RUN 11 RHIC MACHINE/EXPERIMENTS MEETING

5 Apr 2011

Agenda: Open

RUN 11 RHIC MACHINE/EXPERIMENTS MEETING

DECISIONS

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

Decisions (cont')

- 3/25/2011: AnDY Collisions (W. Fischer, L. Bland, E. Aschenauer, S. Vigdor):

(1) A. Drees will test the sequence developed to address both orbit and tune effects of AnDY at the end of a store (or multiple stores if needed).

(2) When the proper functioning of the sequence is demonstrated we will go back to a 1.05e11/bunch threshold, and increase every store by another 0.05e11/bunch until we reach a 10-20% luminosity impact on STAR and PHENIX. In the event the prescribed bunch intensity is not reached during the store then AnDY should be steered into collision during the last 30 minutes of the store.

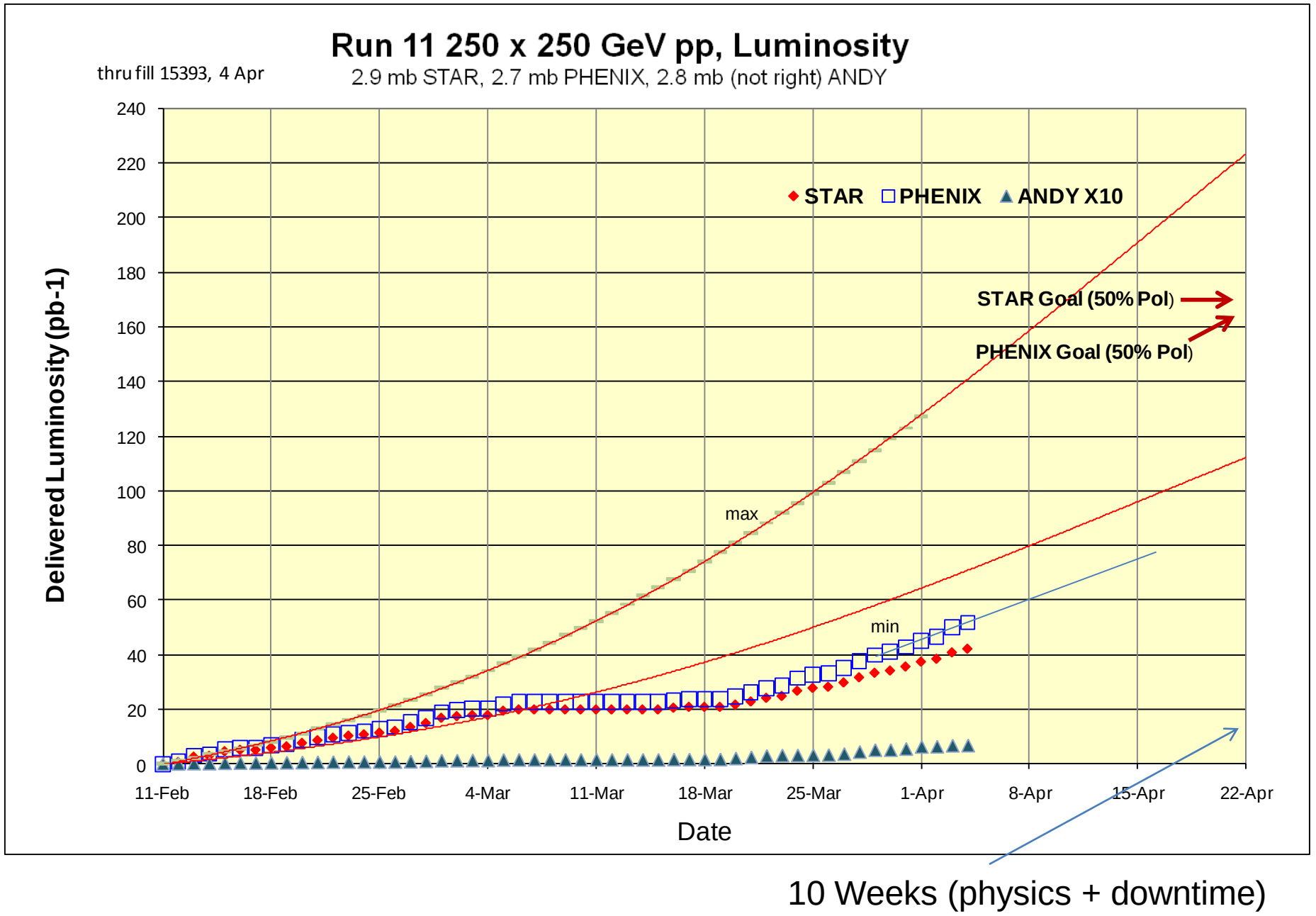
(3) When the tune scan on the ramp finishes (~2 more tune to test), we will increase the store length to 10h or more, (with PHENIX/STAR concurrence), with this AnDY will have more time available after turning on.

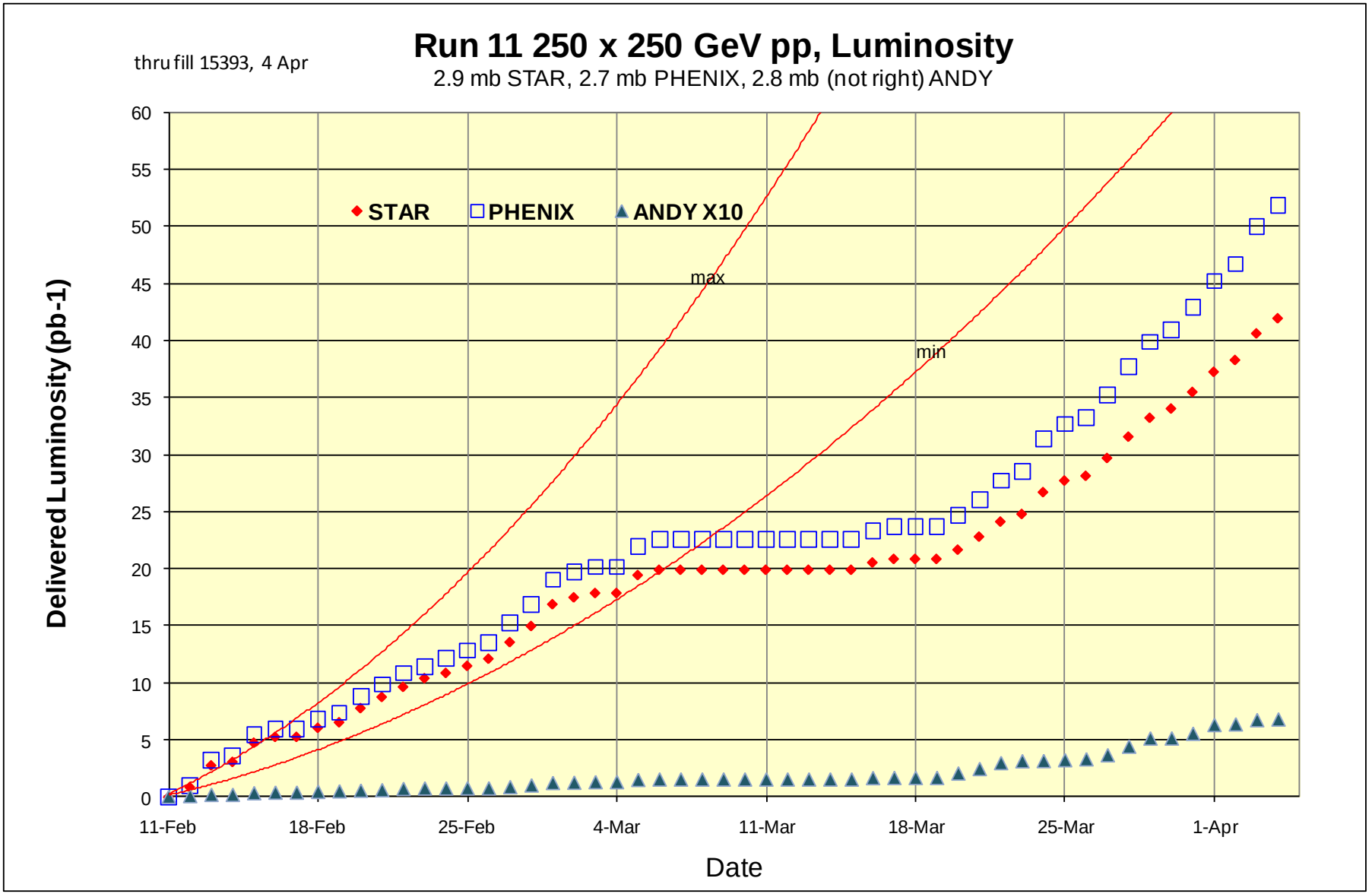
Run 11 Plan based on PAC recommendation/ALD Guidance and 28.3 weeks cryo operation 3/22/10 update

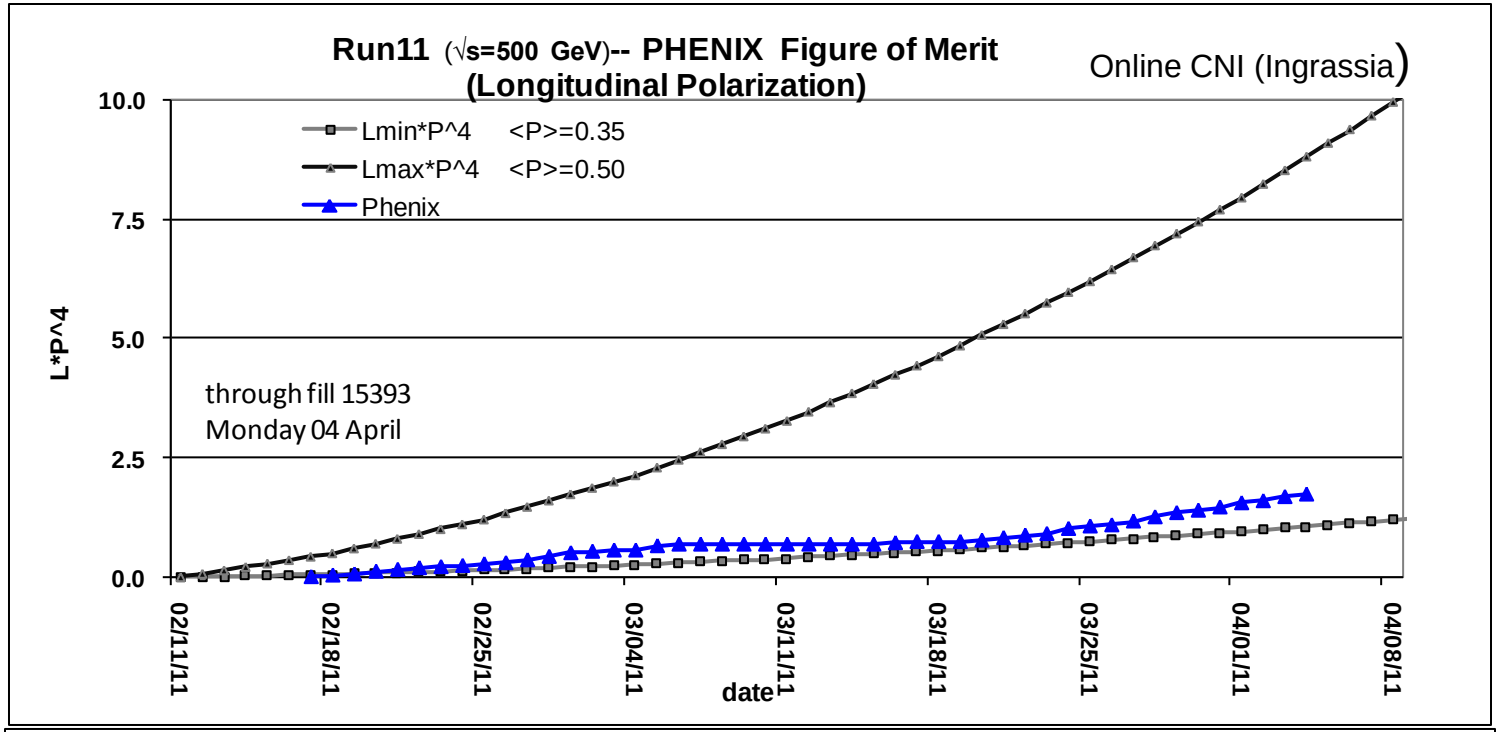
- 3 Jan, Begin cool-down to 4.5K
- 8 Jan, Cool-down to 4.5K complete in both rings, preliminary setup begins
- ~11 Jan, 2 ½ weeks beam setup for √s = 500 GeV pp in RHIC begins.
- 15 Jan, power supply work/DX training complete
- 17 Jan, first successful ramp
- 19 Jan, 1st maint day
- ~~27~~ 24 Jan, 1 week Ramp-up with 8 hr/night beam to experiments
- ~~3~~ **11 Feb (machine and ~experiments), begin 10(?) week physics run (√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 2.3 days
- **28 March – 1 April, PAC 2011**
- ~~**4 18 March –**~~ **8 April Continuing Resolution Ends**
- **14 Apr(?), end less than 10 week physics run at √s = 500 GeV pp run**
- 14 Apr, begin 1 week setup for √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 (√s = 200 AuAu)**
- **23 Jun, end 8 week √s = 200 AuAu run**
- 23 Jun, begin setup for √s = 192 GeV UU
- **30 Jun, begin 1½ week physics run (√s = 192 UU)**
- **4 July – completed 26 weeks of cryo operation, may be out of $$'s**
- **10 Jul, end 1½ week physics run at √s = 192 GeV**
- 10 Jul, begin setup for √s = 18 GeV AuAu
- **11 Jul, begin 1 week physics run (√s = 18 AuAu)**
- **18 Jul, end 1 week physics run at √s = 18 GeV**
- 20 Jul, warm-up complete (28.3 weeks)

Possible additions:

