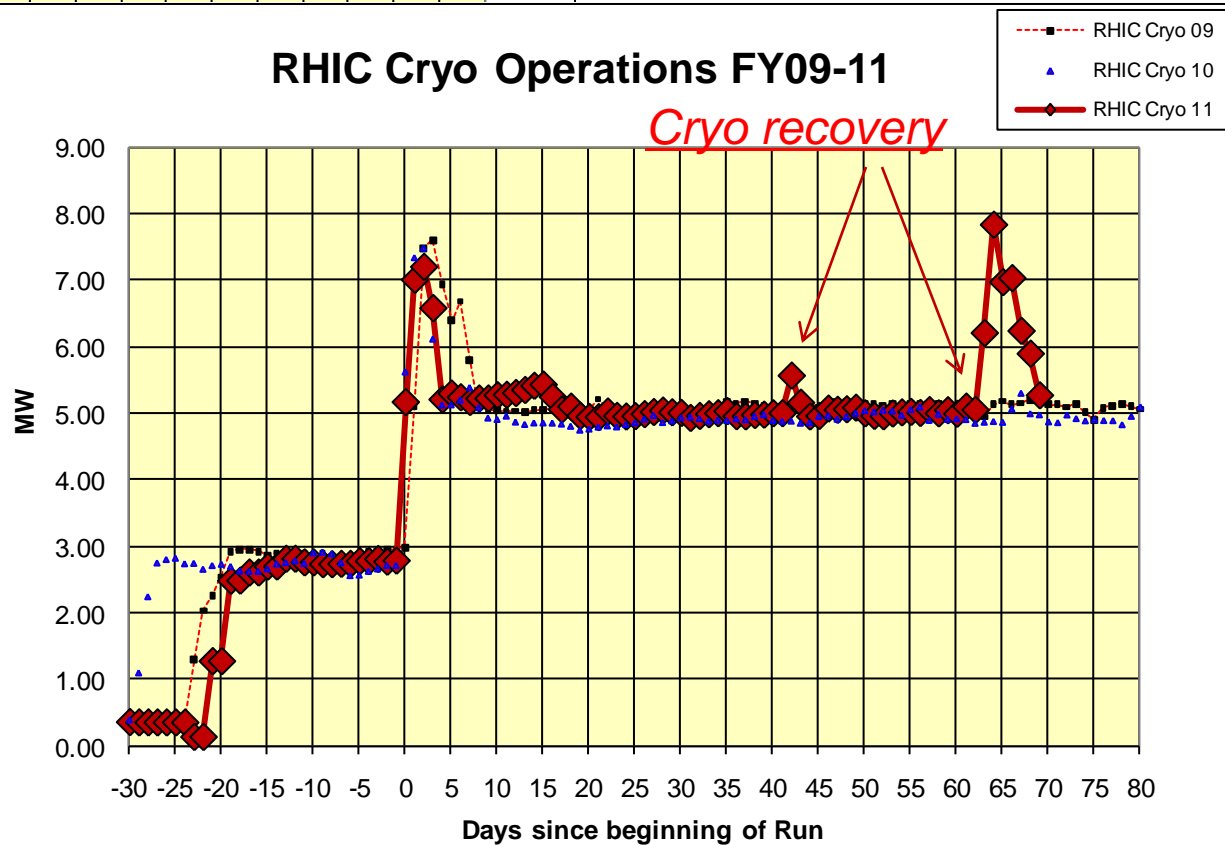


Through 13 Mar 2011

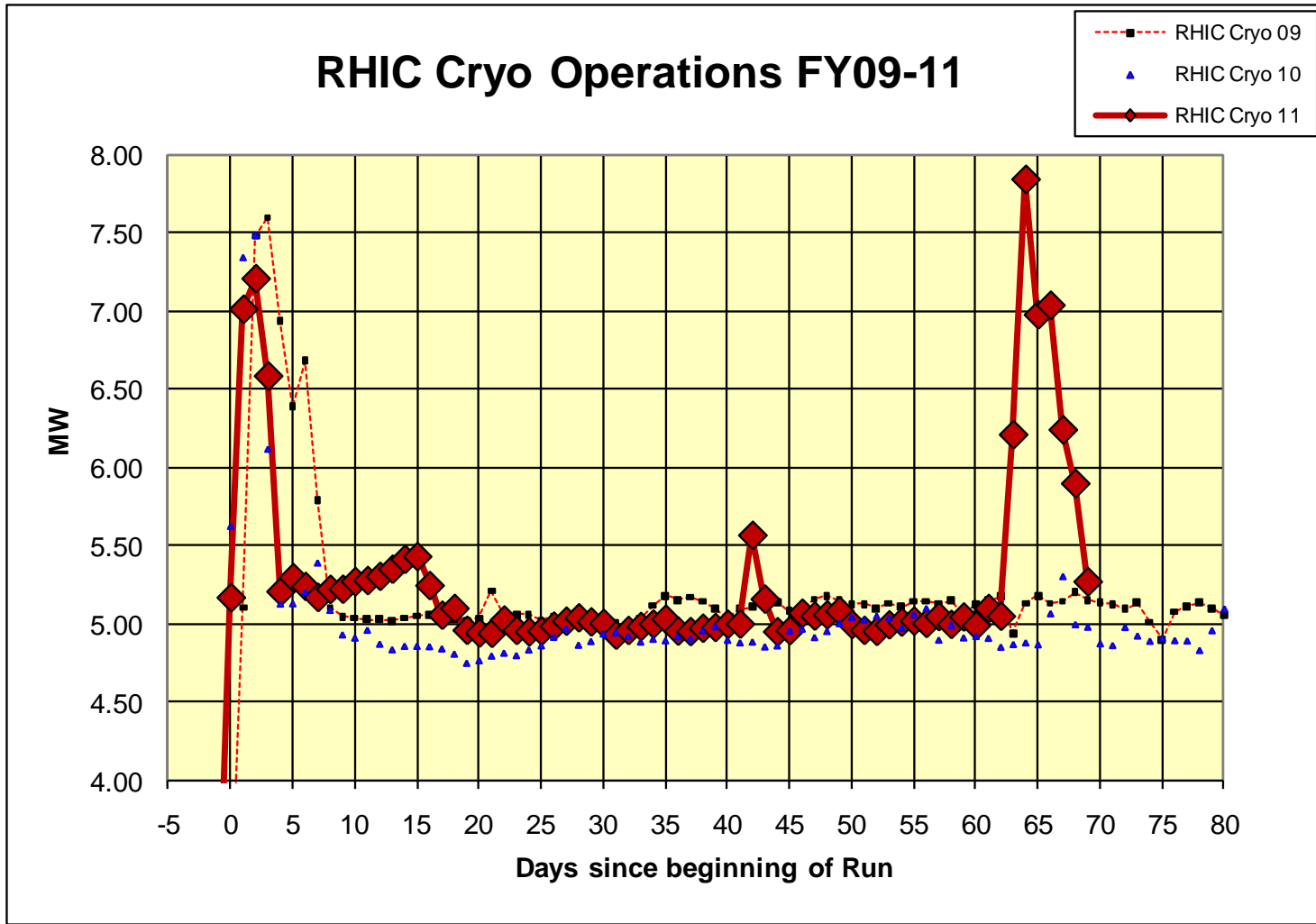
Extended shutdown

