RHIC Run14 Time Meeting

Run14 Status – May 20

- Operations a bit hectic Fri-Sun, only 9 full stores over the past 7 days. Now preparing for 3 weeks of He3-Au at the end of the Run, with the possibility of wrapping up Run14 a week early (still being discussed).

- 6h MD for 56 MHz SRF cavity conditioning with beam last Thursday showed very good progress, still some work left to do. Request for another 6h on Thursday.

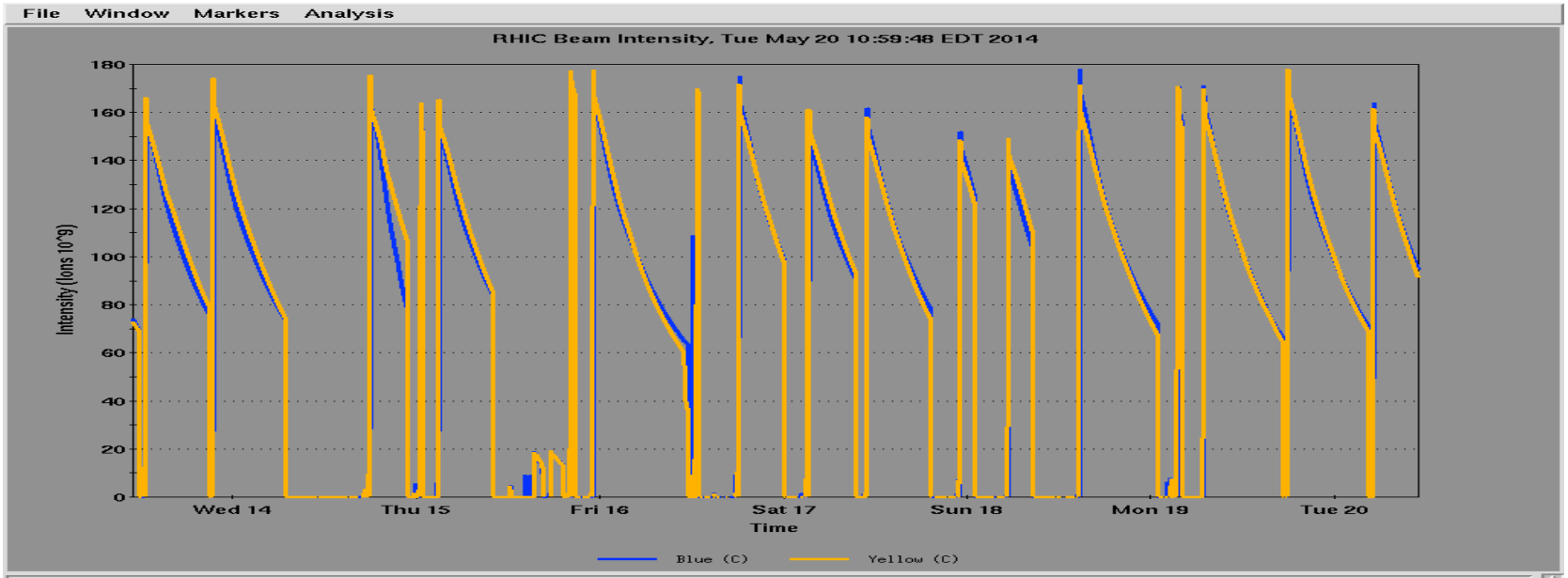
- A few operations hiccups:
  - had to replace two q89 power supplies over the weekend;
  - post-maintenance, quick access to work on a new amplifier for Stochastic Cooling;
  - still have to go through a significant amount of fec's resets due to radiation damage (induced by pre-fire protection scheme).

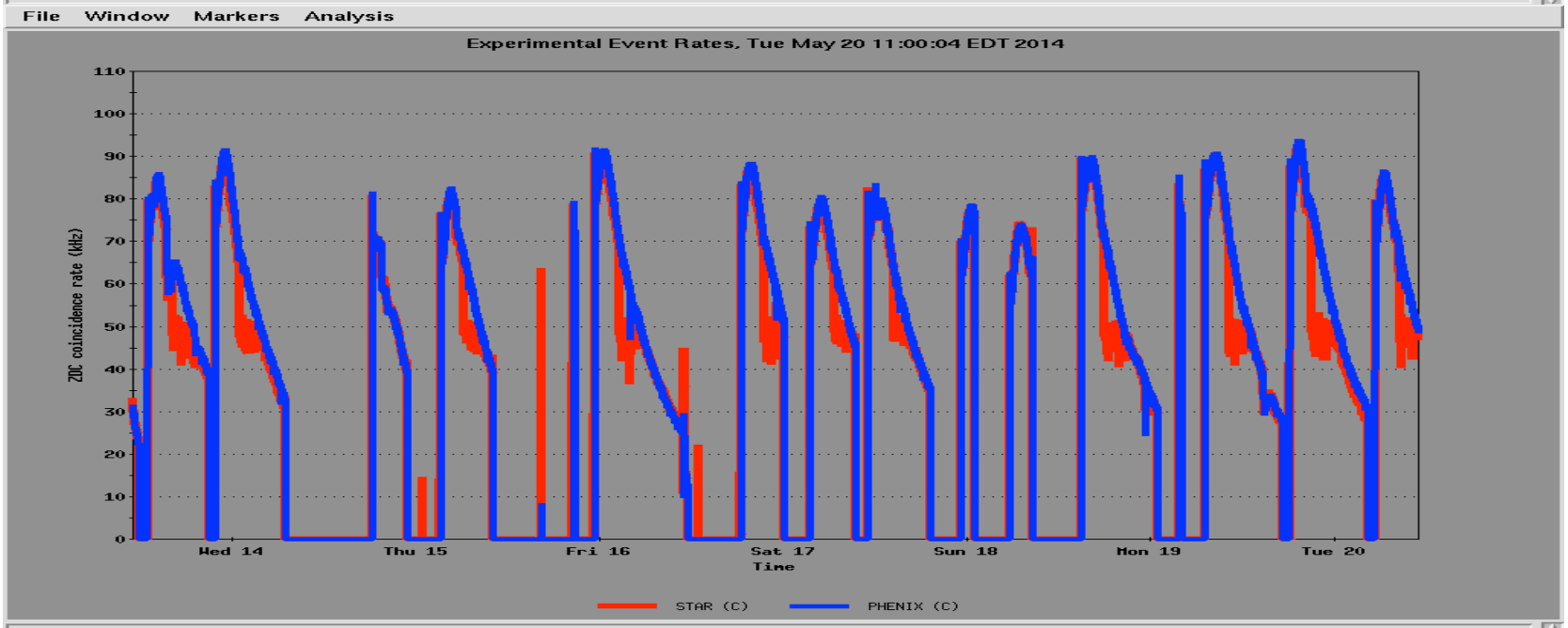
- Worked on avoiding further abort kicker pre-fires: all Yellow modules reservoir voltages were lowered by 100mV, no more conditioning on down ramps.