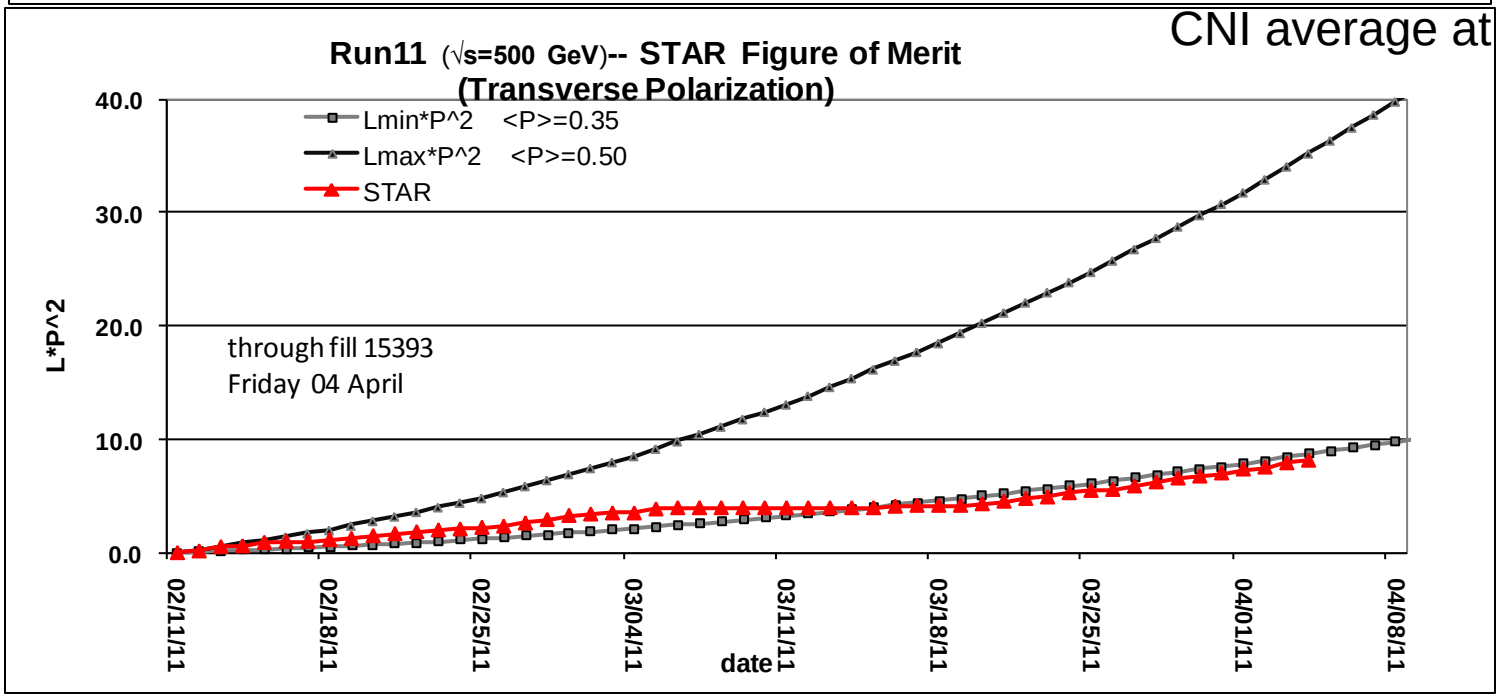
- Low energy test run


Run 11 250 x 250 GeV pp, Luminosity
thru fill 15393, 4 Apr
2.9 mb STAR, 2.7 mb PHENIX, 2.8 mb (not right) ANDY
Delivered Luminosity (pb-1)
240
220
200
180
160
140
120
100
80
60
40
20
0
STAR
PHENIX
ANDY X10
STAR Goal (50% Pol)
PHENIX Goal (50% Pol)
max
min
11-Feb
18-Feb
25-Feb
4-Mar
11-Mar
18-Mar
25-Mar
1-Apr
8-Apr
15-Apr
22-Apr
Date
10 Weeks (physics + downtime)


Run 11 250 x 250 GeV pp, Luminosity
2.9 mb STAR, 2.7 mb PHENIX, 2.8 mb (not right) ANDY
thru fill 15393, 4 Apr
STAR
PHENIX
ANDY X10
max
min
Delivered Luminosity (pb-1)
Date
0
5
10
15
20
25
30
35
40
45
50
55
60
11-Feb
18-Feb
25-Feb
4-Mar
11-Mar
18-Mar
25-Mar
1-Apr

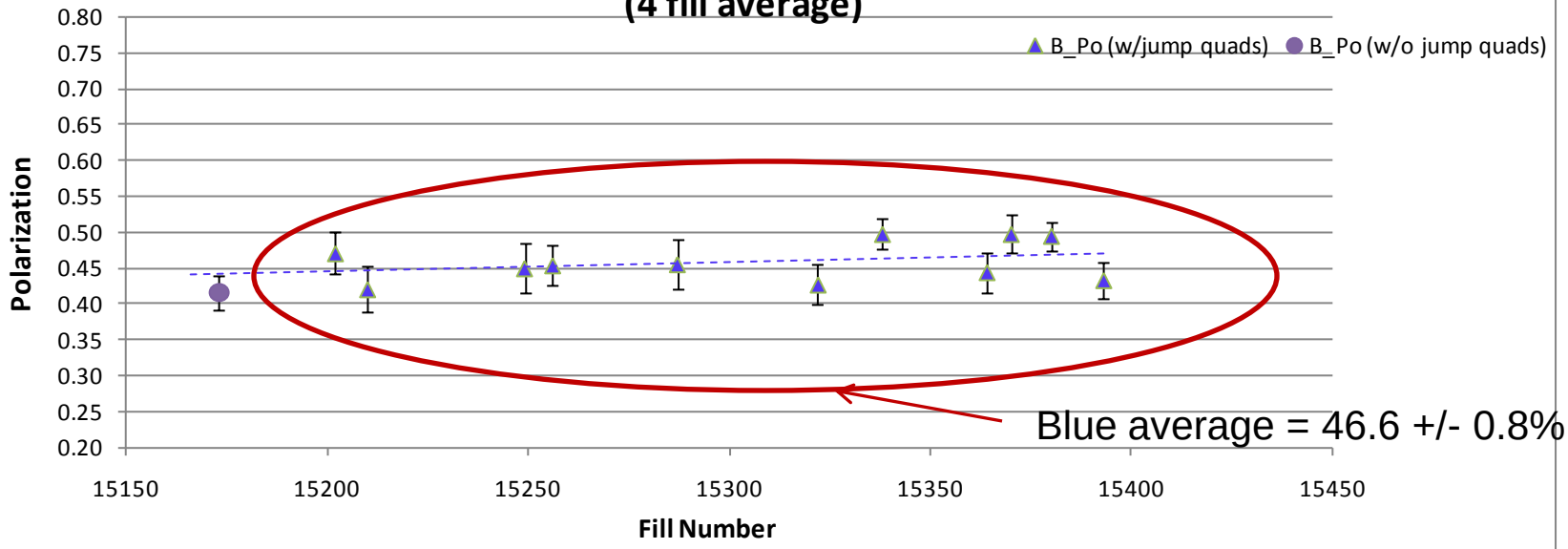


CNI average at store



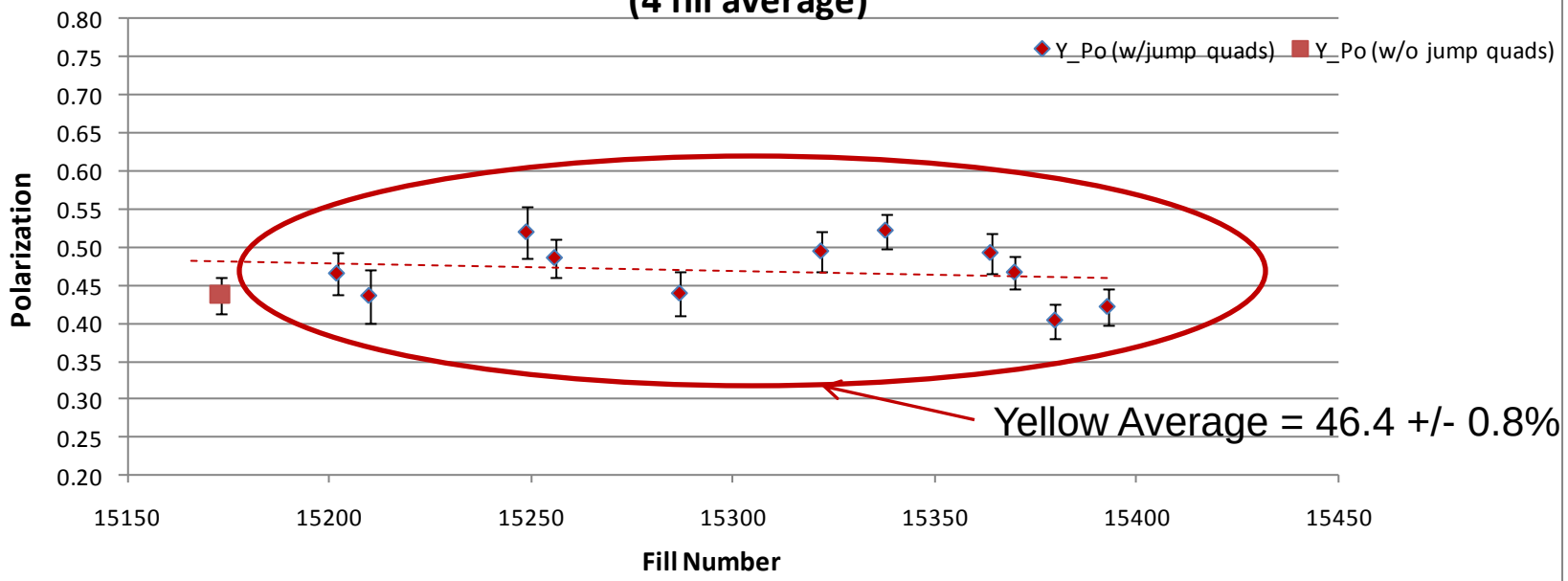
4/4/2011
fill 15393

Run 11 polarization as measured with jet target (4 fill average)

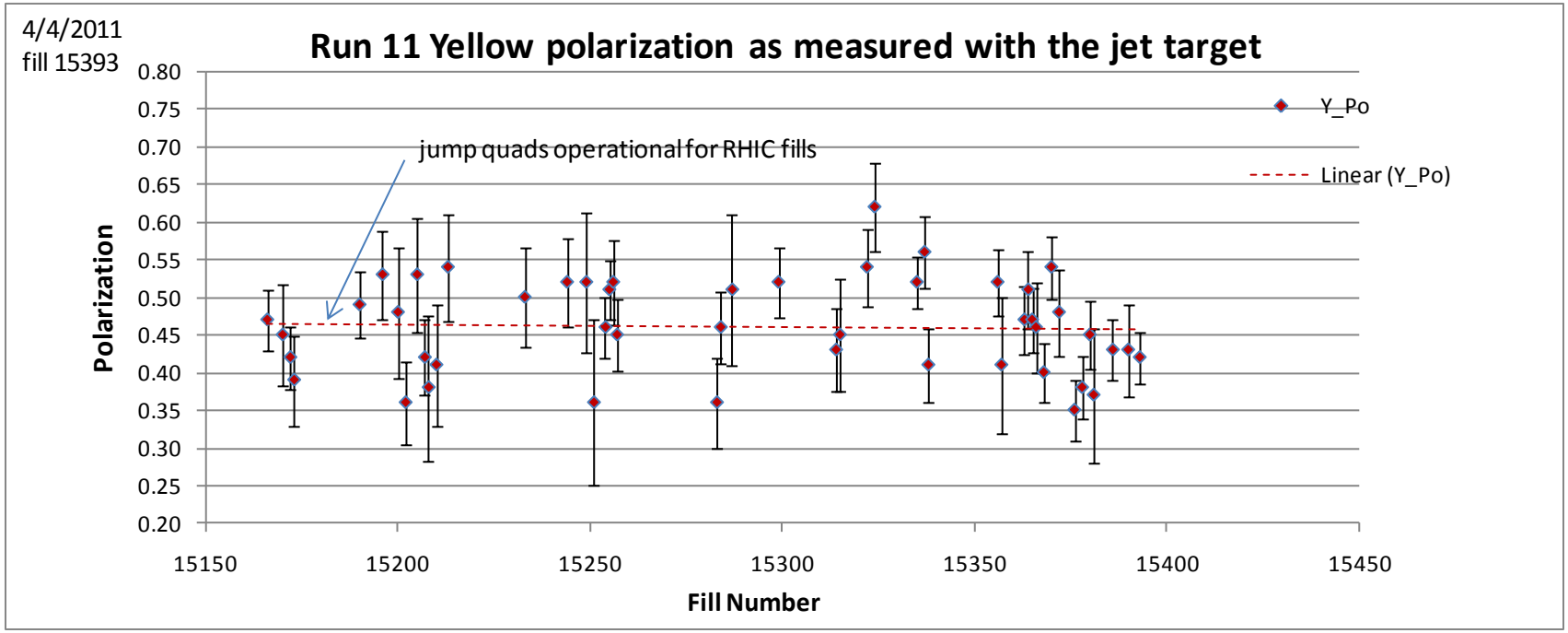


4/4/2011
fill 15393

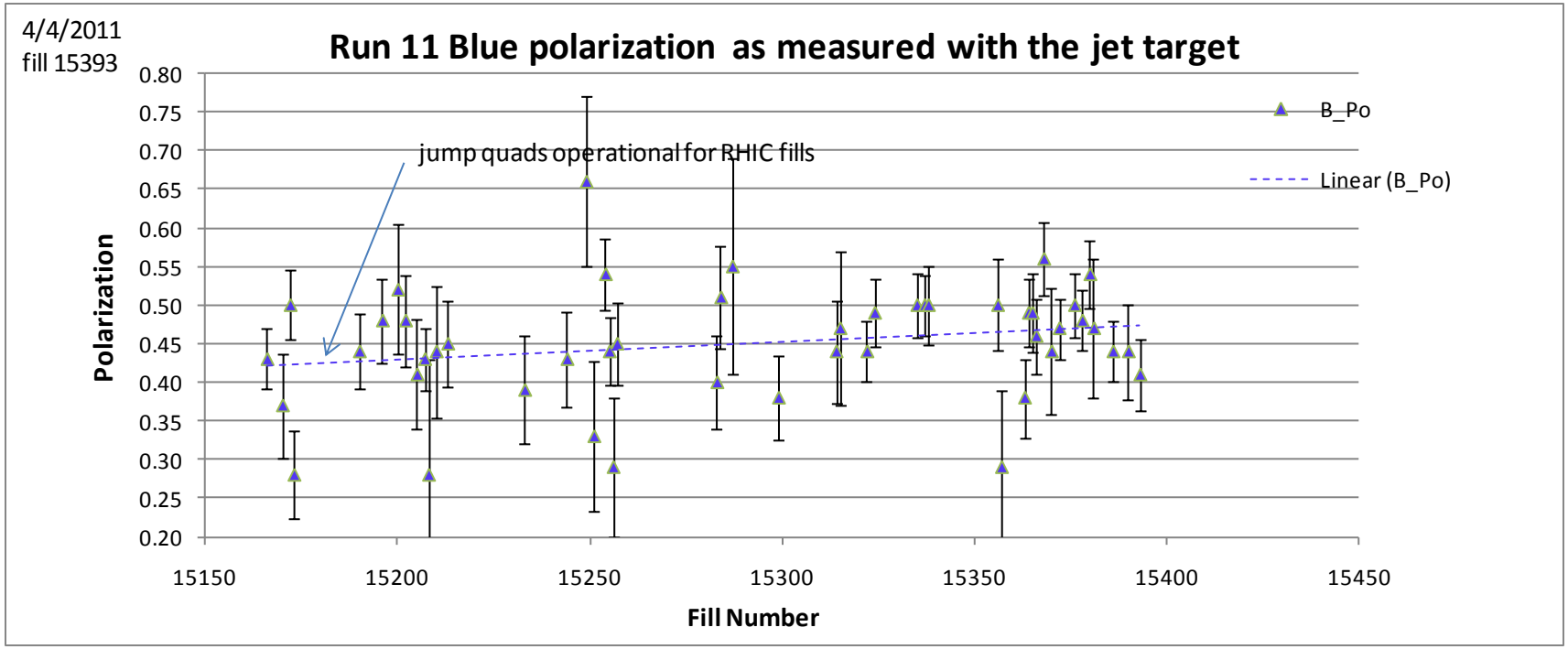
Run 11 polarization as measured with jet target (4 fill average)