maint days

RHIC Cryo Operations FY09-11

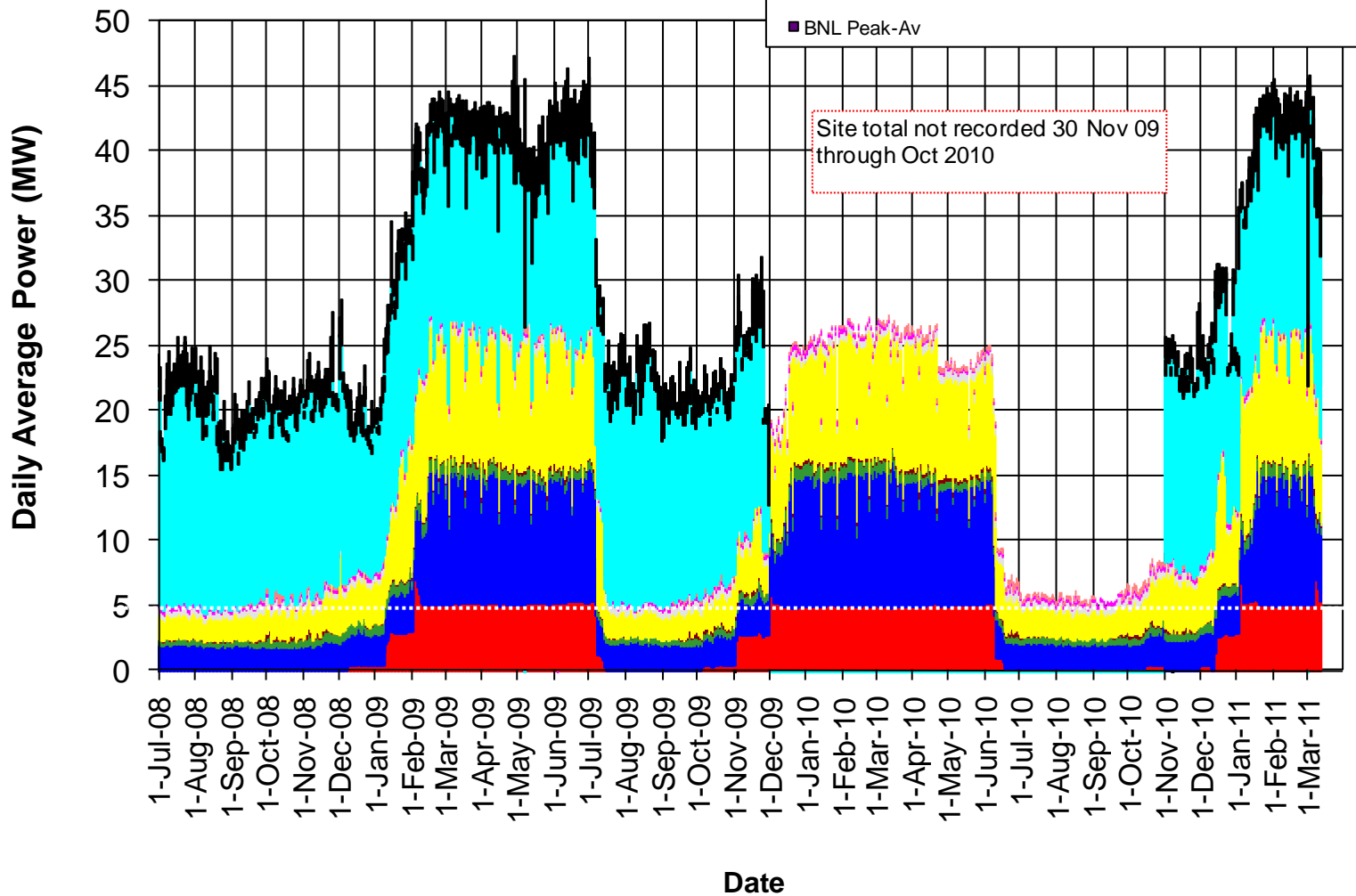


Through 13 Mar 2011