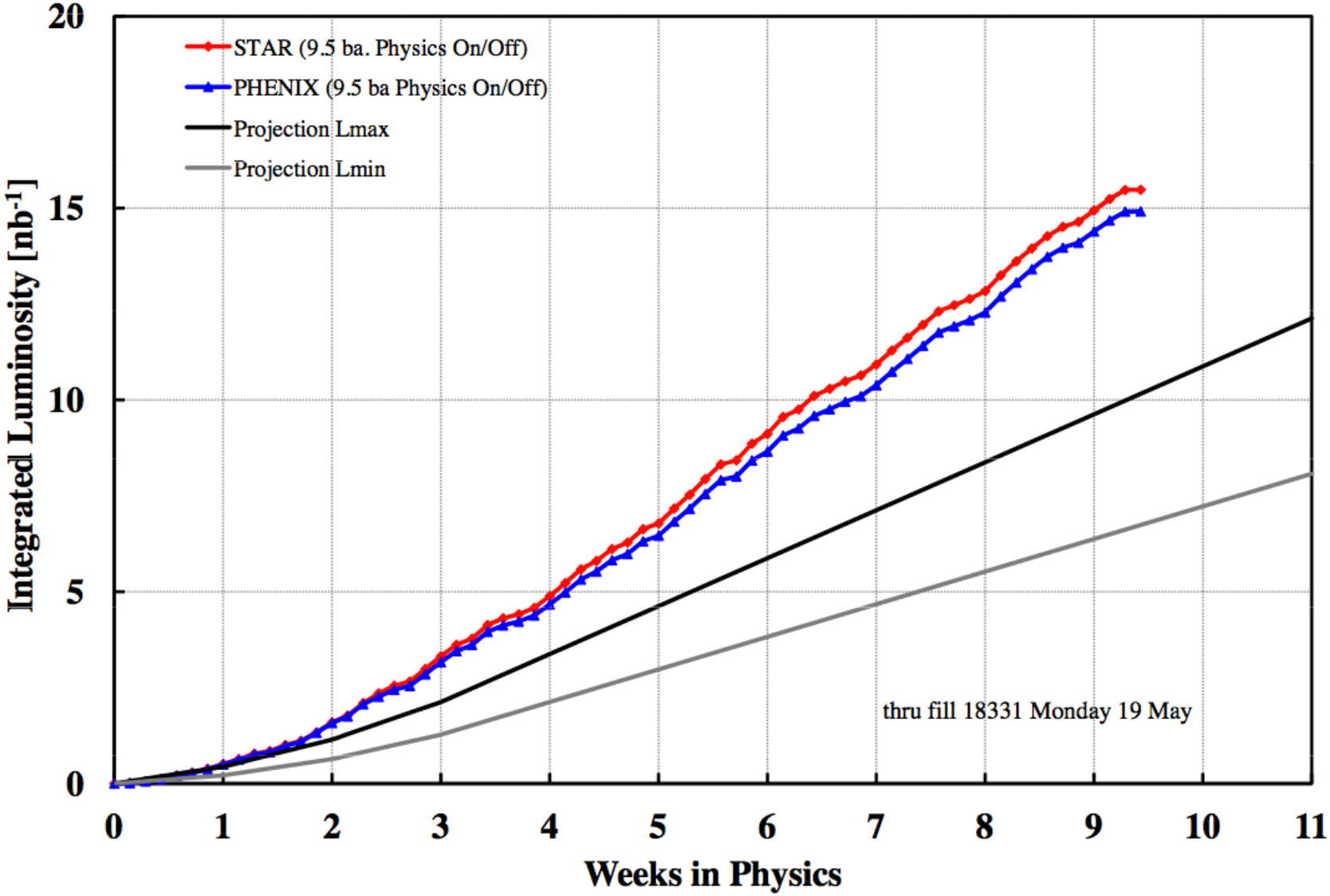
- Further development of dynamic beta* squeeze to 50 cm: end-of-store test had very promising results, incl. the predicted increase in STAR/PHENIX ZDC rates. Have to work on sextupole PS dI/dt limitations on Au14-thor ramp before planning further experiments.

- Polarized protons and He3 (starting this week) setup running behind stores.

- APEX tomorrow, Maintenance on 5/28.

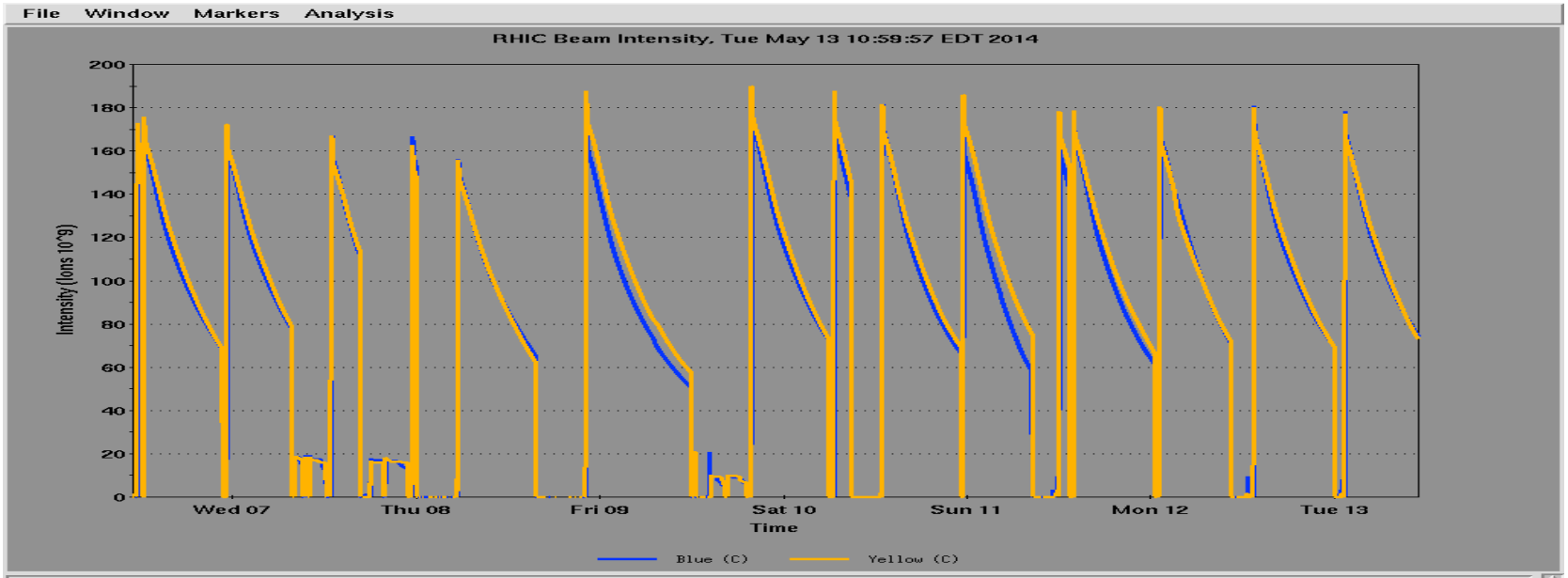

File Window Markers Analysis
RHIC Beam Intensity, Tue May 20 10:59:48 EDT 2014
Intensity (Ions 10^9)
180
160
140
120
100
80
60
40
20
0
Wed 14
Thu 15
Fri 16
Sat 17
Sun 18
Mon 19
Tue 20
Time
Blue (C)
Yellow (C)