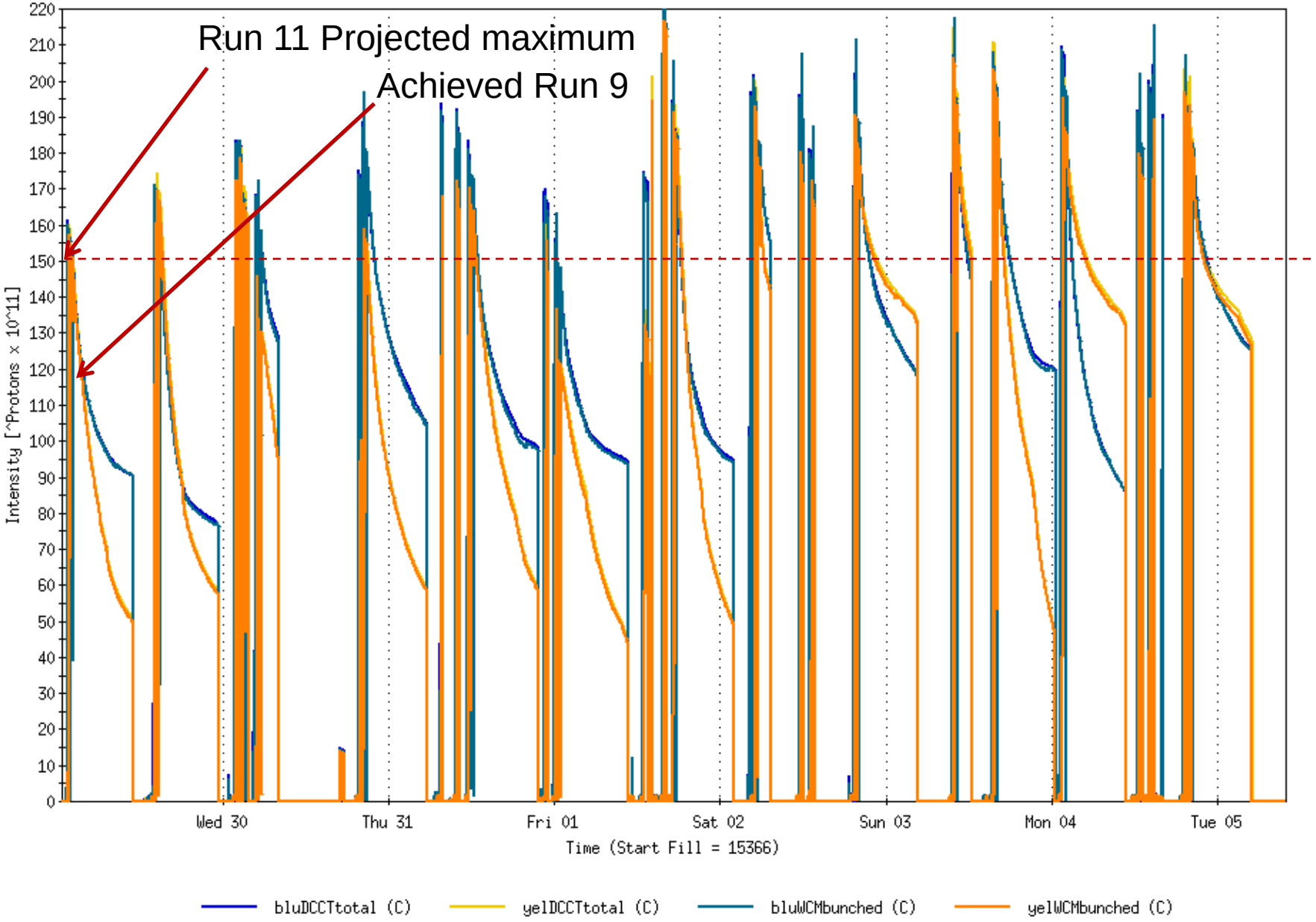
4/4/2011
fill 15393



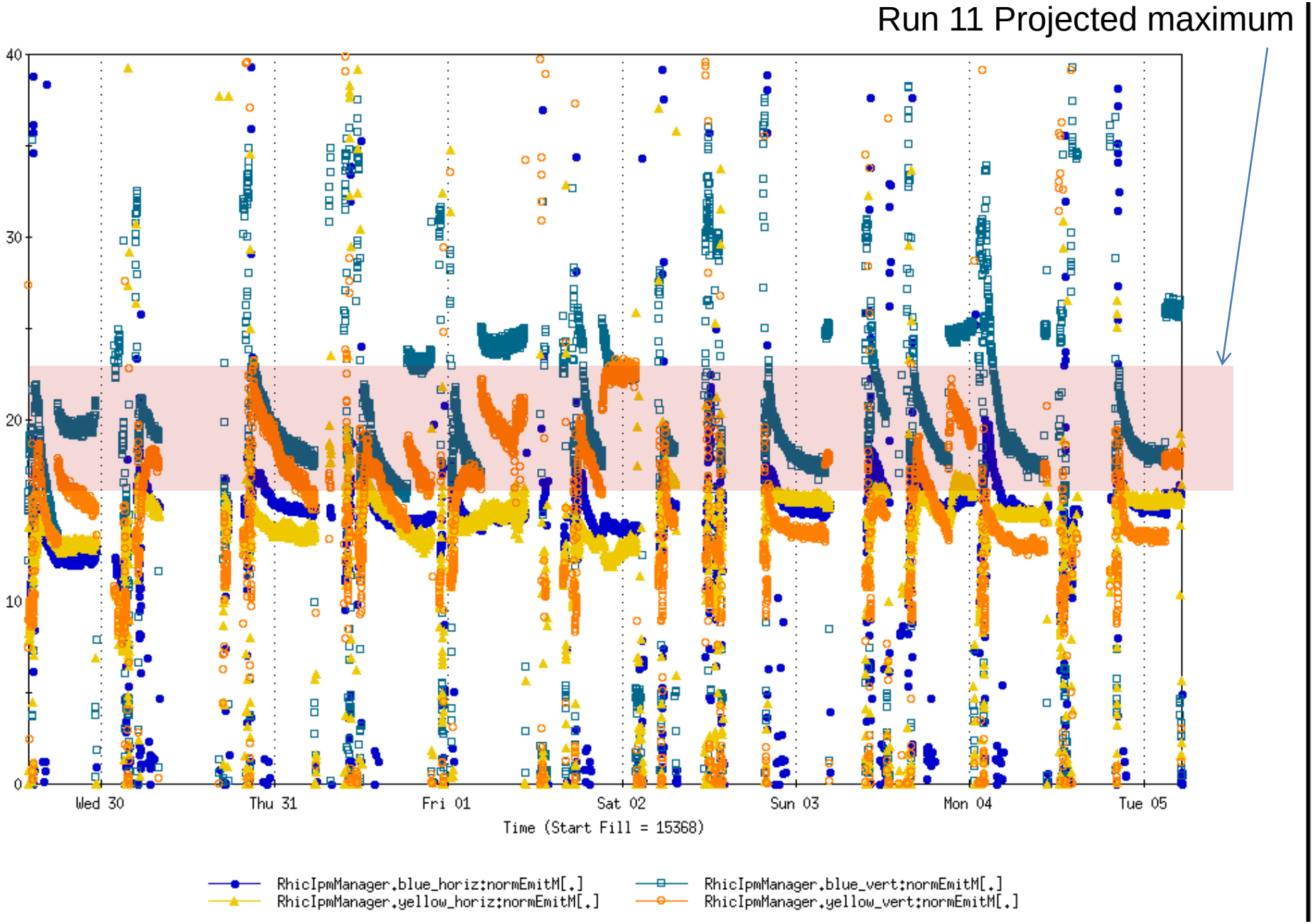
4/4/2011
fill 15393



Physics Stores 15366 through 15397

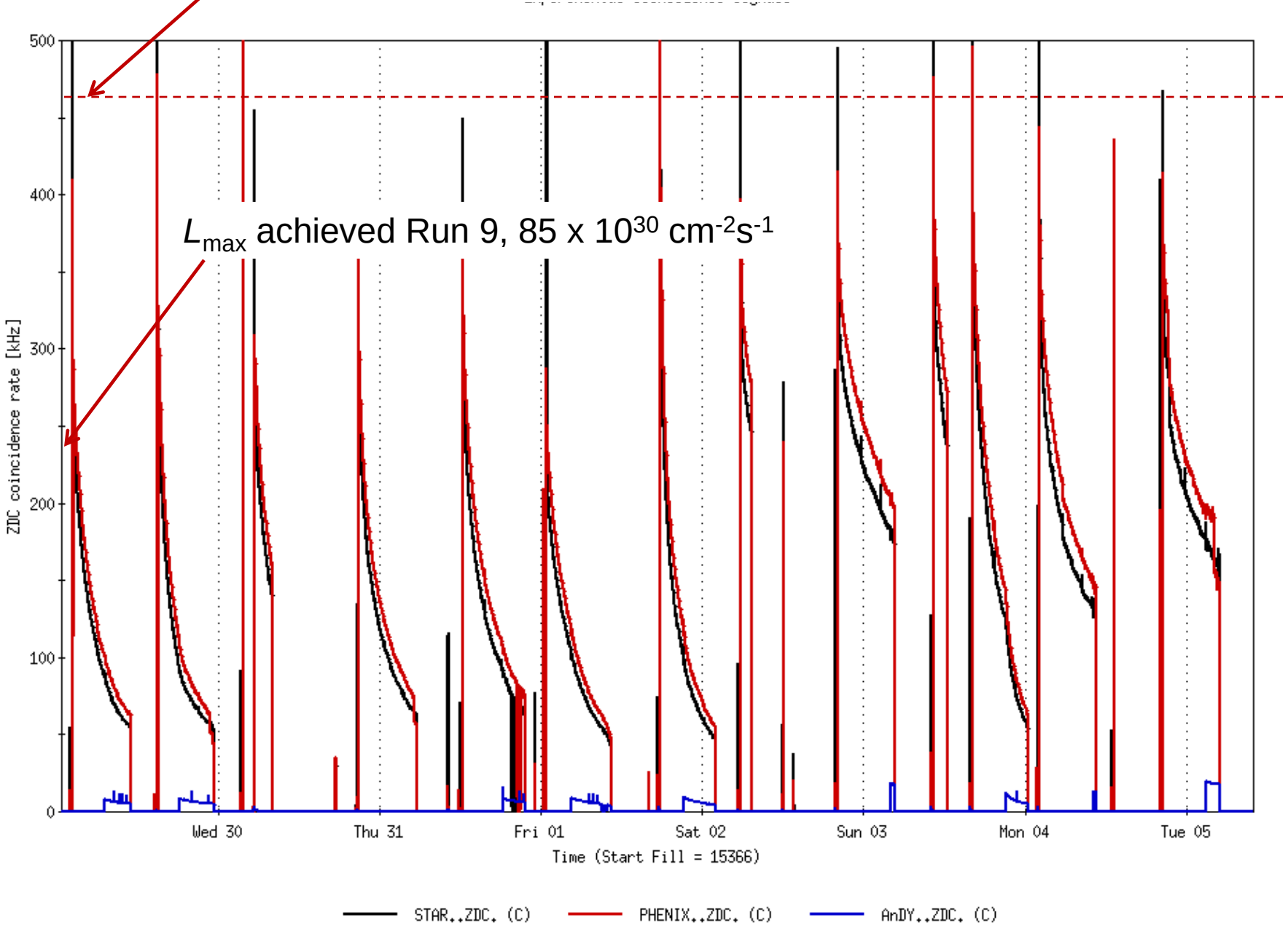


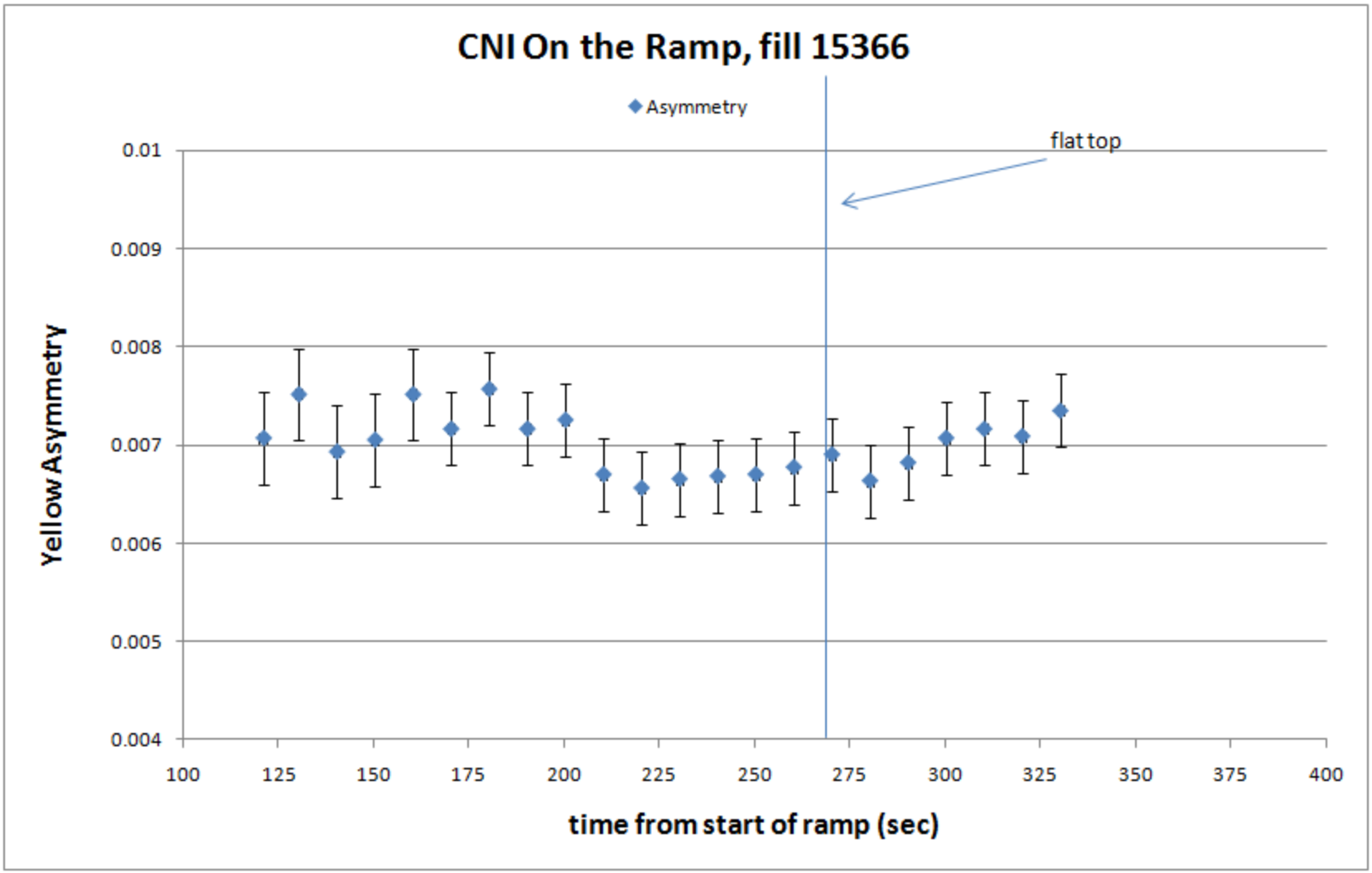
Physics Stores 15366 through 15397

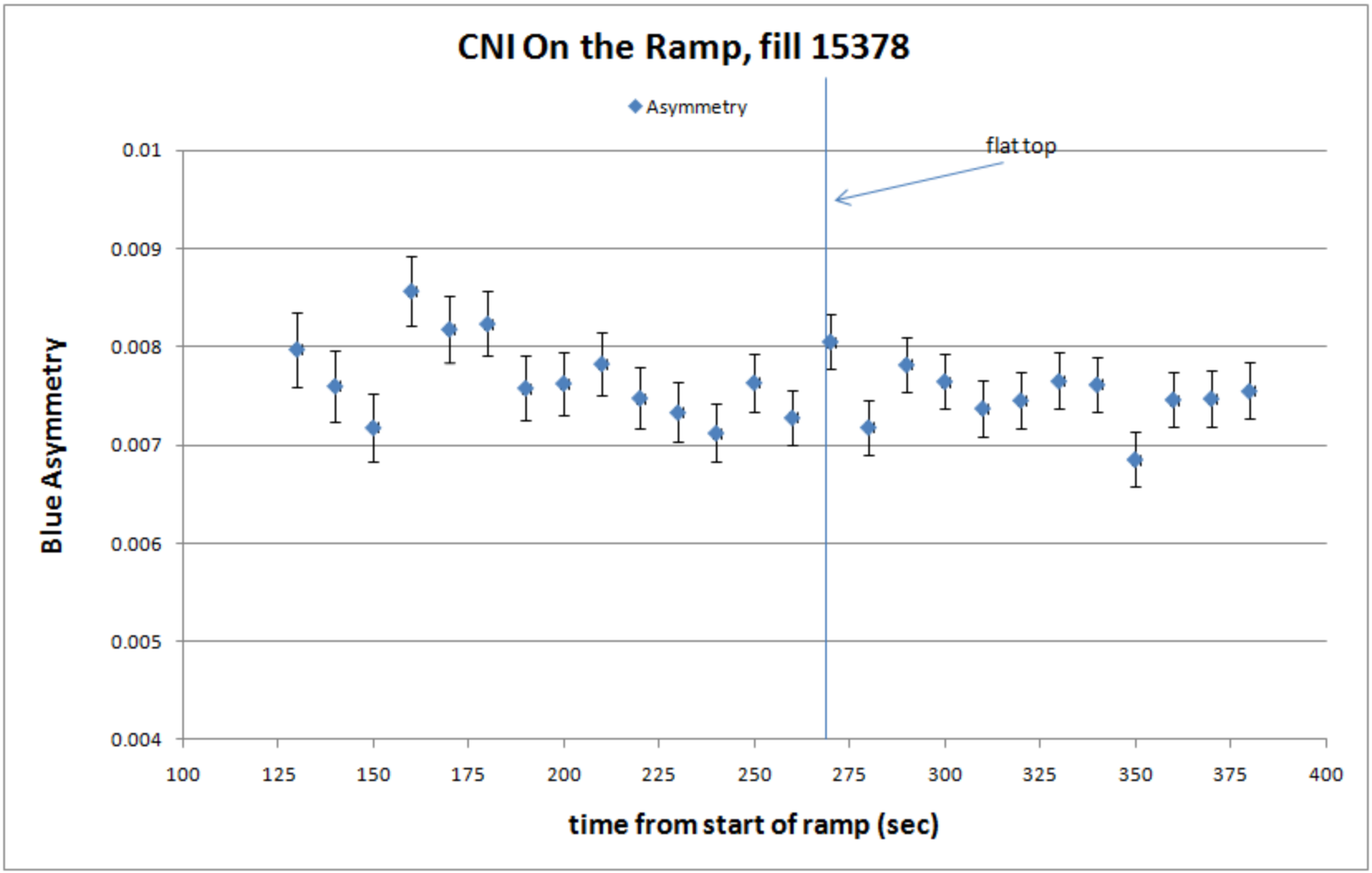


Physics Stores 15366 through 15397

L_{max} = 170 x 10^{30} $cm^{-2}s^{-1}$ (projection with 2.7 mb xsection)




CNI On the Ramp, fill 15366
Asymmetry
flat top
Yellow Asymmetry
0.01
0.009
0.008
0.007
0.006
0.005
0.004
100
125
150
175
200
225
250
275
300
325
350
375
400
time from start of ramp (sec)


CNI On the Ramp, fill 15378
Asymmetry
flat top
0.01
0.009