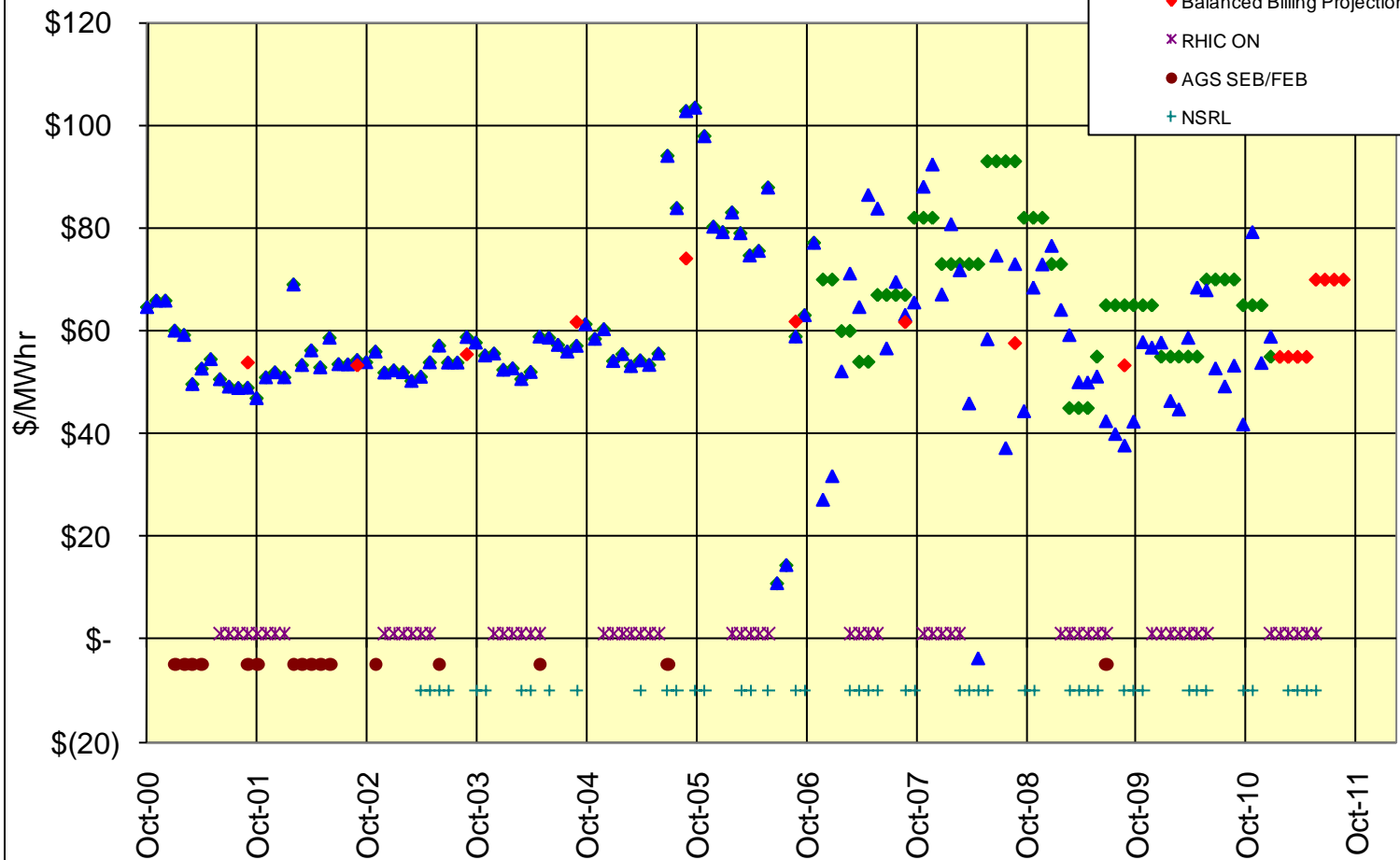
Through 13 Mar 2011

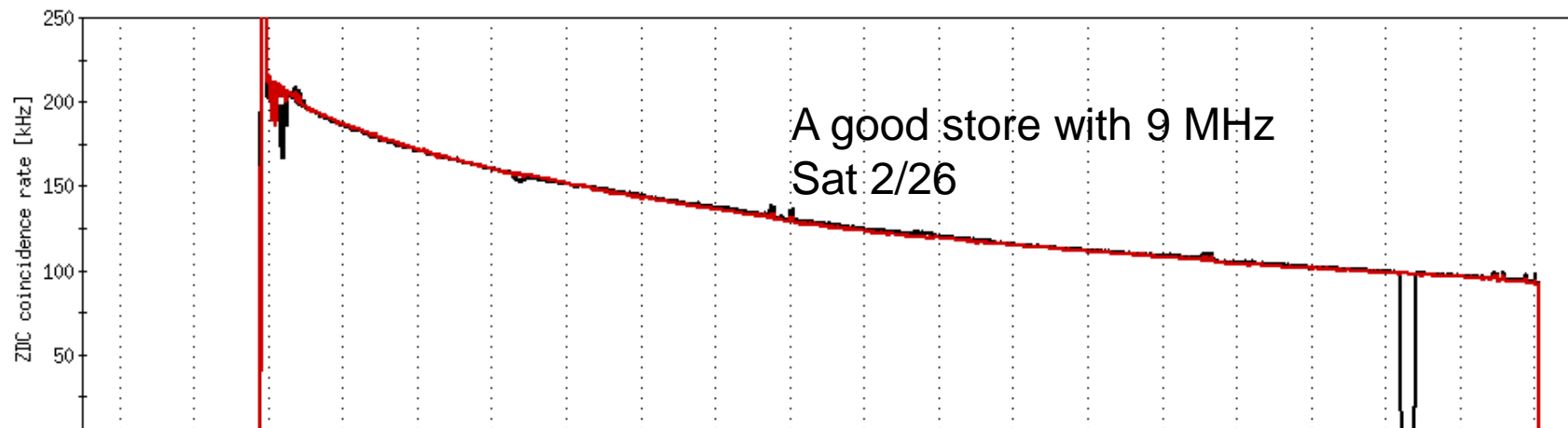