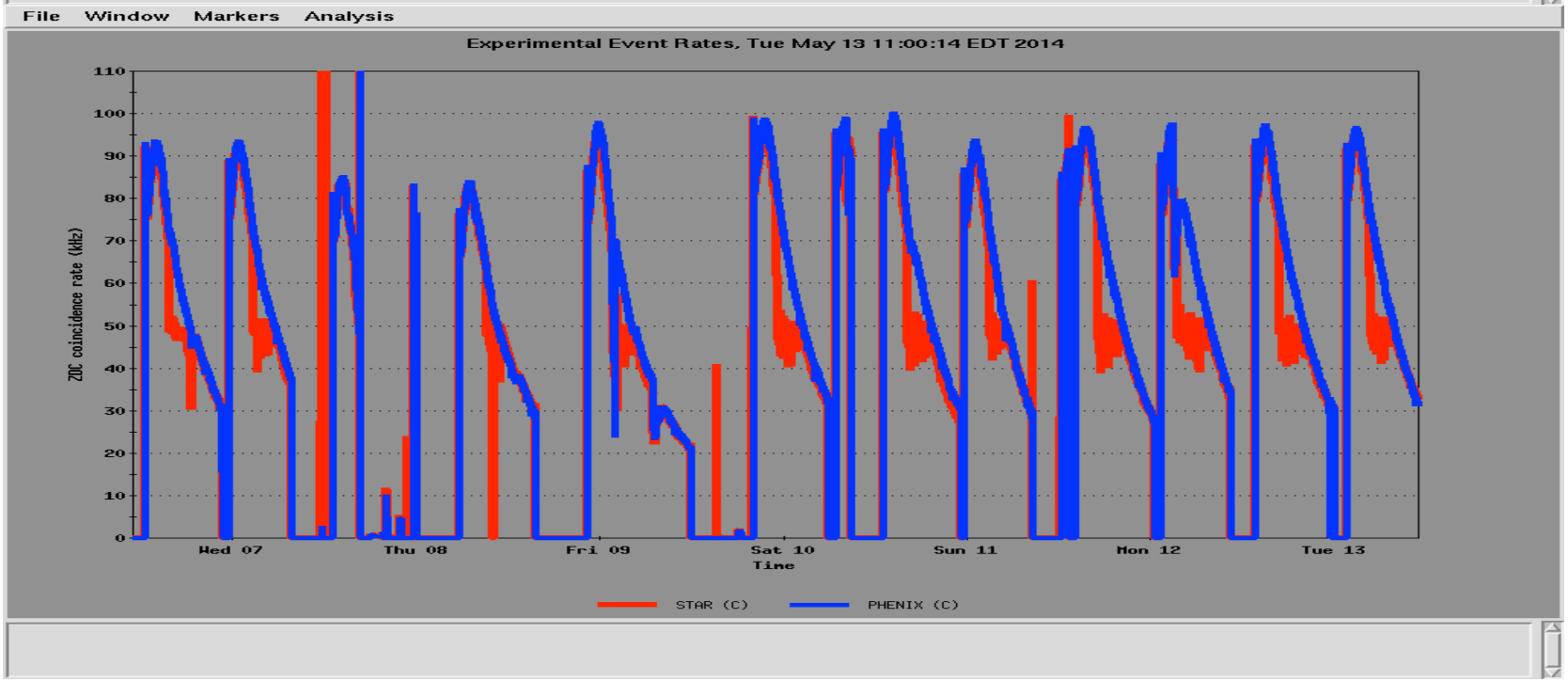

File Window Markers Analysis
Experimental Event Rates, Tue May 20 11:00:04 EDT 2014
ZDC coincidence rate (kHz)
110
100
90
80
70
60
50
40
30
20
10
0
Wed 14
Thu 15
Fri 16
Sat 17
Sun 18
Mon 19
Tue 20
Time
STAR (C)
PHENIX (C)

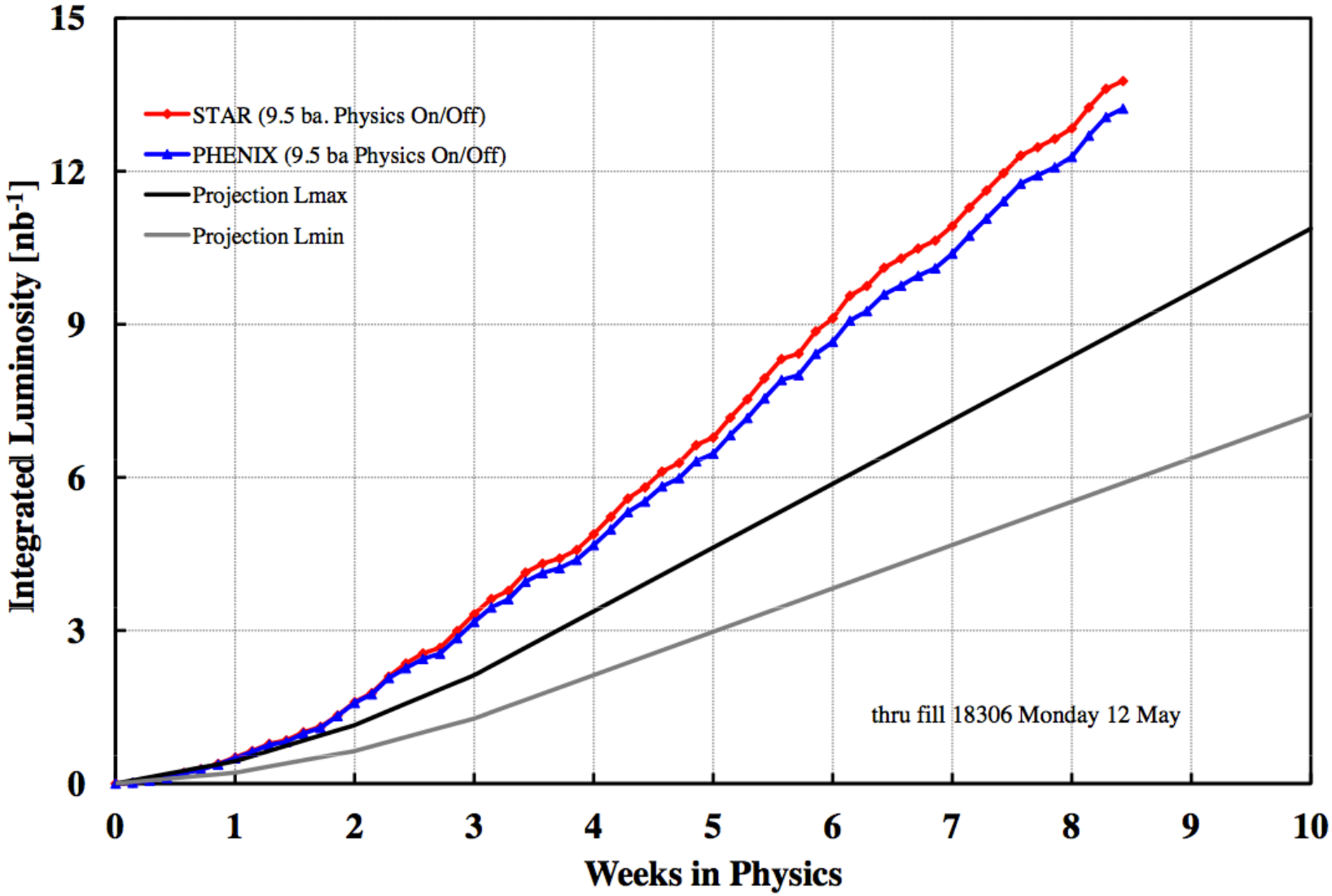

STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18331 Monday 19 May
Integrated Luminosity [nb-1]
Weeks in Physics
0
5
10
15
20
0
1
2
3
4
5
6
7
8
9
10
11

Run14 Status – May 13

- Operations running well, 11 full stores over the past 7 days. Starting discussions this week on a He-Au (short) run.
- Ran Blue and Yellow beams at unequal RF frequencies in preparation for p-Au run.
- Two more MD periods for 56 MHz SRF cavity conditioning with beam: 4 hours last Friday, another 6 hours requested for this coming Thursday.
- Small interruptions in physics due to power supplies needing replacement.
- Still working on abort kicker conditioning on down ramps (after physics store): problem found where RF cavities tripping due to multiple "dump" events being issue.
- Further development of dynamic beta* squeeze to 50 cm, synchronized with STAR ZDC target rates: one more MD requested to investigate non-linear chromaticity correction. If successful, next is test with a full 111x111 train before implementation of Au14-thor in operations.
- Polarized protons setup running behind stores.
- Maintenance tomorrow, APEX on 5/21.