0.008
0.007
0.006
0.005
0.004
Blue Asymmetry
100
125
150
175
200
225
250
275
300
325
350
375
400
time from start of ramp (sec)

CNI Polarization asymmetry measurements on the ramp analysis

Assume the jet target measurements are correct, then:

- Polarization at 100 GeV ~ 60%
- Polarization at 250 GeV ~ 50%

Then:

- Calculate effective analyzing power for the first 100 and first 250 GeV asymmetry points to force 60%/50% polarization at 100 GeV/250 GeV

Get:

- 100 GeV analyzing power = 0.0118
- 250 GeV analyzing power = 0.0138

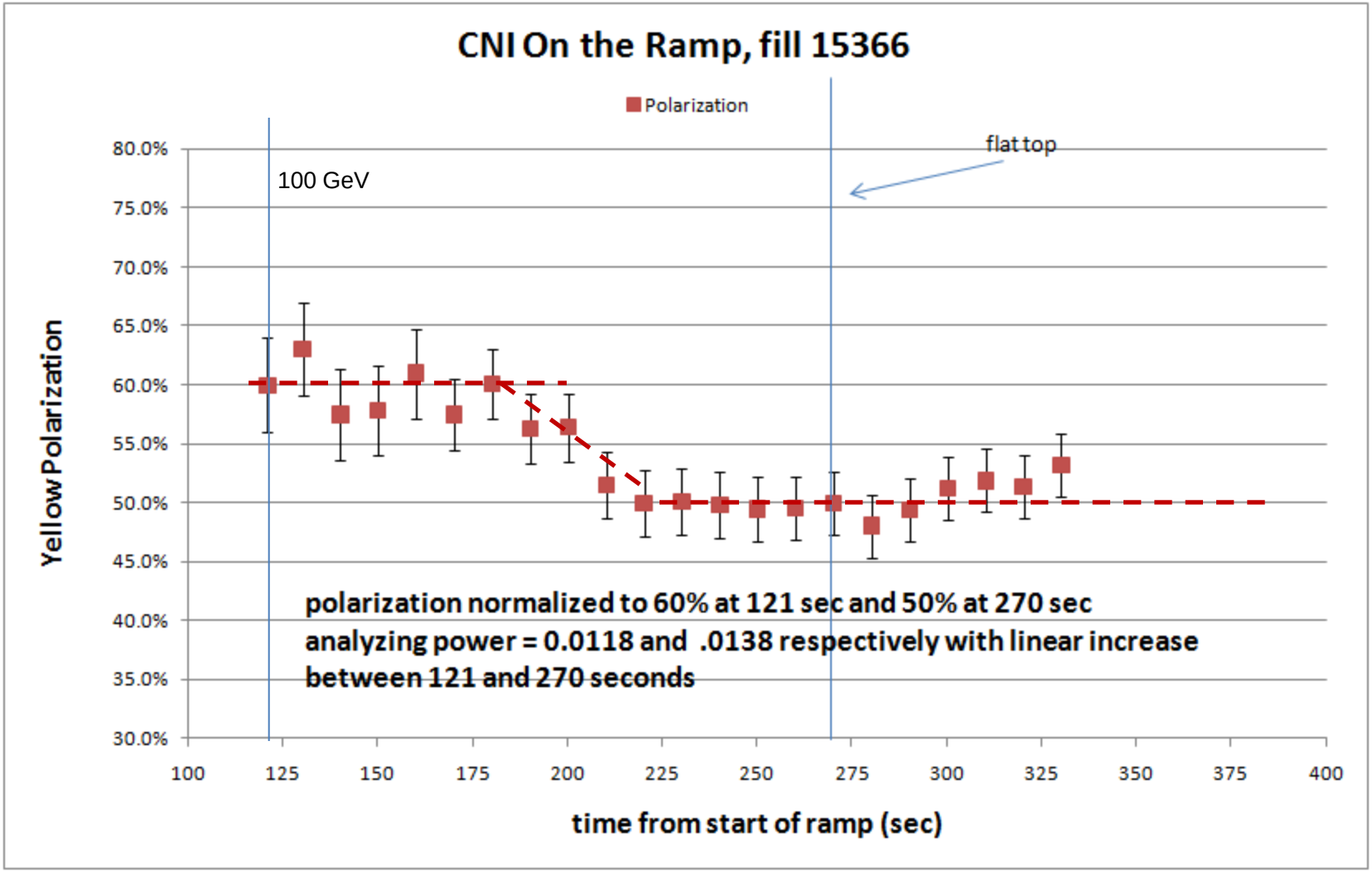
Assume:

- Analyzing power varies linearly from 100 GeV to 250 GeV

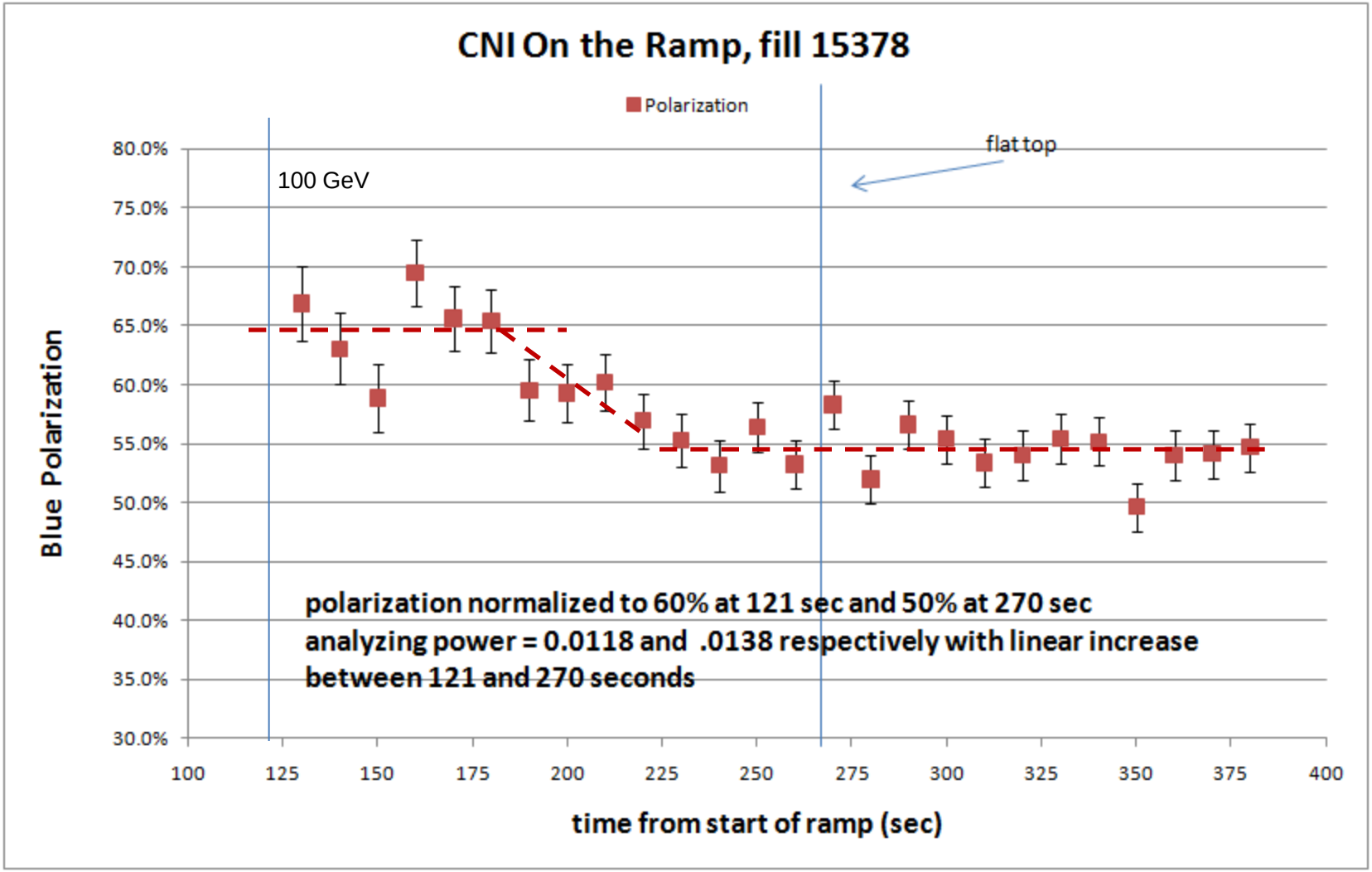
Then:

- Calculate polarization for each point (Asymmetry/Analyzing Power)

Yellow


CNI On the Ramp, fill 15366
Polarization
flat top
100 GeV
80.0%
75.0%
70.0%
65.0%
60.0%
55.0%
50.0%
45.0%
40.0%
35.0%
30.0%
Yellow Polarization
100
125
150
175
200
225
250
275
300
325
350
375
400
time from start of ramp (sec)
polarization normalized to 60% at 121 sec and 50% at 270 sec
analyzing power = 0.0118 and .0138 respectively with linear increase
between 121 and 270 seconds

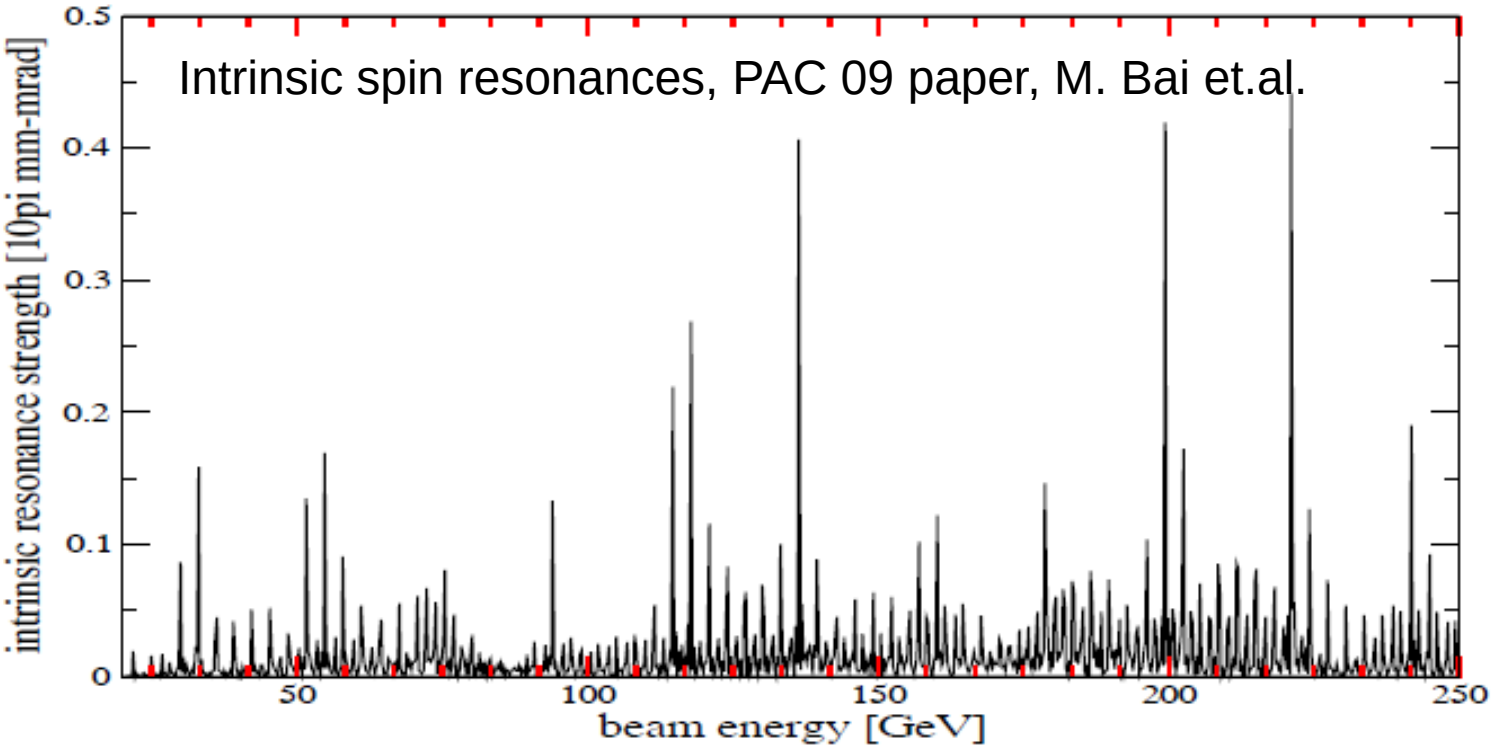
Blue


CNI On the Ramp, fill 15378
Polarization
flat top
100 GeV
80.0%
75.0%
70.0%
65.0%
60.0%
55.0%
50.0%
45.0%
40.0%
35.0%
30.0%
Blue Polarization
100
125
150
175
200
225
250
275
300
325
350
375
400
time from start of ramp (sec)
polarization normalized to 60% at 121 sec and 50% at 270 sec
analyzing power = 0.0118 and .0138 respectively with linear increase
between 121 and 270 seconds

CNI Polarization asymmetry measurements on the ramp analysis

Possible Conclusion

- *Likely a localized polarization drop on the ramp for both Blue and Yellow around 200 MeV*



RHIC Spin Note Jan 2002
L. Trueman

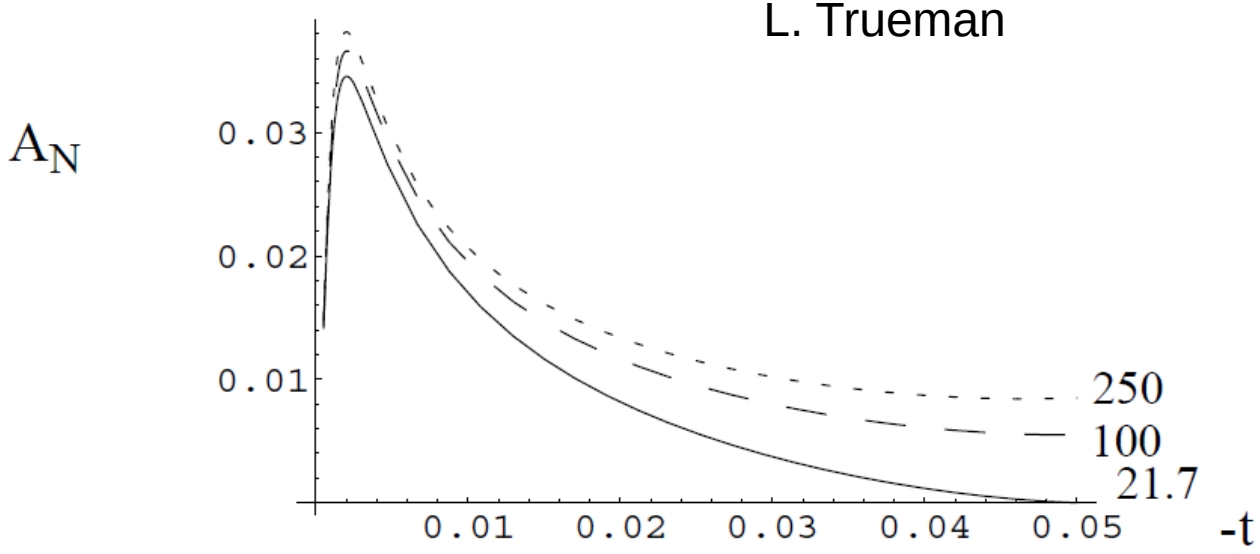
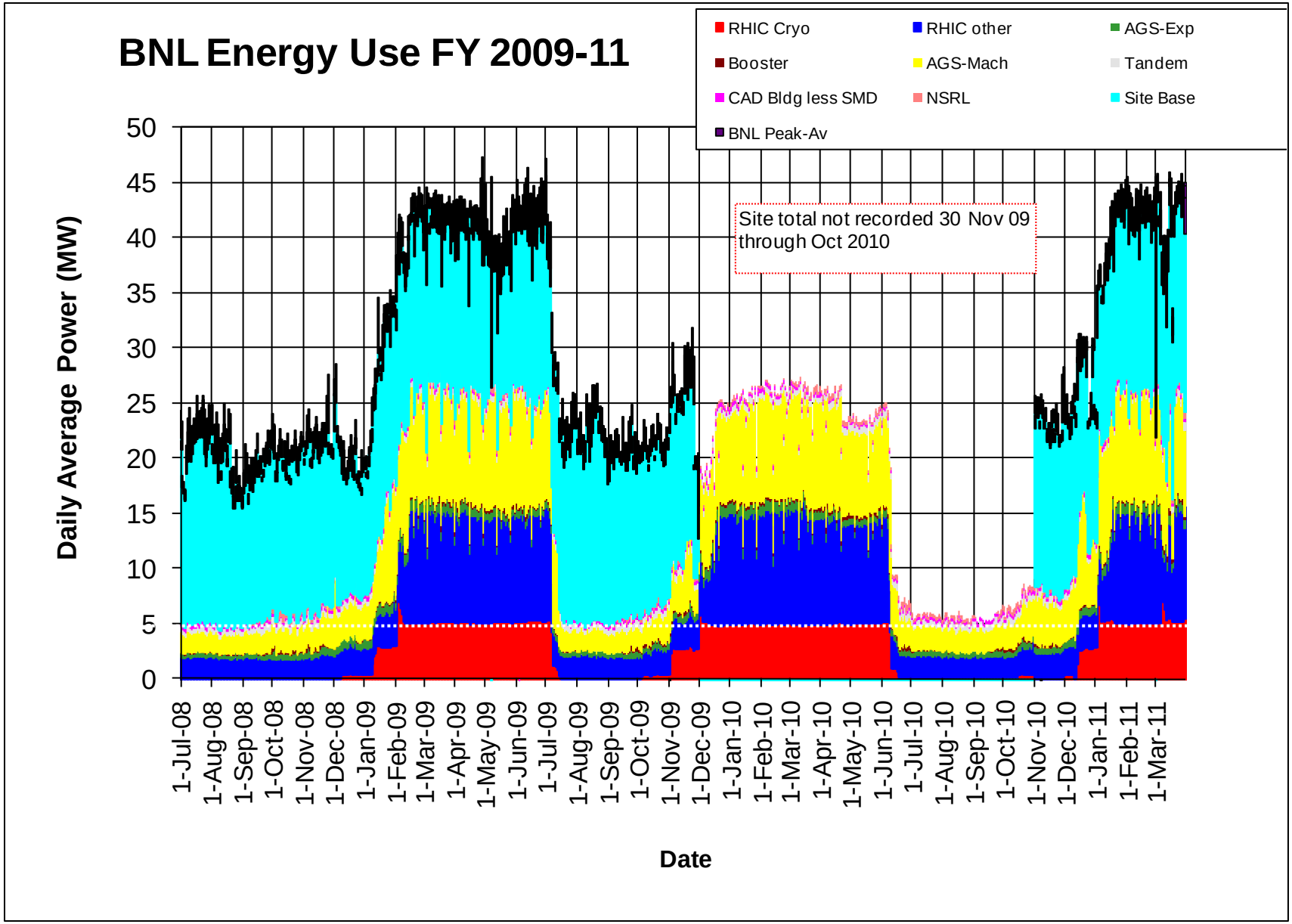
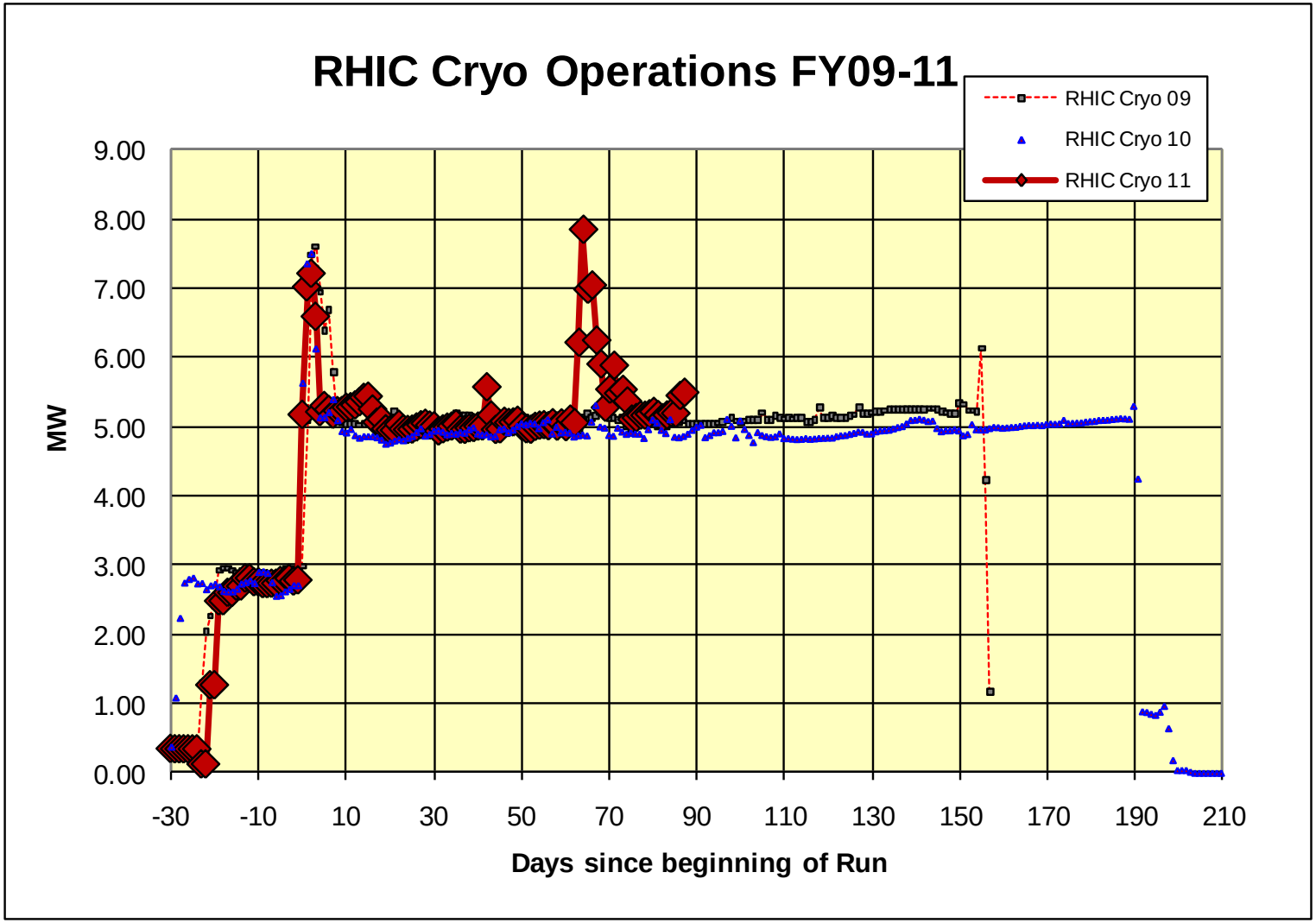


Figure 7: *The predicted analyzing power at* $p_L = 100\,GeV/c$ *and* $p_L = 250\,GeV/c$ *compared to the best fit curve at* $p_L = 21.7\,GeV/c$.