BNL Energy Use FY 2009-11



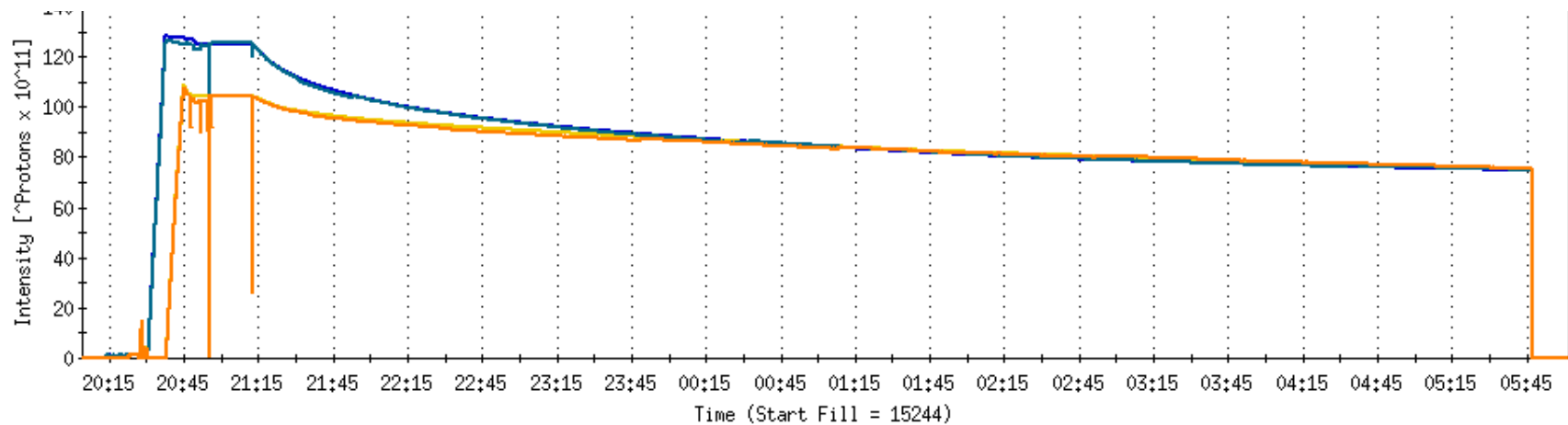
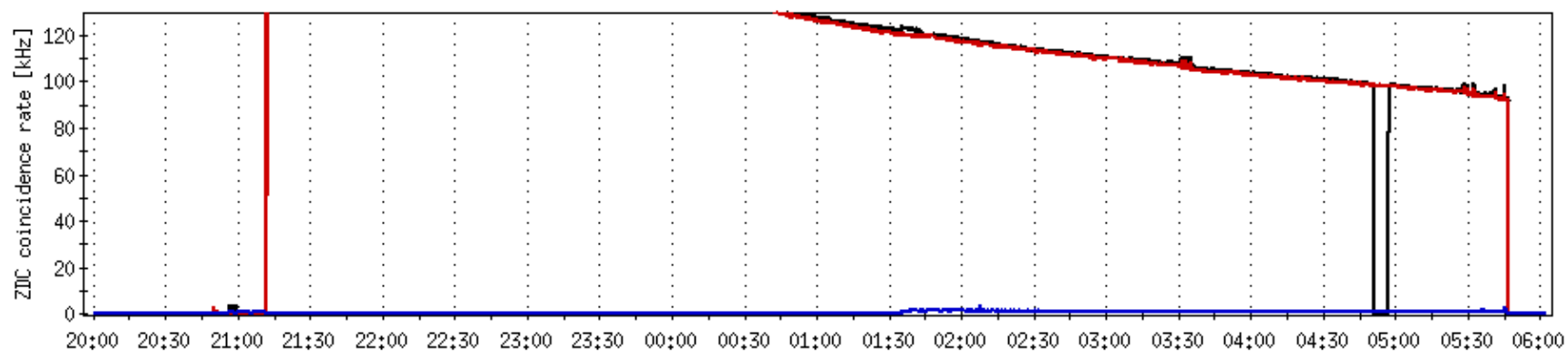
BNL Energy Cost