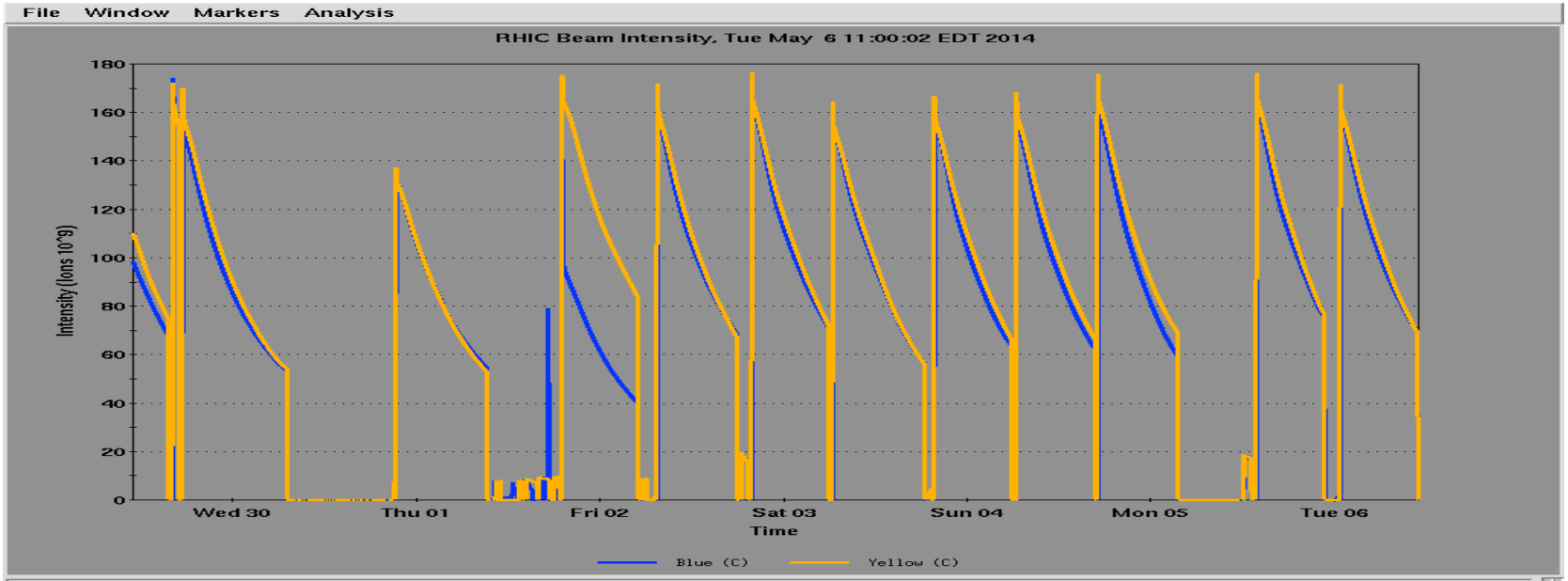

File Window Markers Analysis
RHIC Beam Intensity, Tue May 13 10:59:57 EDT 2014
Intensity (Ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 07
Thu 08
Fri 09
Sat 10
Sun 11
Mon 12
Tue 13
Time
Blue (C)
Yellow (C)

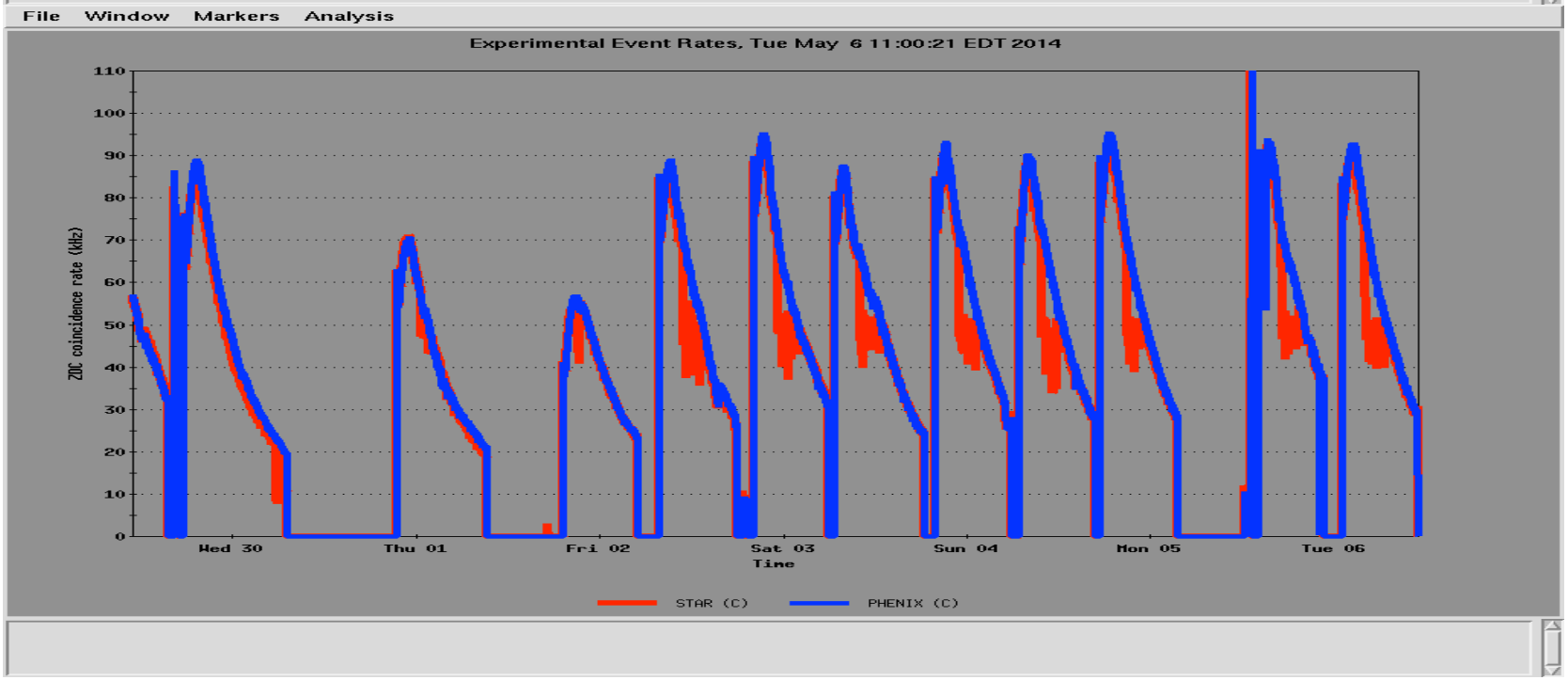

File Window Markers Analysis
Experimental Event Rates, Tue May 13 11:00:14 EDT 2014
ZDC coincidence rate (kHz)
110
100
90
80
70
60
50
40
30
20
10
0
Wed 07
Thu 08
Fri 09
Sat 10
Sun 11
Mon 12
Tue 13
Time
STAR (C)
PHENIX (C)