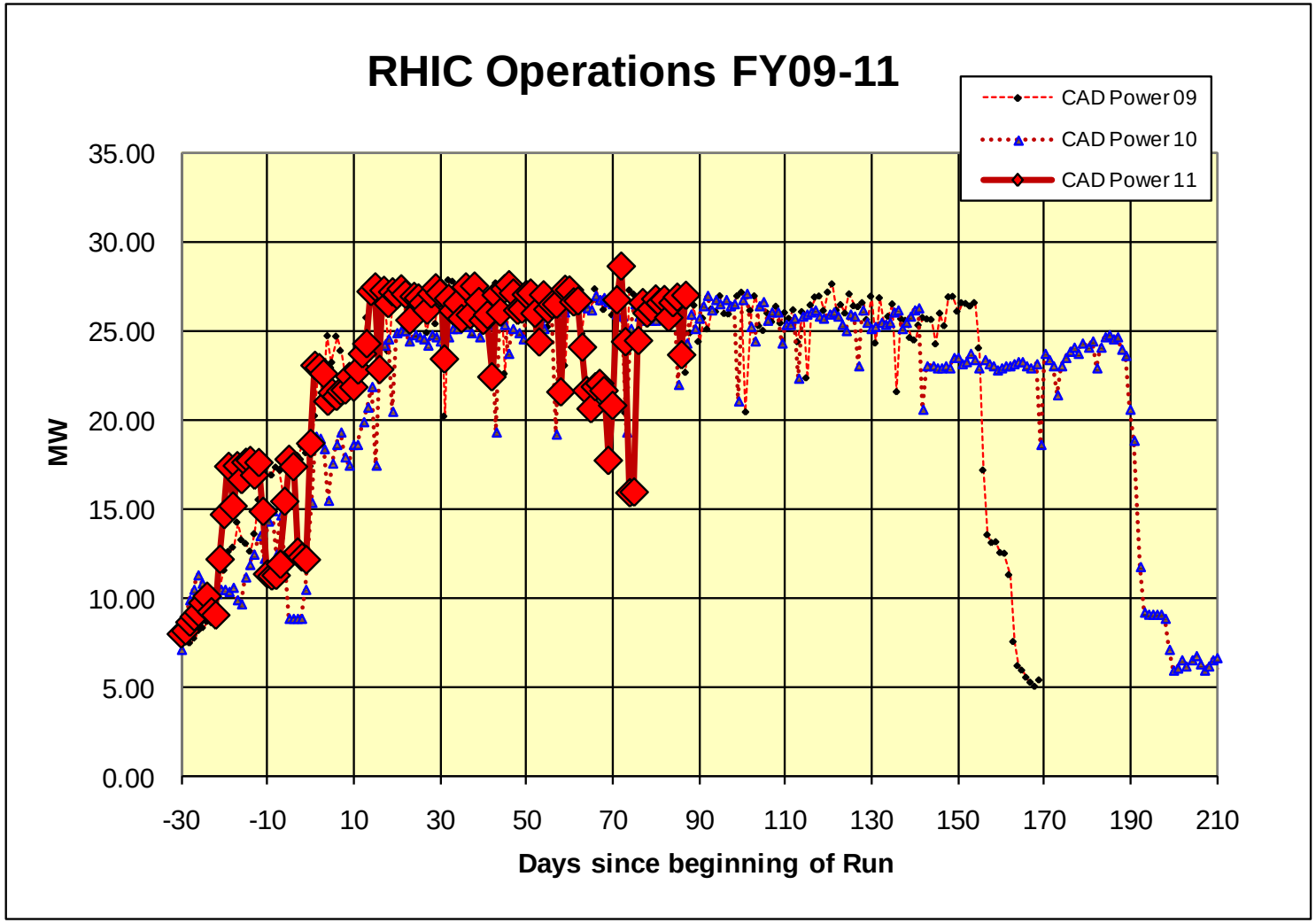
Through 31 Mar 2011



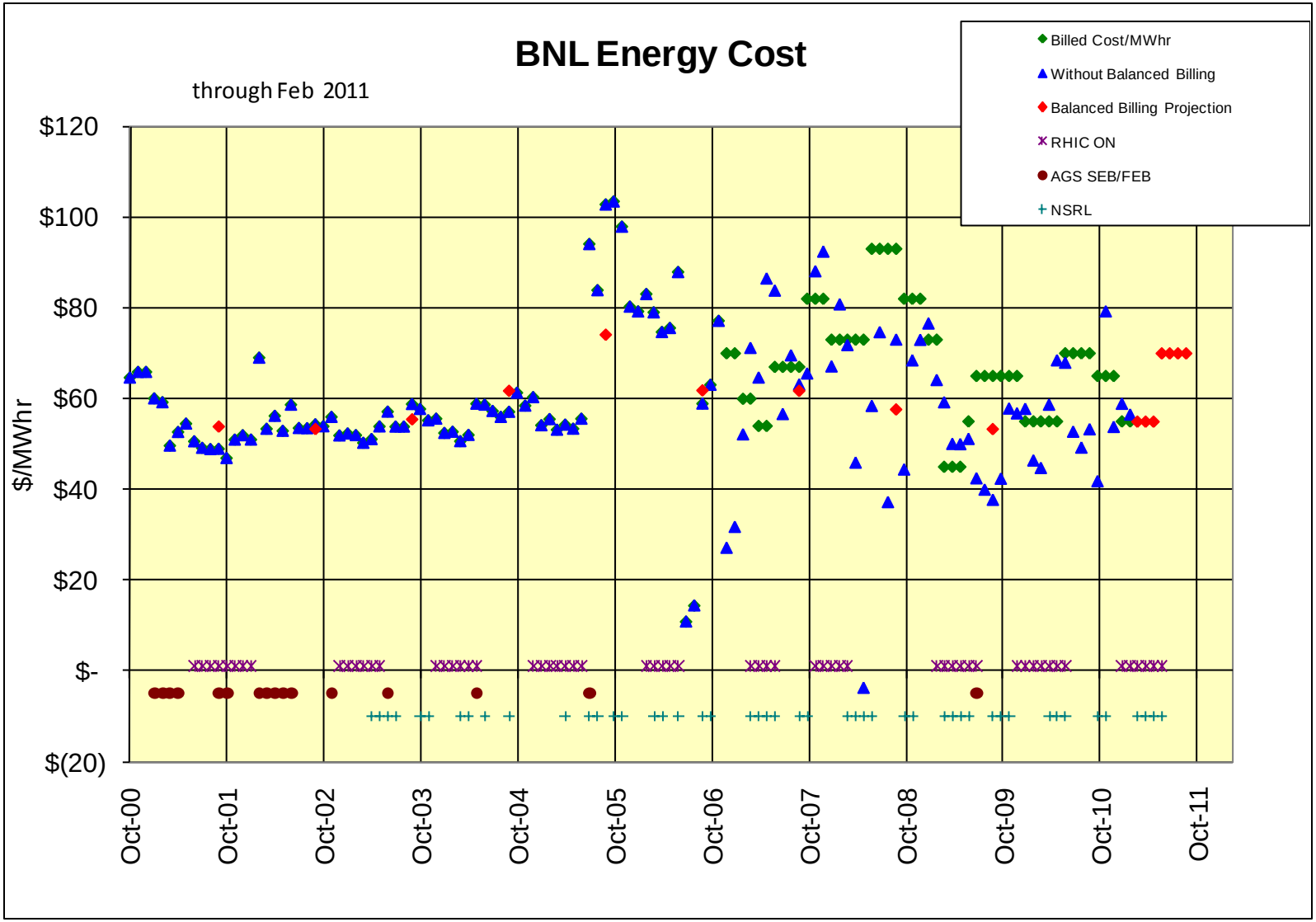
Through 31 Mar 2011

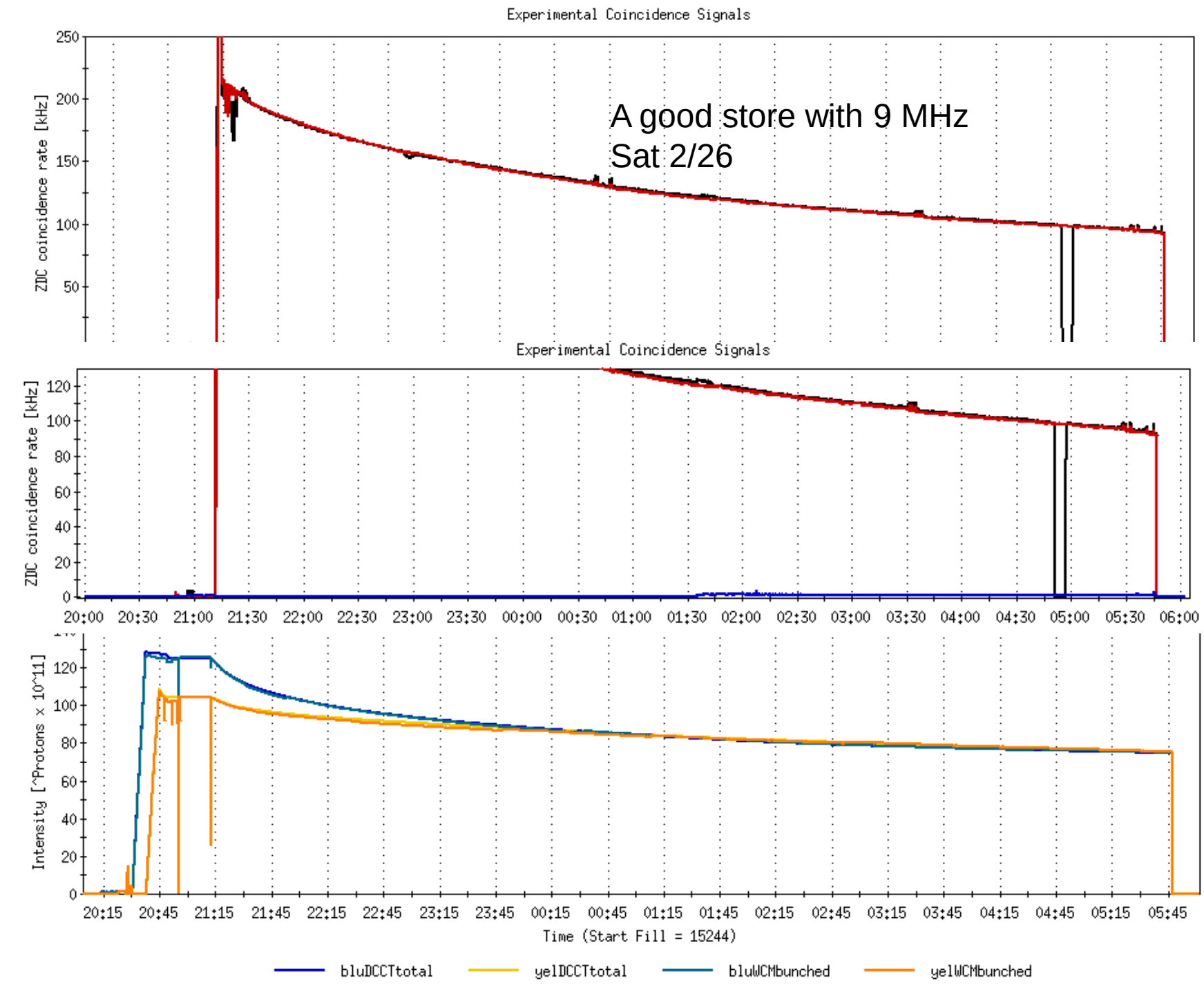


Through 31 Mar 2011



Old information

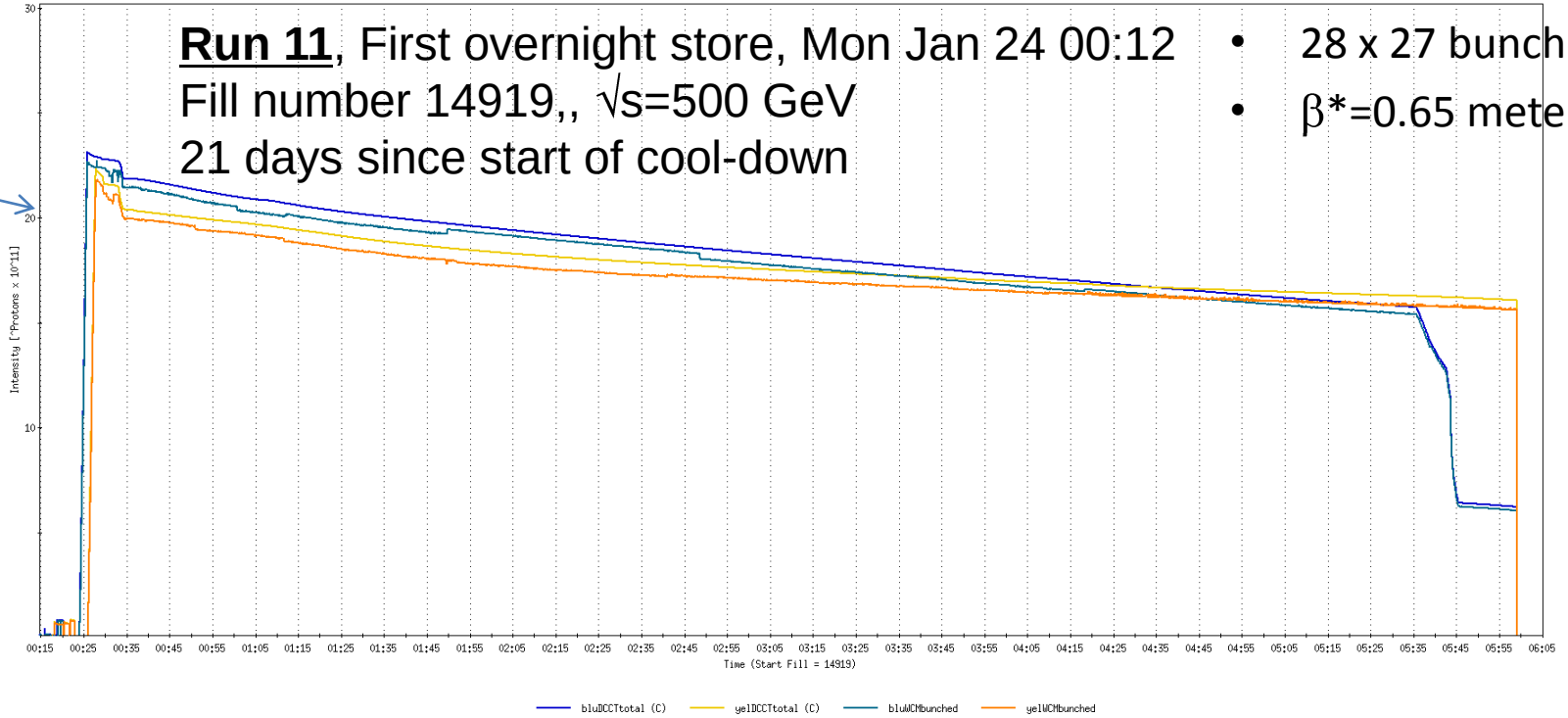

BNL Energy Cost
through Feb 2011
Billed Cost/MWhr
Without Balanced Billing
Balanced Billing Projection
RHIC ON
AGS SEB/FEB
NSRL
$120
$100
$80
$60
$40
$20
$-
$(20)
$/MWhr
Oct-00
Oct-01
Oct-02
Oct-03
Oct-04
Oct-05
Oct-06
Oct-07
Oct-08
Oct-09
Oct-10
Oct-11