through Jan 2011





Experimental Coincidence Signals



— bluDCCTtotal

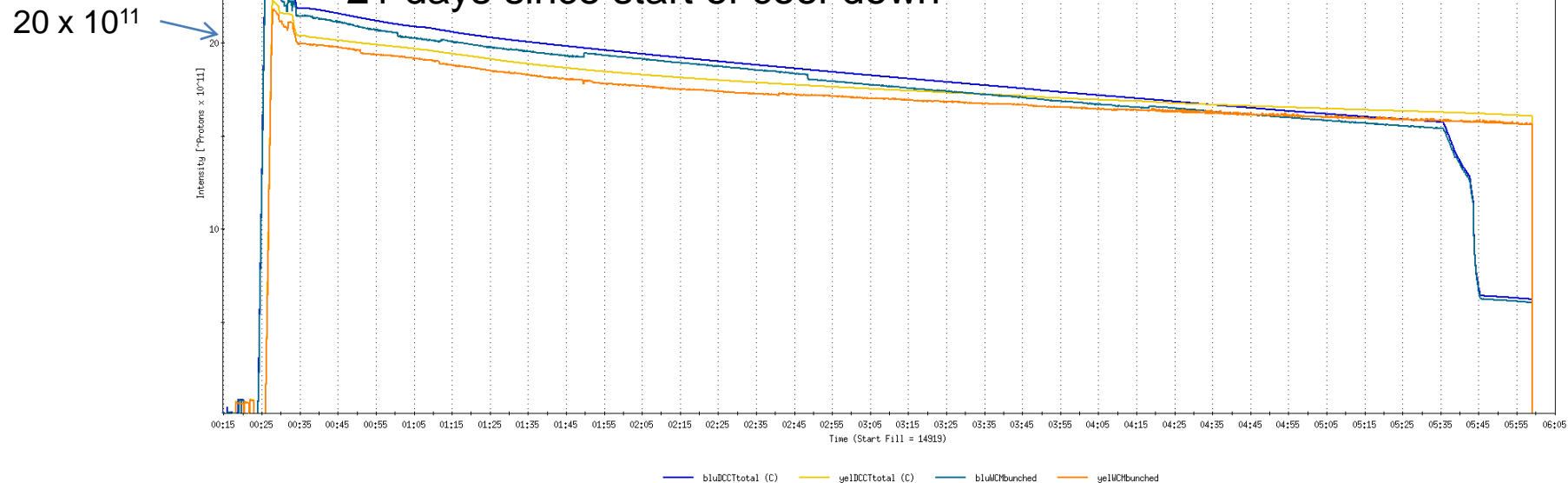
— yelDCCTtotal

— bluWCBunched

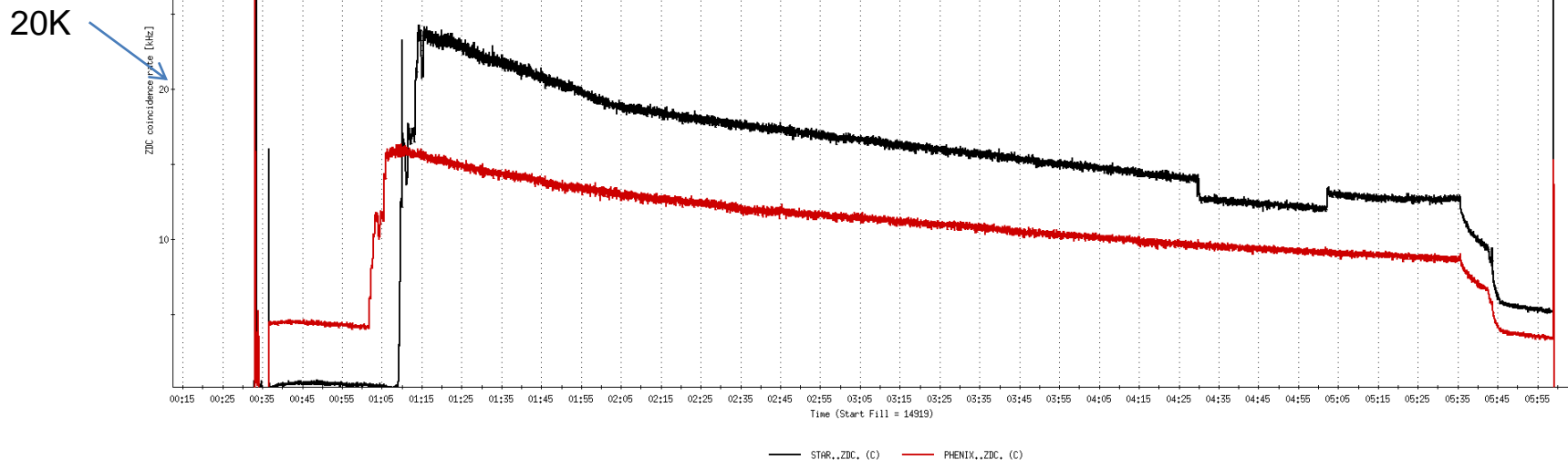
— yelWCBunched

Run 11, First overnight store, Mon Jan 24 00:12
Fill number 14919,, $\sqrt{s}=500$ GeV
21 days since start of cool-down

- 28 x 27 bunches
- $\beta^*=0.65$ meters



For peak store lumi = $170 \times 10^{30} \text{ cm}^{-2}\text{s}^{-1}$ (projected MAXIMUM)
ZDC Rate ~ 400K (assuming 2.4 mb n-pair xsection)



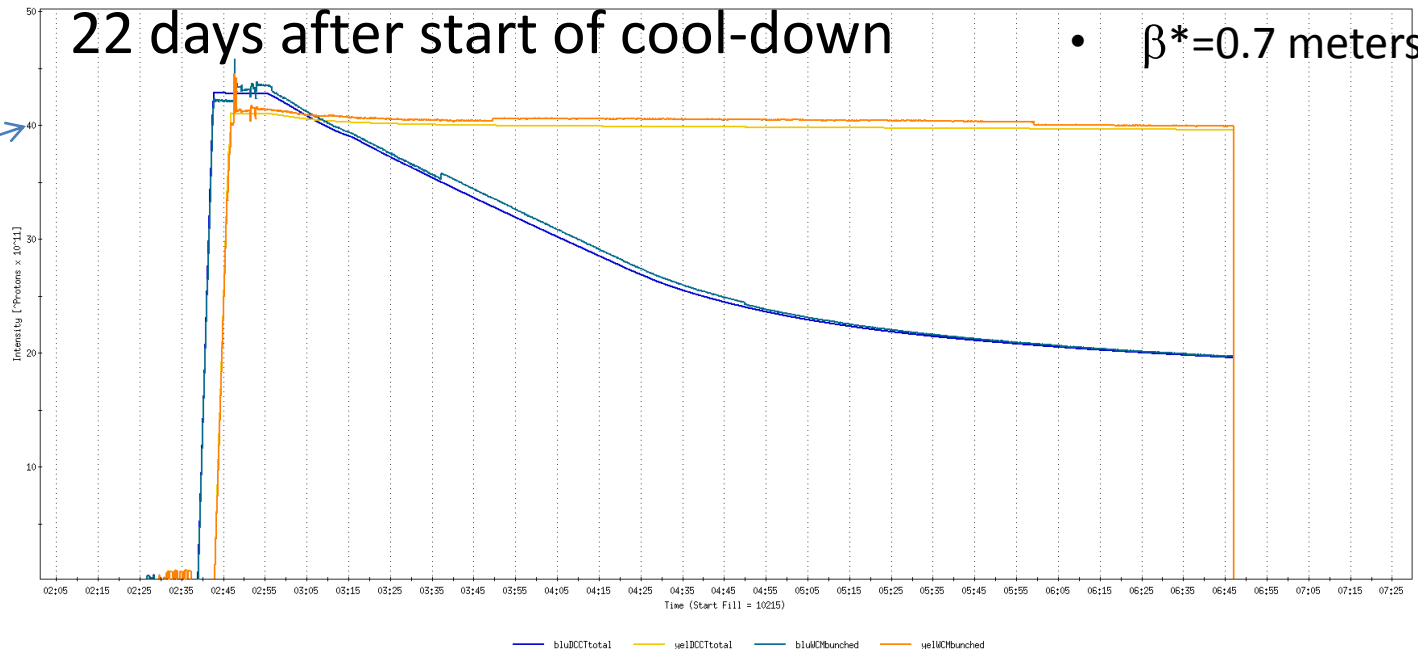
Run 9, First overnight store at $\sqrt{s}=500$ GeV