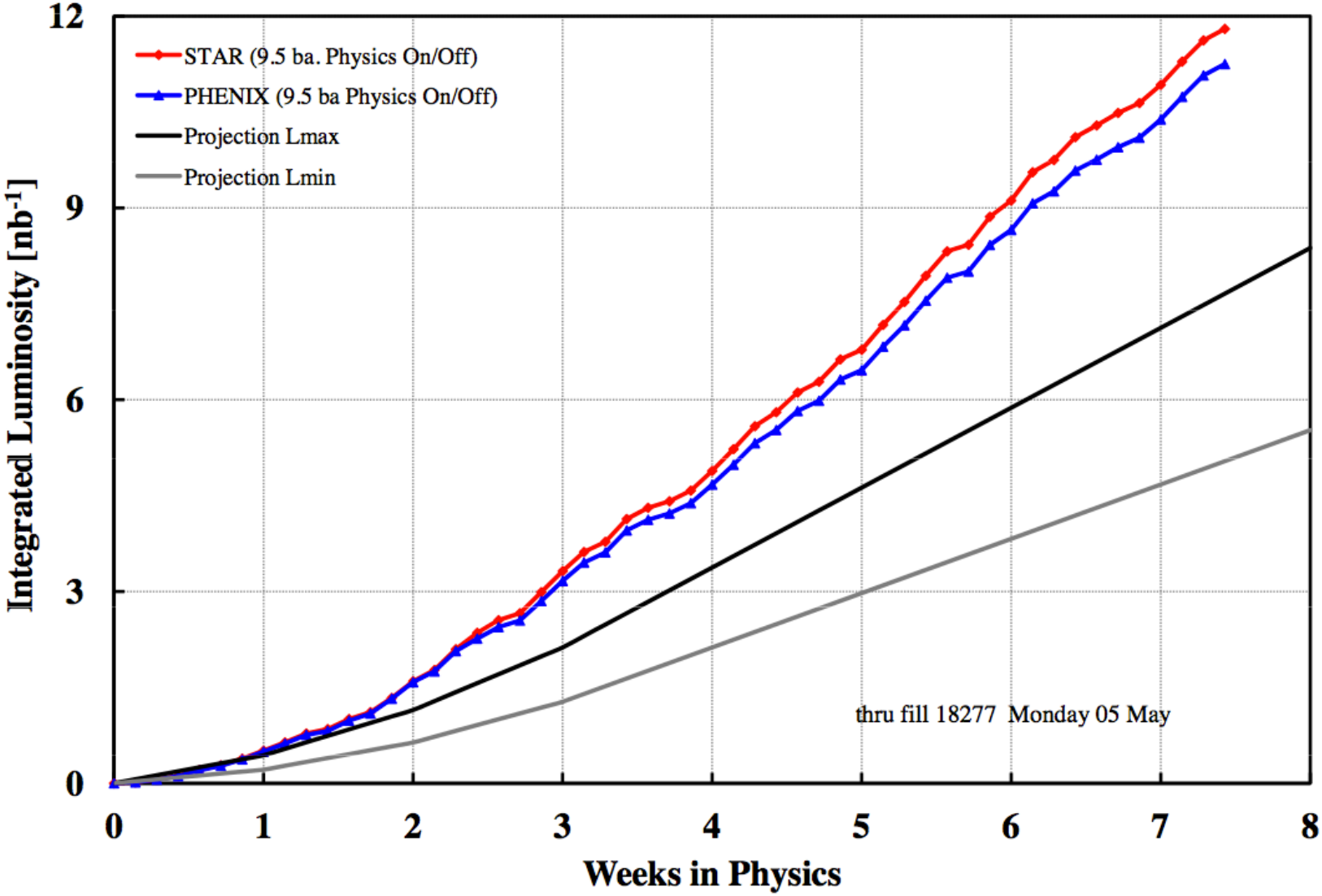

STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18306 Monday 12 May
Integrated Luminosity [nb-1]
Weeks in Physics
0
3
6
9
12
15
0
1
2
3
4
5
6
7
8
9
10

Run14 Status – May 6

- Operations running well, 11 full stores over the past 7 days; setting STAR ZDC rates to 50 khz is now part of regular operations.
- First 56 MHz SRF cavity conditioning with beam started last Thursday (5/1); additional time requested for either Thursday/Friday, 4 hour session.
- e-lens commissioning: successful LISA steering in IR10.
- Plans for testing abort kicker conditioning on down ramps (after physics store) to reduce chances of pre-fires.
- Continue development of dynamic beta* squeeze to 50 cm, synchronized with STAR ZDC target rates: need additional MD time to complete setup with feedback systems.
- Polarized protons setup running behind stores.
- APEX tomorrow, Maintenance on 5/14.


File Window Markers Analysis
RHIC Beam Intensity, Tue May 6 11:00:02 EDT 2014
Intensity (ions 10^9)
180
160
140
120
100
80
60
40
20
0
Wed 30
Thu 01
Fri 02
Sat 03
Sun 04
Mon 05
Tue 06
Time
Blue (C)
Yellow (C)


File Window Markers Analysis
Experimental Event Rates, Tue May 6 11:00:21 EDT 2014
ZDC coincidence rate (kHz)
110
100
90
80
70
60
50
40
30
20
10
0
Wed 30
Thu 01
Fri 02
Sat 03
Sun 04
Mon 05
Tue 06
Time
STAR (C)
PHENIX (C)


STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18277 Monday 05 May
Integrated Luminosity [nb-1]
Weeks in Physics
0
3
6
9
12
0
1
2
3
4
5
6
7
8

Run14 Status – Apr. 29

- Operations running well, 12 full stores over the past 7 days; lost 3 stores to abort kicker module trips, but one of these events raised the total radiation dose deposited in the 10-12 Arc to very close to its allowed limit => raised the Tritium limit via waiver

- Use LISA to optimize STAR ZDC rates 3 hours into each store to 50 khz: first attempt on today's second store?

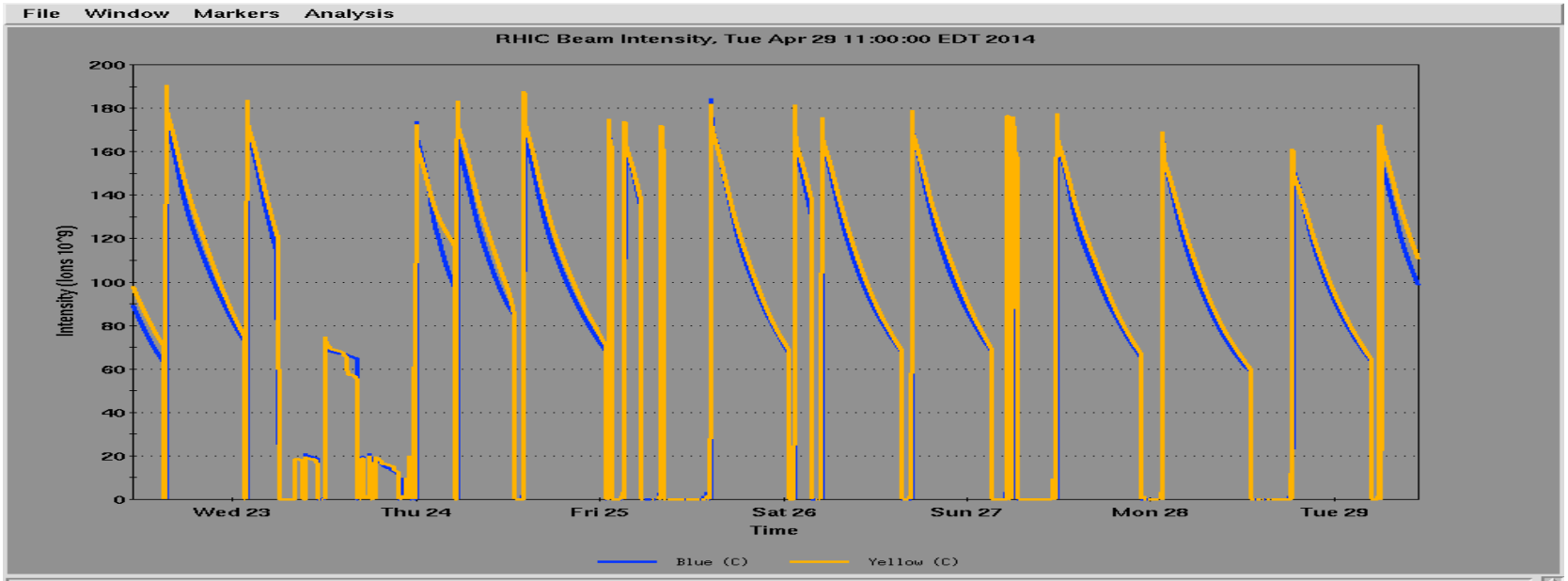
- e-lens commissioning is still progressing well: basic functions (current, profile, position) all demonstrated; further tests with Au beam lined up.