Experimental Coincidence Signals
ZDC coincidence rate [kHz]
250
200
150
100
50
A good store with 9 MHz
Sat 2/26
Experimental Coincidence Signals
ZDC coincidence rate [kHz]
120
100
80
60
40
20
0
20:00
20:30
21:00
21:30
22:00
22:30
23:00
23:30
00:00
00:30
01:00
01:30
02:00
02:30
03:00
03:30
04:00
04:30
05:00
05:30
06:00
Intensity [^Protons x 10^11]
120
100
80
60
40
20
0
20:15
20:45
21:15
21:45
22:15
22:45
23:15
23:45
00:15
00:45
01:15
01:45
02:15
02:45
03:15
03:45
04:15
04:45
05:15
05:45
Time (Start Fill = 15244)
bluDCCTtotal
yelDCCTtotal
bluWCMbunched
yelWCMbunched

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

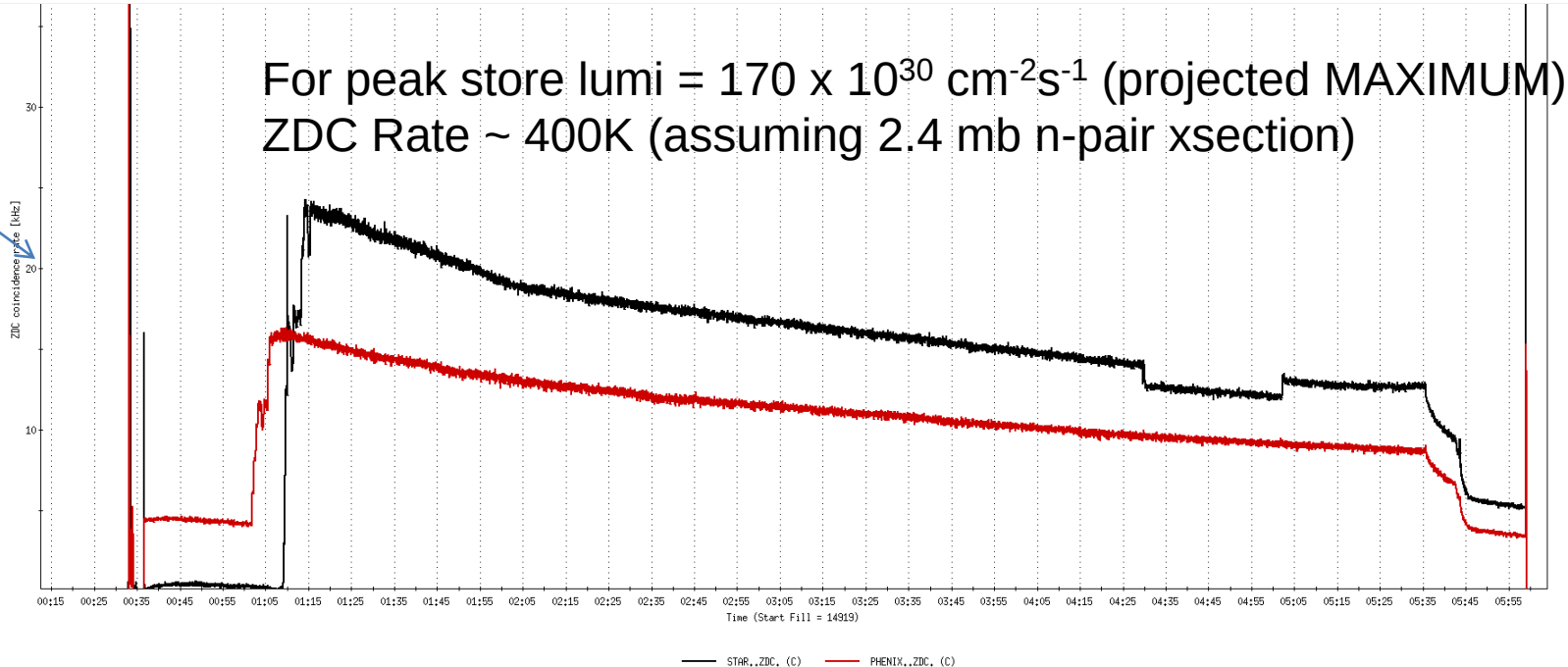
- 28 x 27 bunches
- β*=0.65 meters

20 x 10^{11}



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

20K

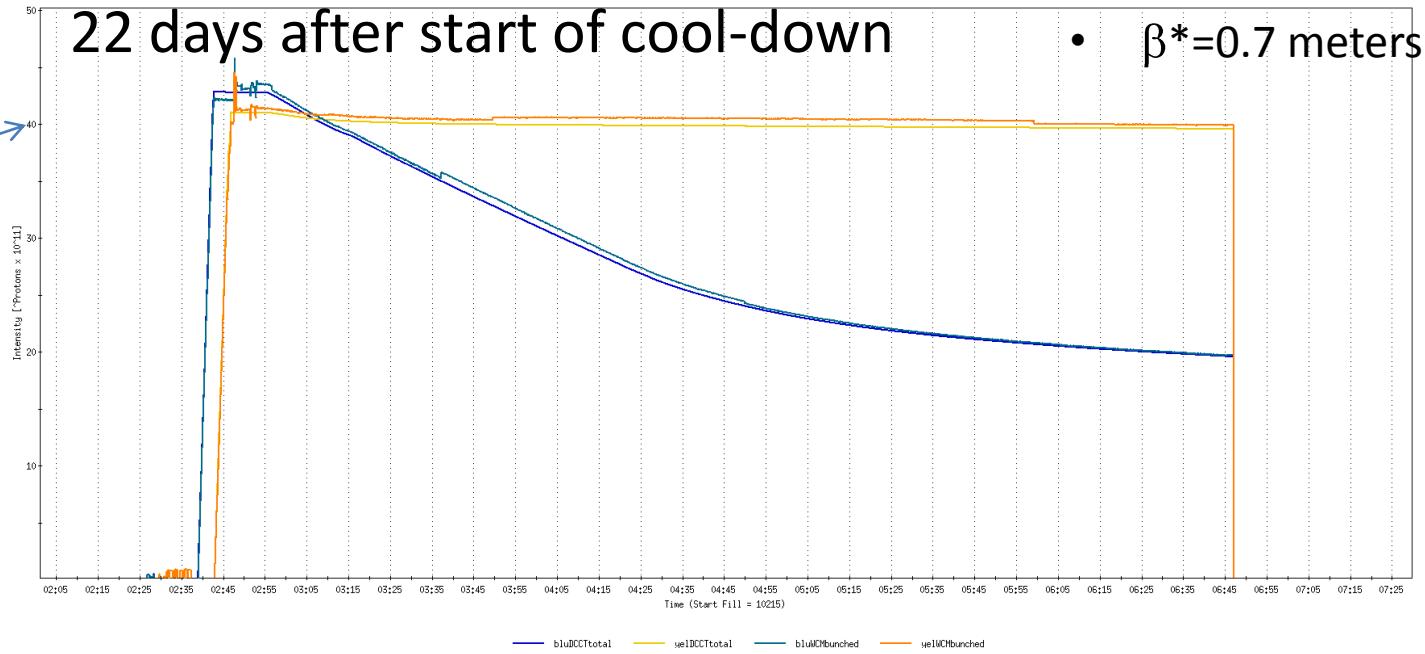


Run 9, First overnight store at √s=500 GeV

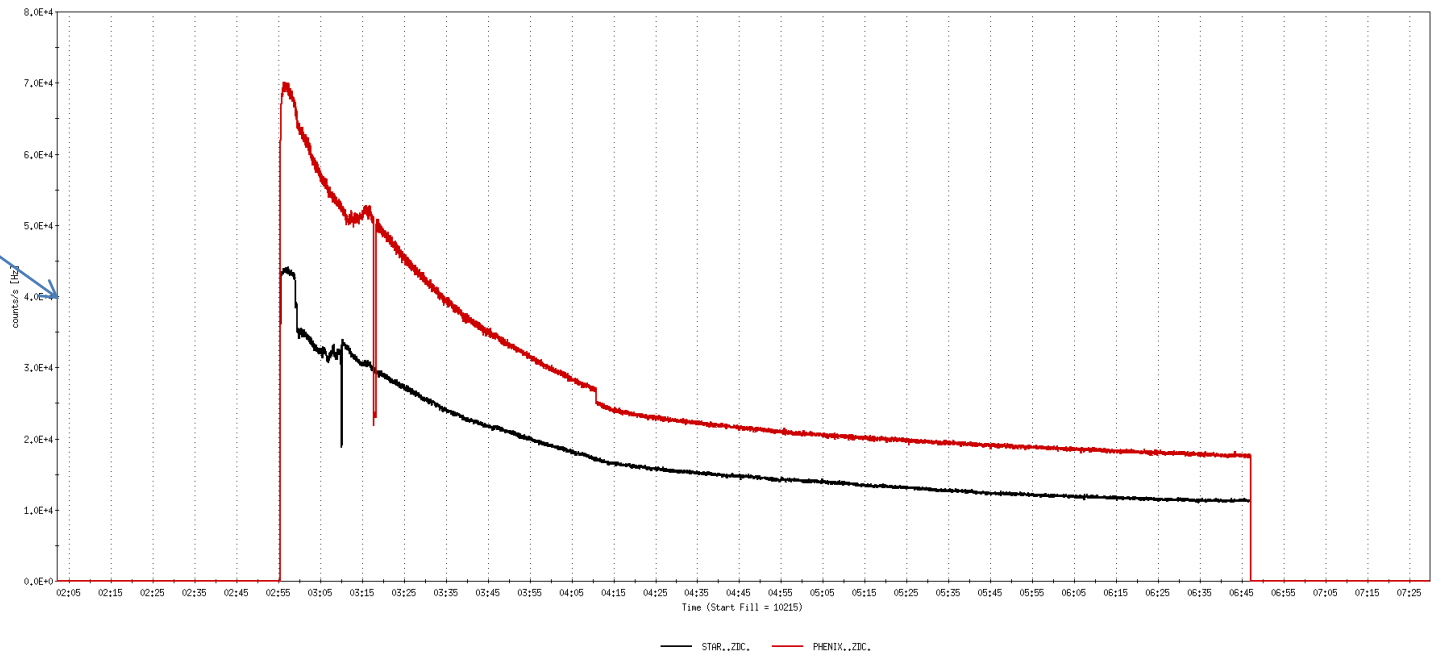
22 days after start of cool-down

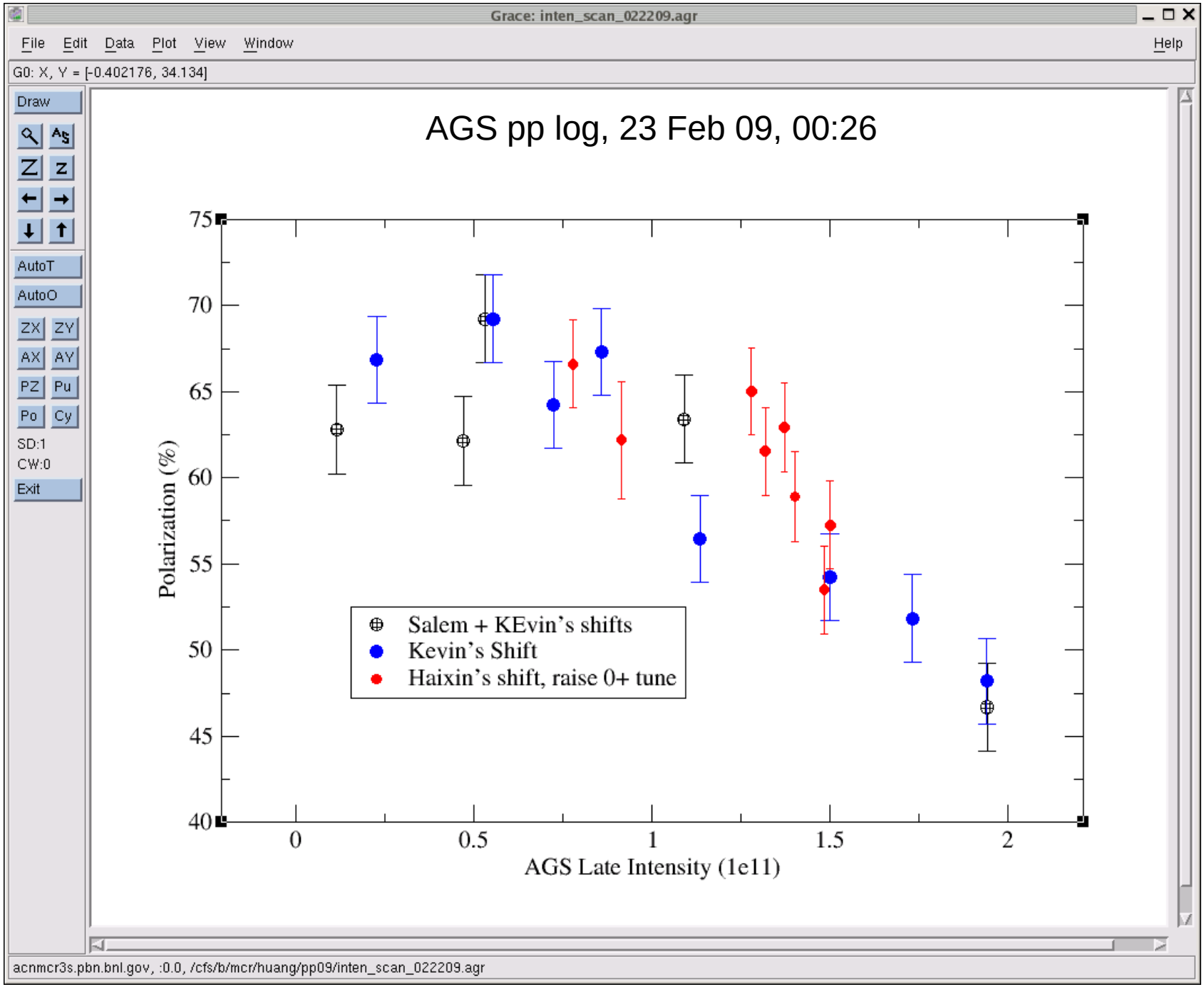
- 56 x 56 bunches
- β*=0.7 meters

40 x 10^{11}



40K



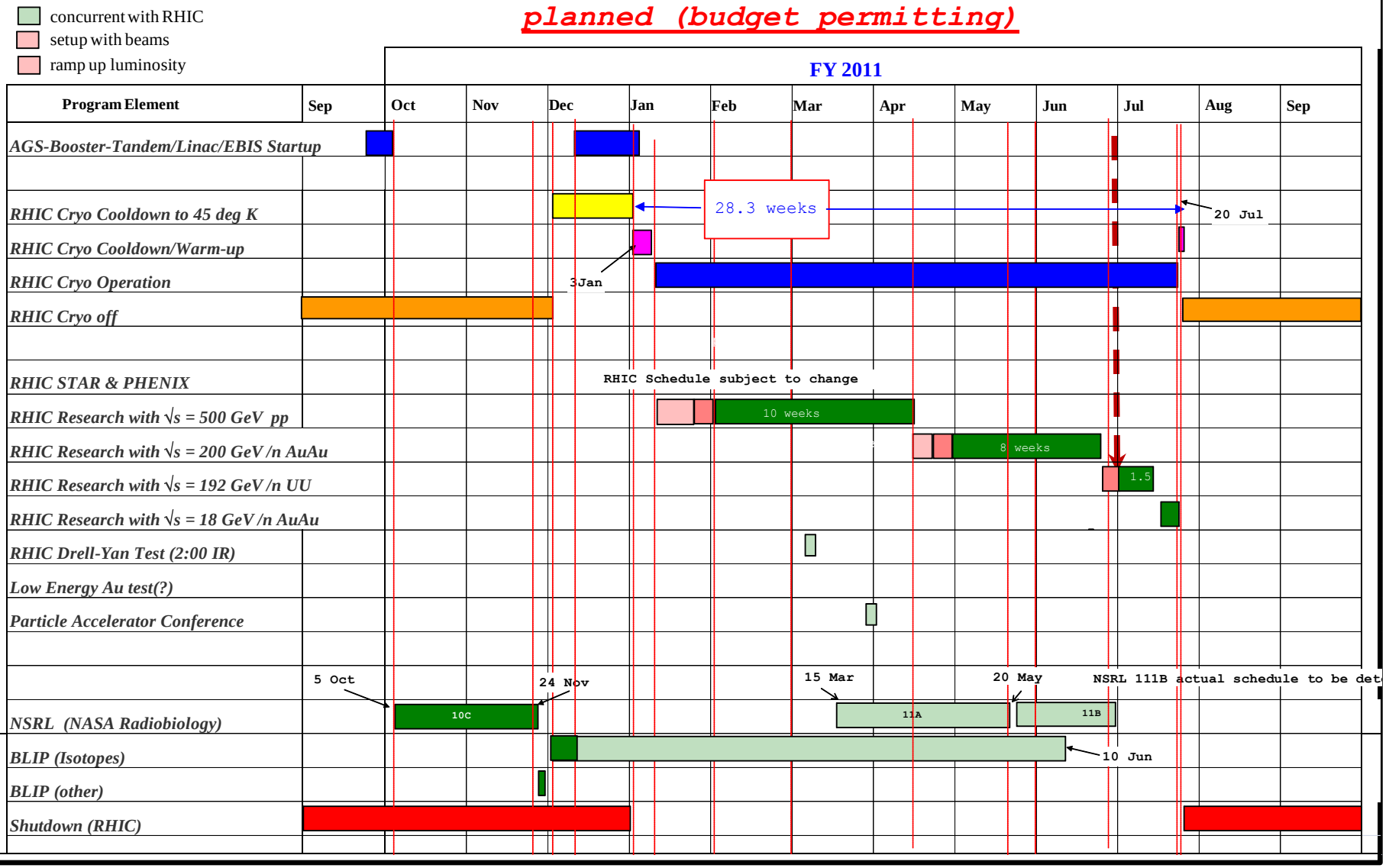