• 56 x 56 bunches

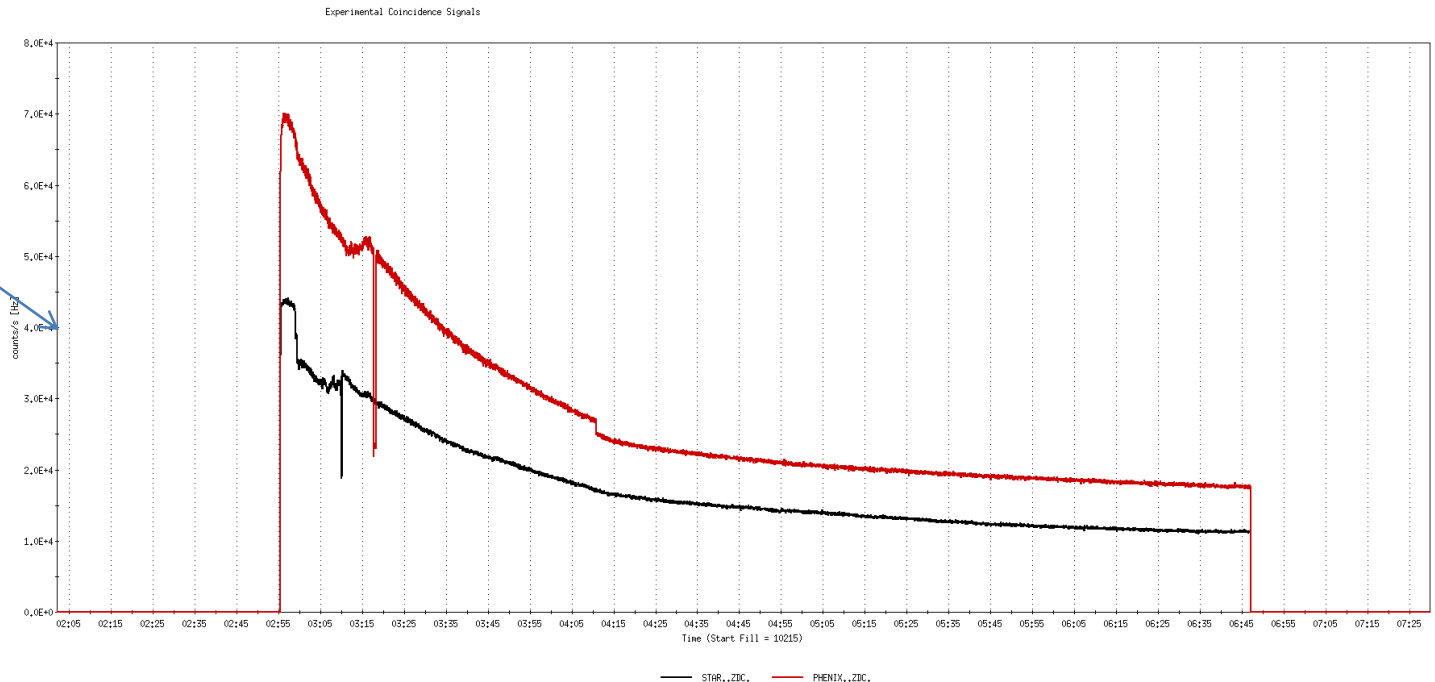
• $\beta^*=0.7$ meters

22 days after start of cool-down

40×10^{11}

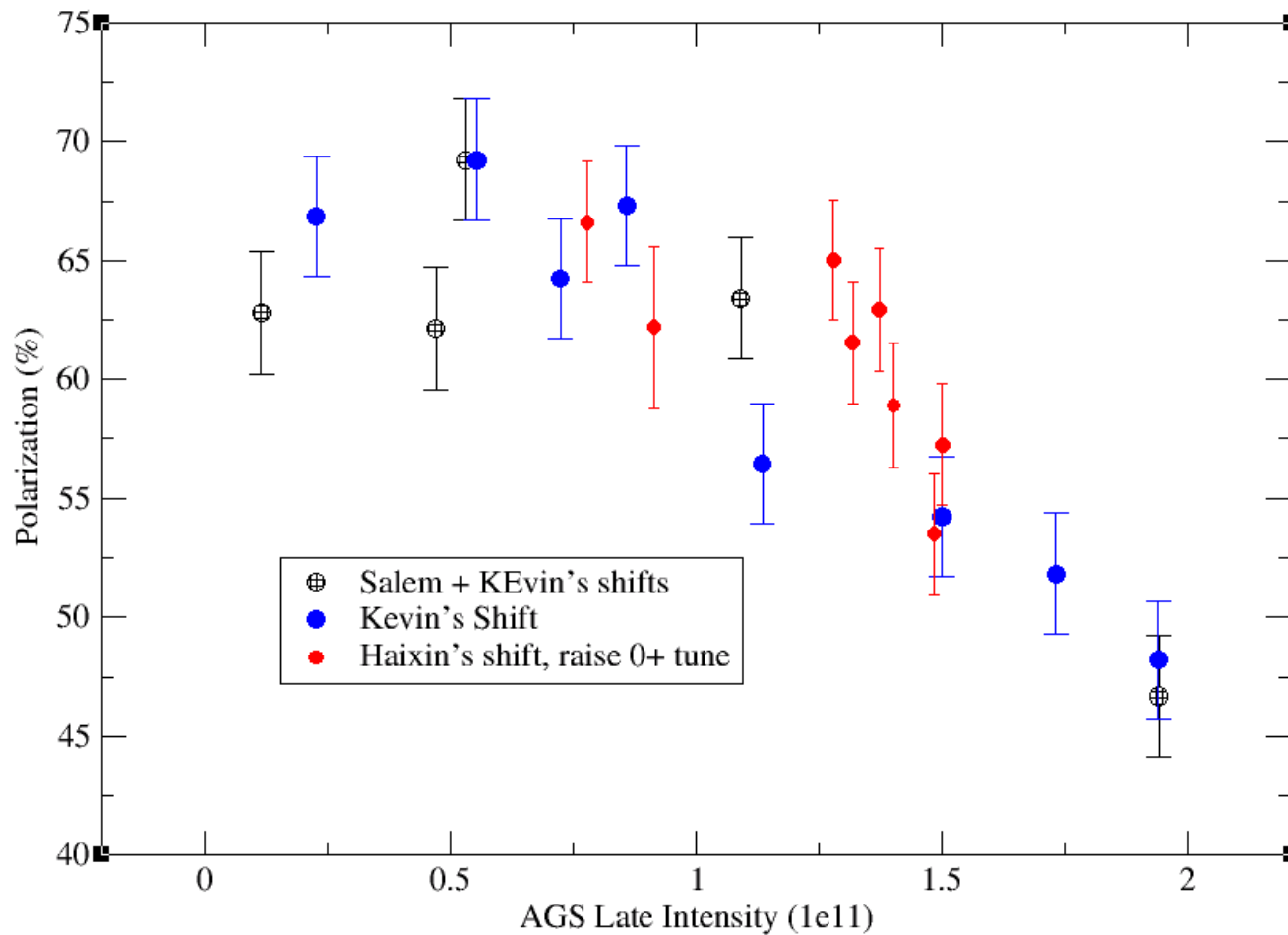


40K



G0: X, Y = [-0.402176, 34.134]