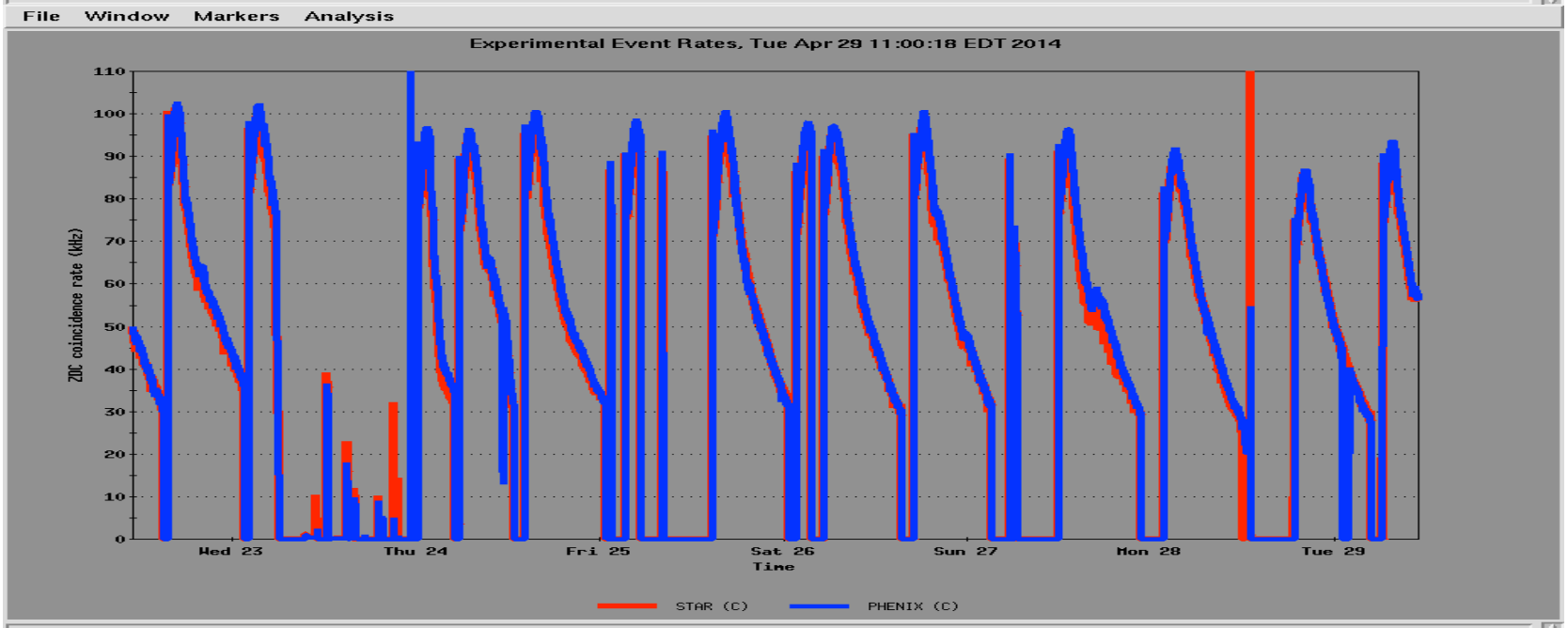
- 56 MHz SRF cavity conditioning w/o beam ongoing, first tests with beam by end of week/beginning of next.

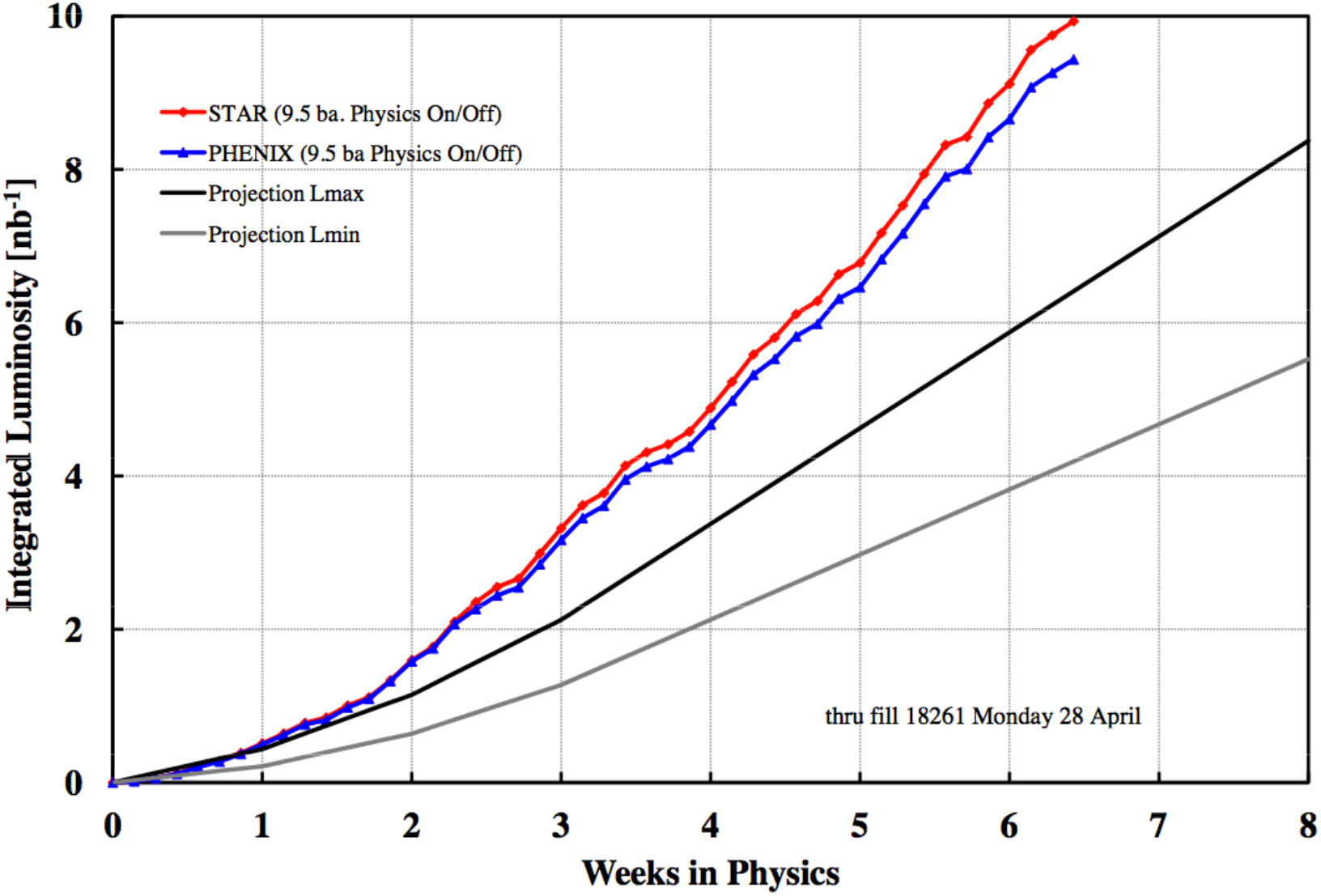
- APEX: successful implementation of 50cm optics (along w/ end-of-store exercise on 4/28) and ramp optics correction

- Polarized protons setup running behind stores.

- Maintenance tomorrow, APEX on 5/7.