Grace: inten_scan_022209.agr
File Edit Data Plot View Window Help
G0: X, Y = [-0.402176, 34.134]
Draw
AutoT
AutoO
ZX ZY
AX AY
PZ Pu
Po Cy
SD:1
CW:0
Exit
AGS pp log, 23 Feb 09, 00:26
Polarization (%)
AGS Late Intensity (1e11)
Salem + KEvin's shifts
Kevin's Shift
Haixin's shift, raise 0+ tune
acnmcr3s.pbn.bnl.gov, :0.0, /cfs/b/mcr/huang/pp09/inten_scan_022209.agr

http://www.bnl.gov/cad/esfd

C-A Operations-FY11

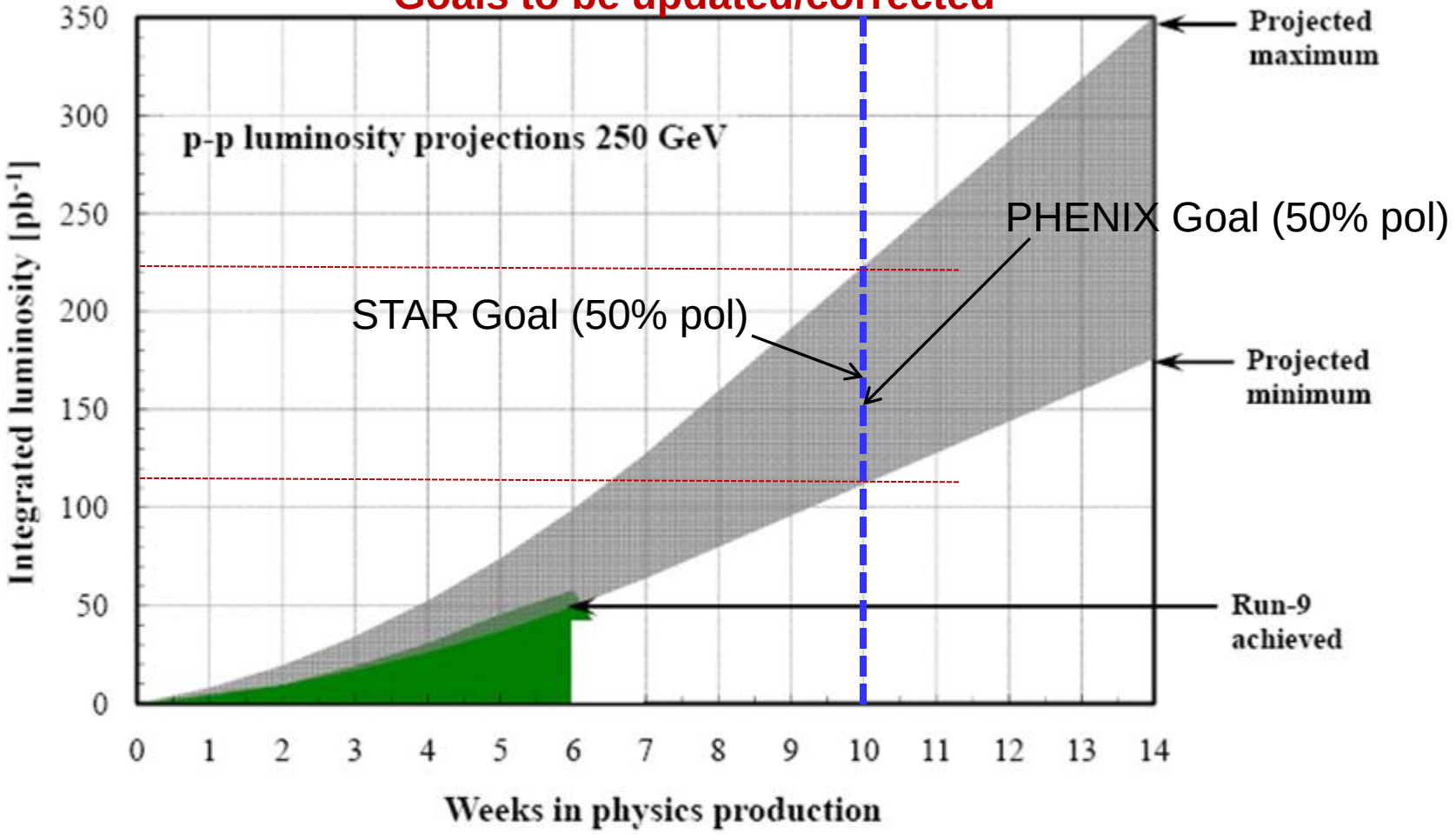
26 Jan 11

planned (budget permitting)



Run-11 p↑-p↑ luminosity projections

Goals to be updated/corrected



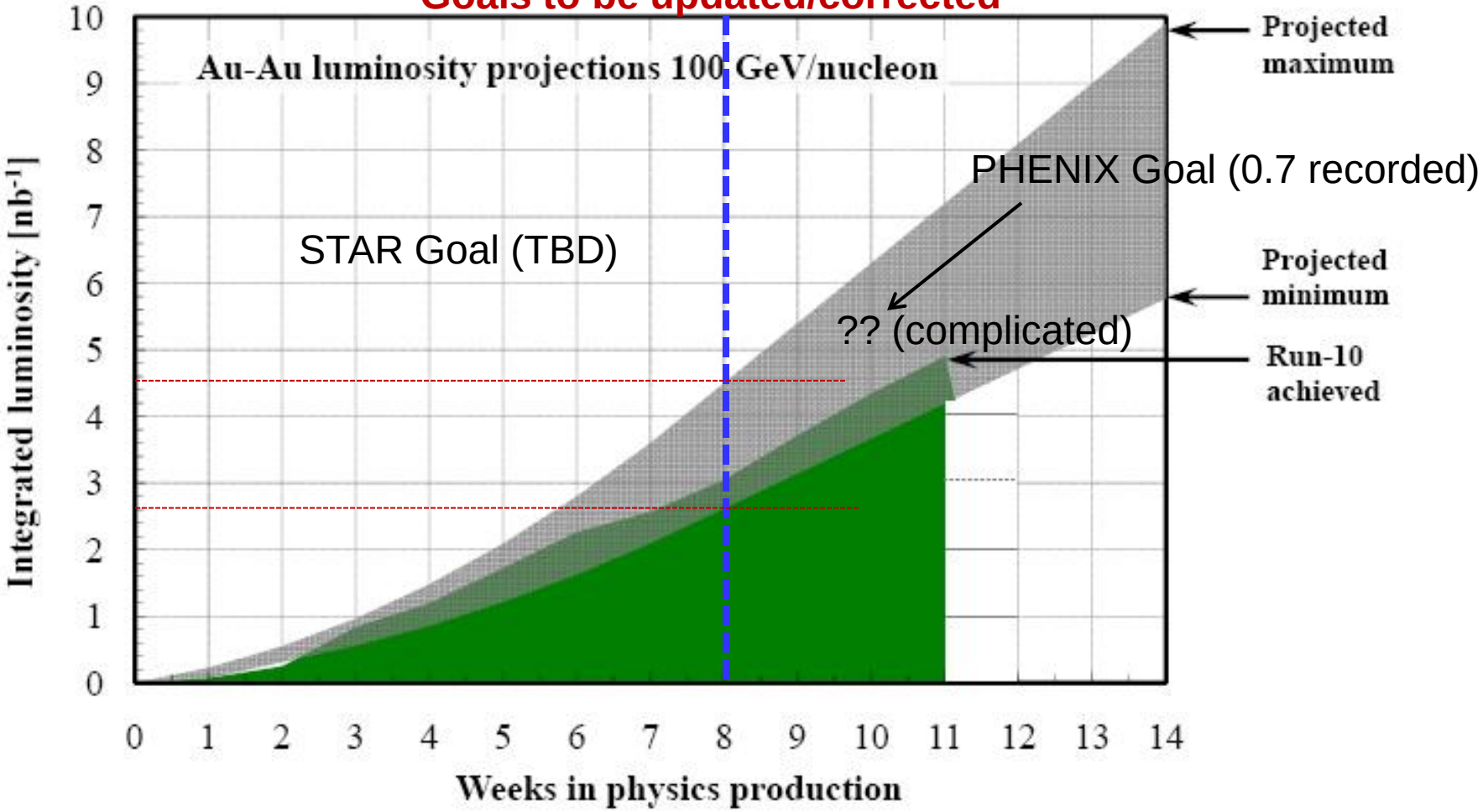
Assume 8 weeks to ramp-up for max.

Expect store P_{avg} = 35-50%, L_{avg} up to 100x10^{30}cm^{-2}s^{-1} (+80%).

[from Run-9 to max projection: β^* = 0.7 → 0.6 m, N_b = 1.1 → 1.4x10^{11}]

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

Goals to be updated/corrected



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

Expect L_{avg} up to 25x10^{26}cm^{-2}s^{-1} (+25%).

[from Run-10 to max: β^* = 0.75 ➔ 0.65 m, N_b = 1.1 ➔ 1.1x10^9, more cooling]