AGS pp log, 23 Feb 09, 00:26

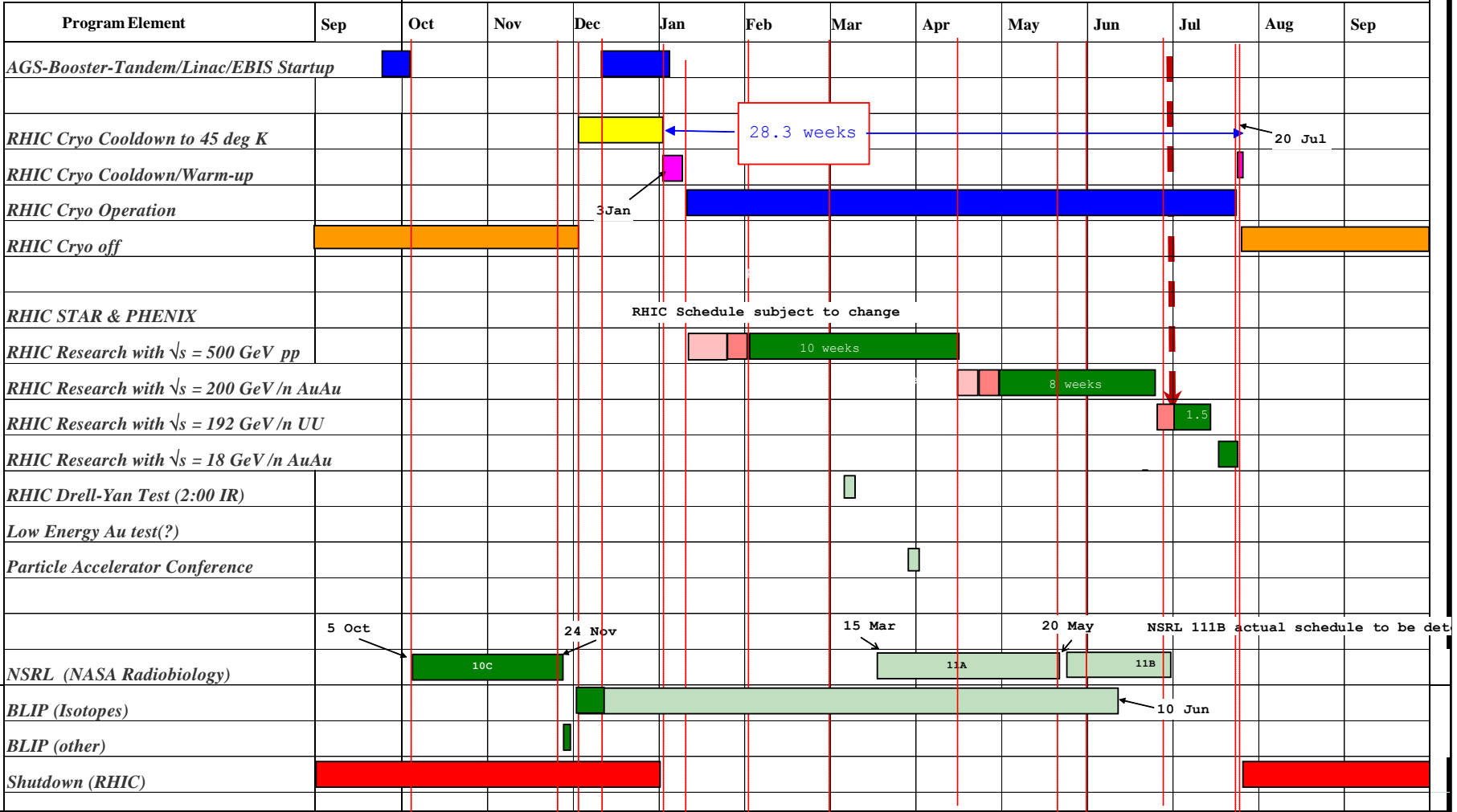


C-A Operations-FY11

planned (budget permitting)

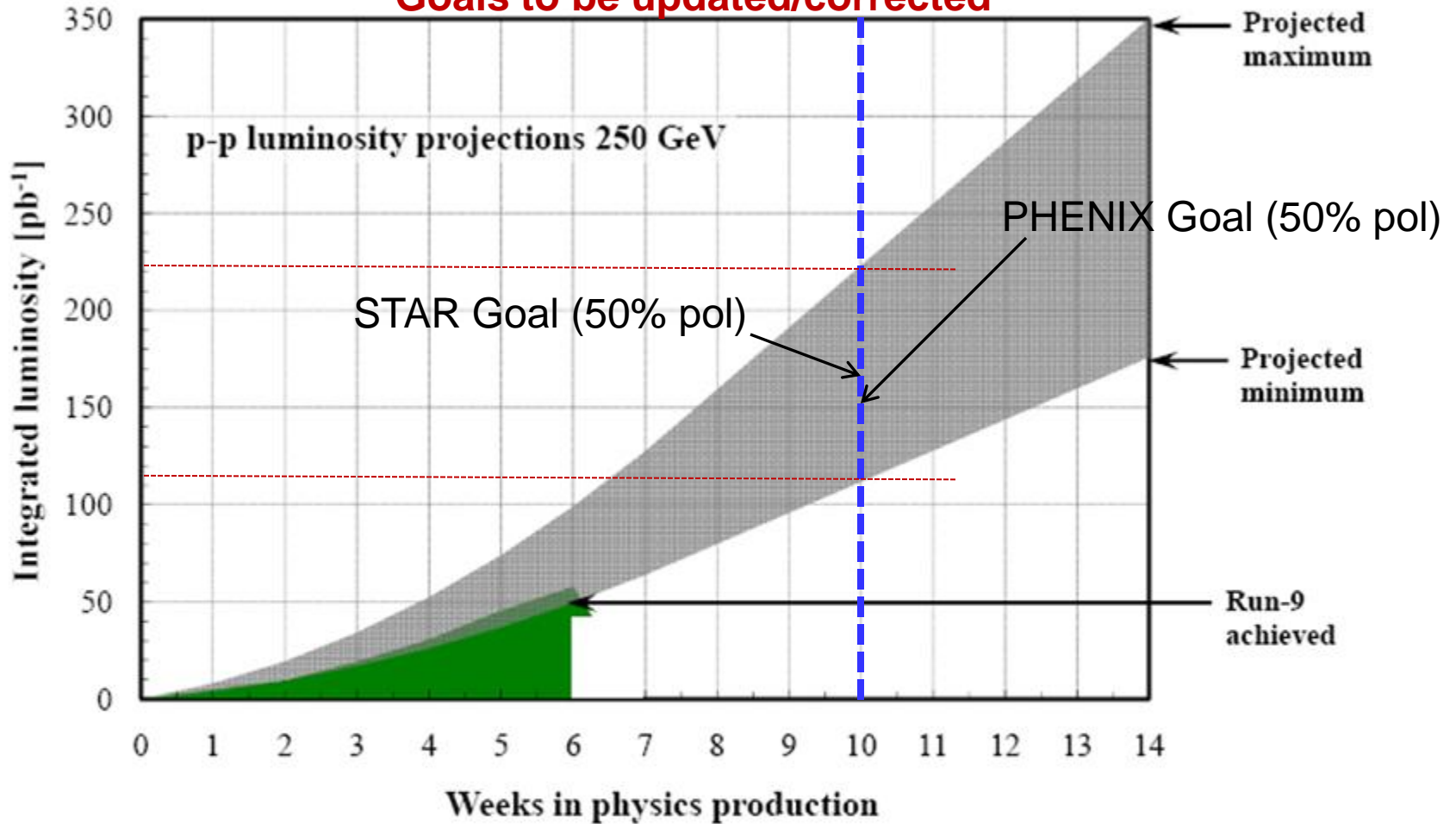
- concurrent with RHIC
- setup with beams
- ramp up luminosity