File Window Markers Analysis
RHIC Beam Intensity, Tue Apr 29 11:00:00 EDT 2014
Intensity (ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 23
Thu 24
Fri 25
Sat 26
Sun 27
Mon 28
Tue 29
Time
Blue (C)
Yellow (C)


File Window Markers Analysis
Experimental Event Rates, Tue Apr 29 11:00:18 EDT 2014
ZDC coincidence rate (kHz)
110
100
90
80
70
60
50
40
30
20
10
0
Wed 23
Thu 24
Fri 25
Sat 26
Sun 27
Mon 28
Tue 29
Time
STAR (C)
PHENIX (C)


STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18261 Monday 28 April
Integrated Luminosity [nb-1]
Weeks in Physics
0
2
4
6
8
10
0
1
2
3
4
5
6
7
8

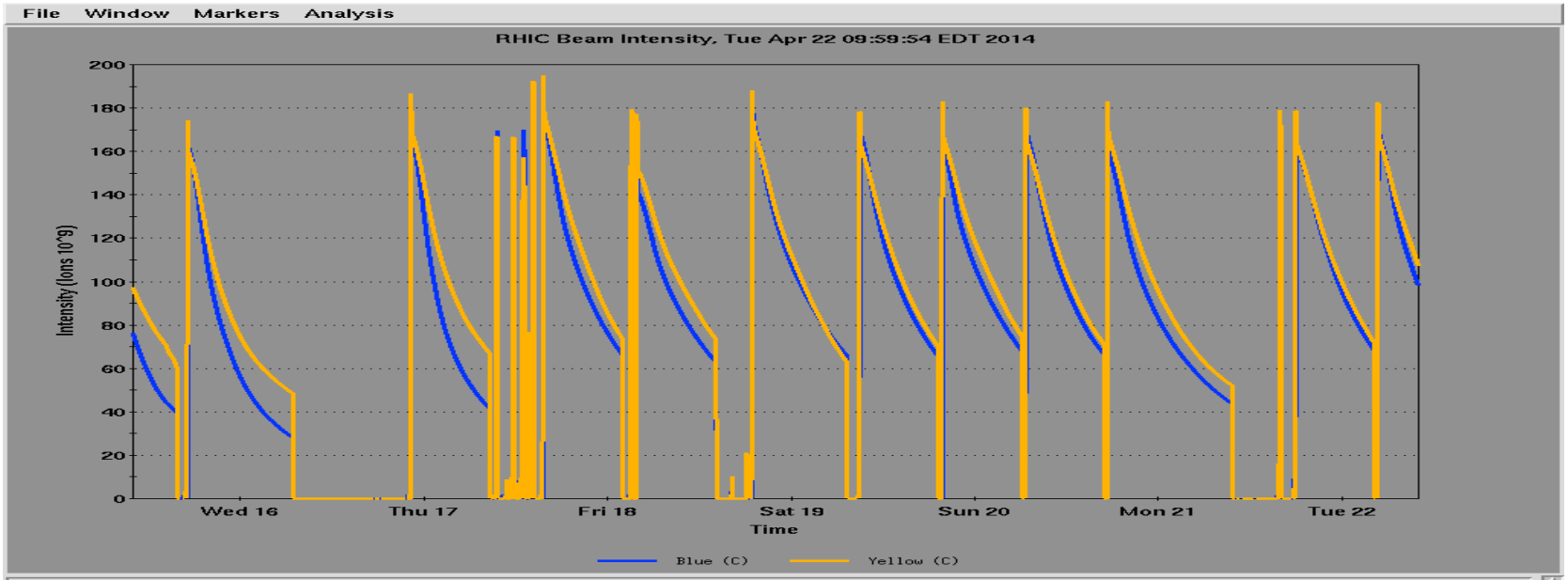
Run14 Status – Apr. 22

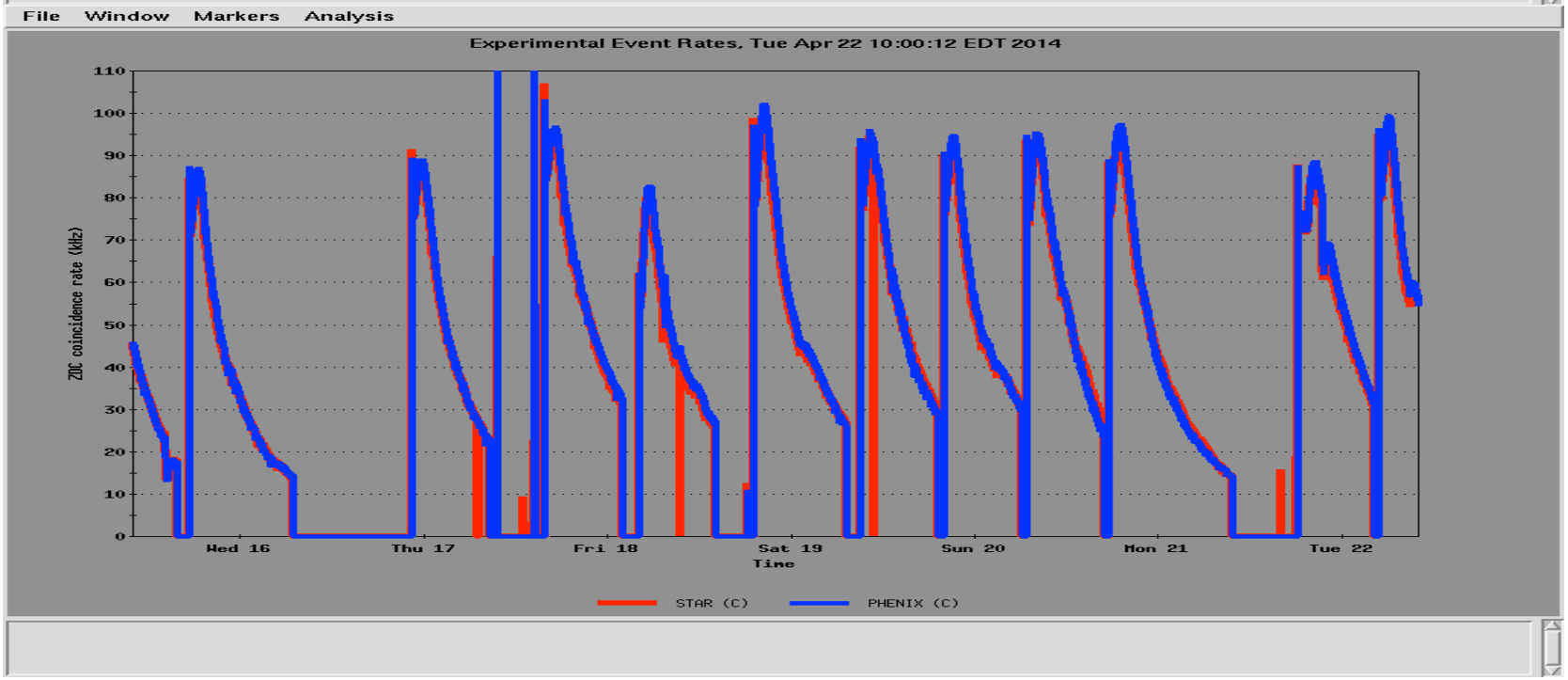
- Operations running well, 12 stores over the past 7 days with 1 "super store" of 17 hours. Repositioned STAR IP transverse location on 4/18: +2mm vertically, -2.8mm horizontally.