FY 2011



Run-11 p[↑]-p[↑] luminosity projections

Goals to be updated/corrected

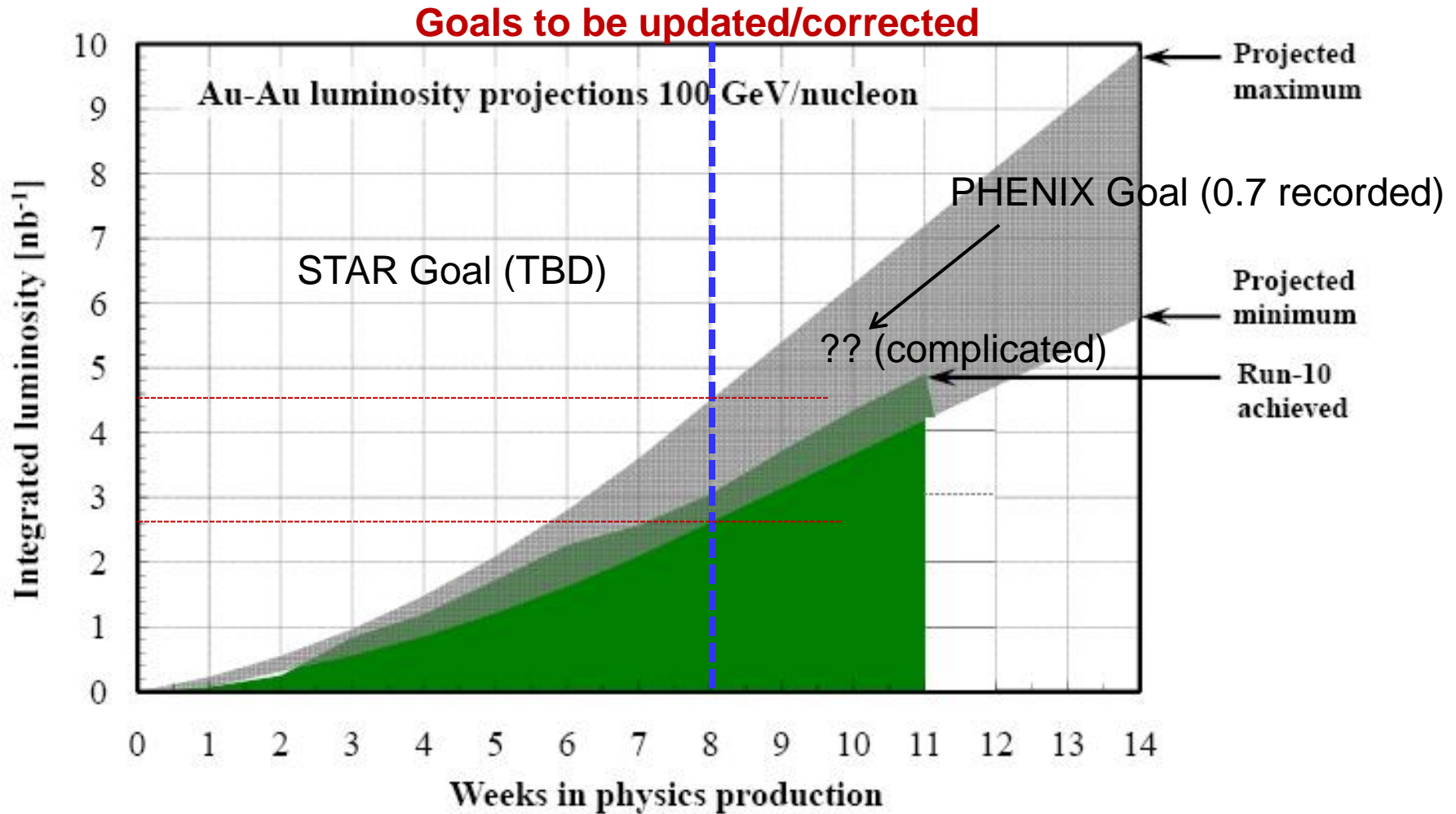


Assume 8 weeks to ramp-up for max.

Expect store $P_{\text{avg}} = 35\text{-}50\%$, L_{avg} up to $100 \times 10^{30} \text{cm}^{-2} \text{s}^{-1}$ (+80%).

[from Run-9 to max projection: $\beta^* = 0.7 \rightarrow 0.6 \text{ m}$, $N_b = 1.1 \rightarrow 1.4 \times 10^{11}$]

Run-11 Au-Au luminosity projections 100 GeV/nucleon



Assume 6 weeks to ramp-up for min, and 8 weeks for max (stoch. cooling re-commissioning).

Expect L_{avg} up to $25 \times 10^{26} \text{cm}^{-2} \text{s}^{-1}$ (+25%).

[from Run-10 to max: $\beta^* = 0.75 \rightarrow 0.65$ m, $N_b = 1.1 \rightarrow 1.1 \times 10^9$, more cooling]