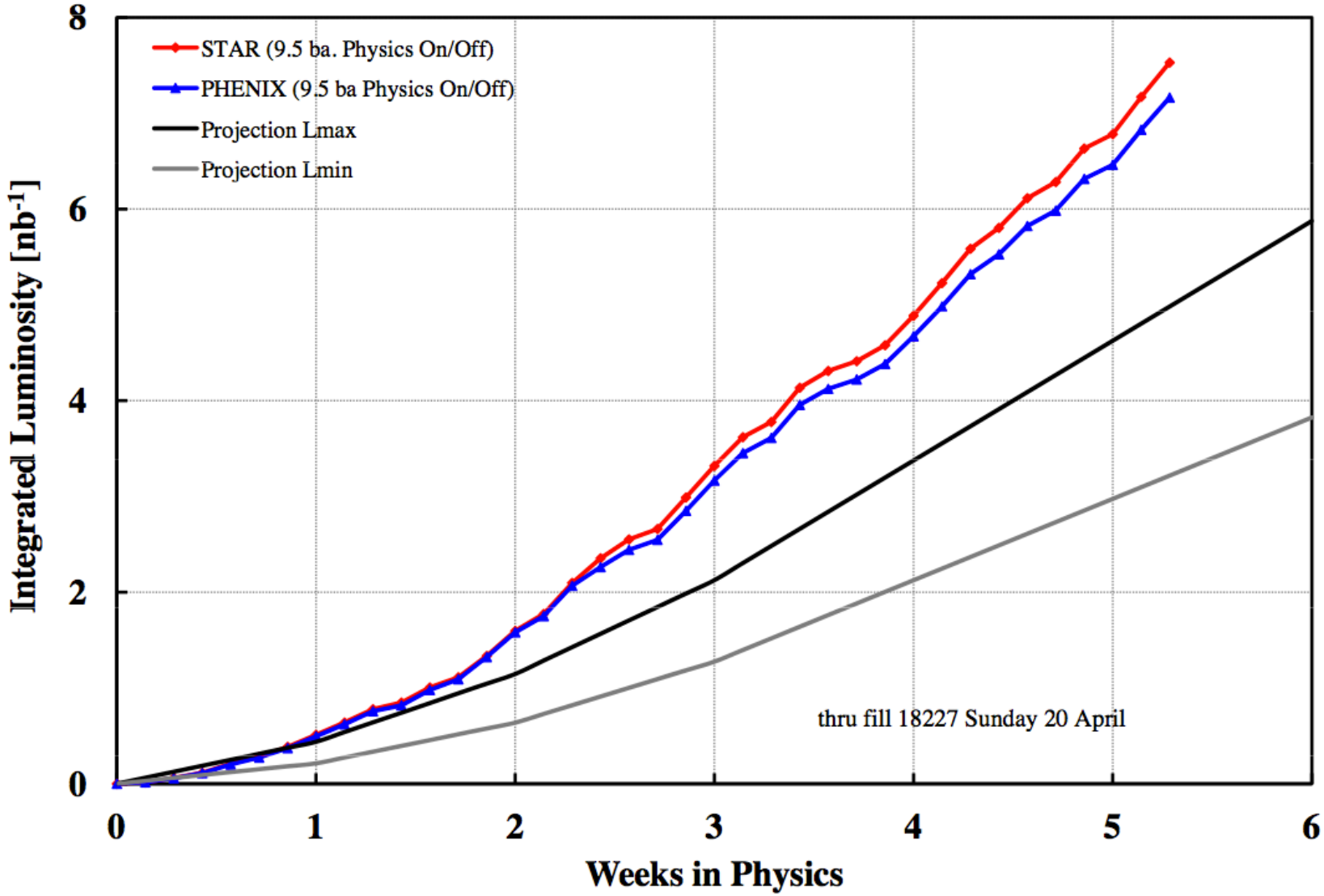
- Maintenance: all tasks for 56 MHz SRF worked on, allowed for 4 hours of "no beam" time yesterday (4/21).

- Polarized protons setup running behind stores.

- APEX tomorrow, maintenance on 4/30.


File Window Markers Analysis
RHIC Beam Intensity, Tue Apr 22 09:59:54 EDT 2014
Intensity (ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 16
Thu 17
Fri 18
Sat 19
Sun 20
Mon 21
Tue 22
Time
Blue (C)
Yellow (C)


File Window Markers Analysis
Experimental Event Rates, Tue Apr 22 10:00:12 EDT 2014
ZDC coincidence rate (kHz)
110
100
90
80
70
60
50
40
30
20
10
0
Wed 16
Thu 17
Fri 18
Sat 19
Sun 20
Mon 21
Tue 22
Time
STAR (C)
PHENIX (C)


STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18227 Sunday 20 April
Integrated Luminosity [nb-1]
Weeks in Physics
0
2
4
6
8
0
1
2
3
4
5
6

Run14 Status – Apr. 15

- Operations running well, 12 stores over the past 7 days with 1 lost to another "super quench". Testing fast gating for longitudinal cooling to reduce satellite bunches.

- APEX: Proof of principle of 60 cm optics in both Blue and Yellow with very reasonable lifetime despite (usual) large emittances at store.

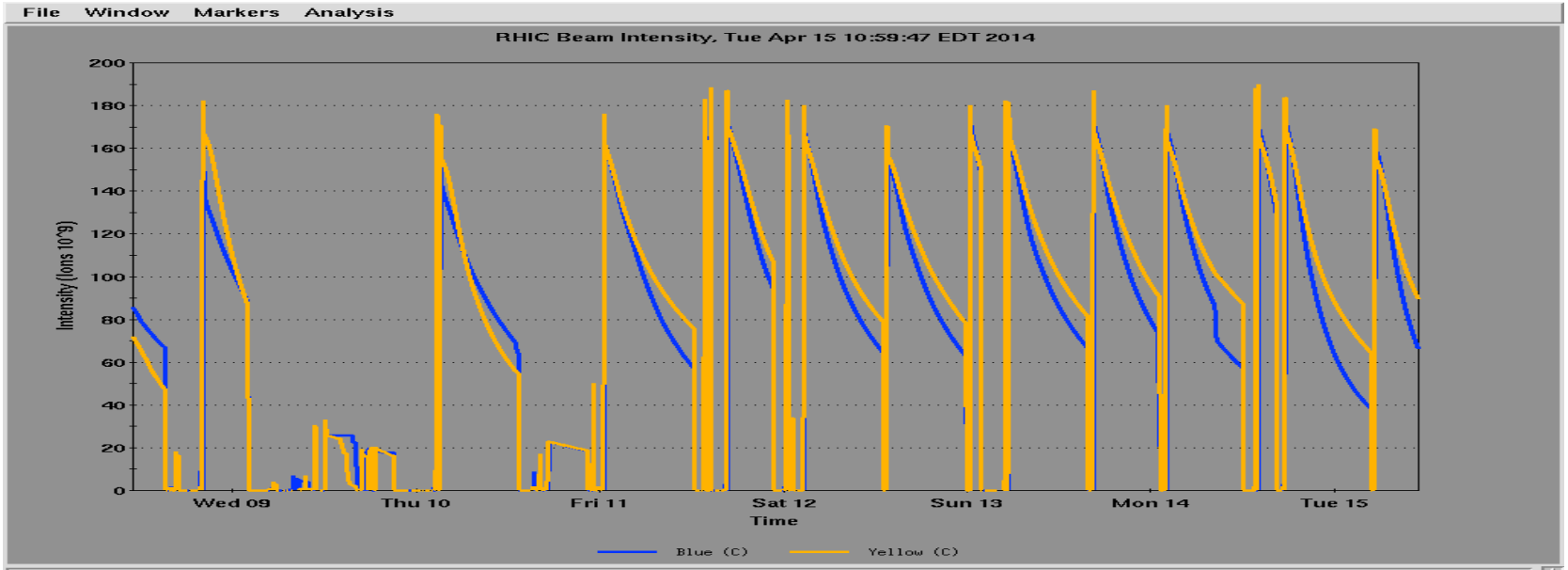
- Last Friday (4/11): 3 quenches in 14 hours but problem is understood: superconducting solenoids are running at 10% of their current settings to limit frequency of event.

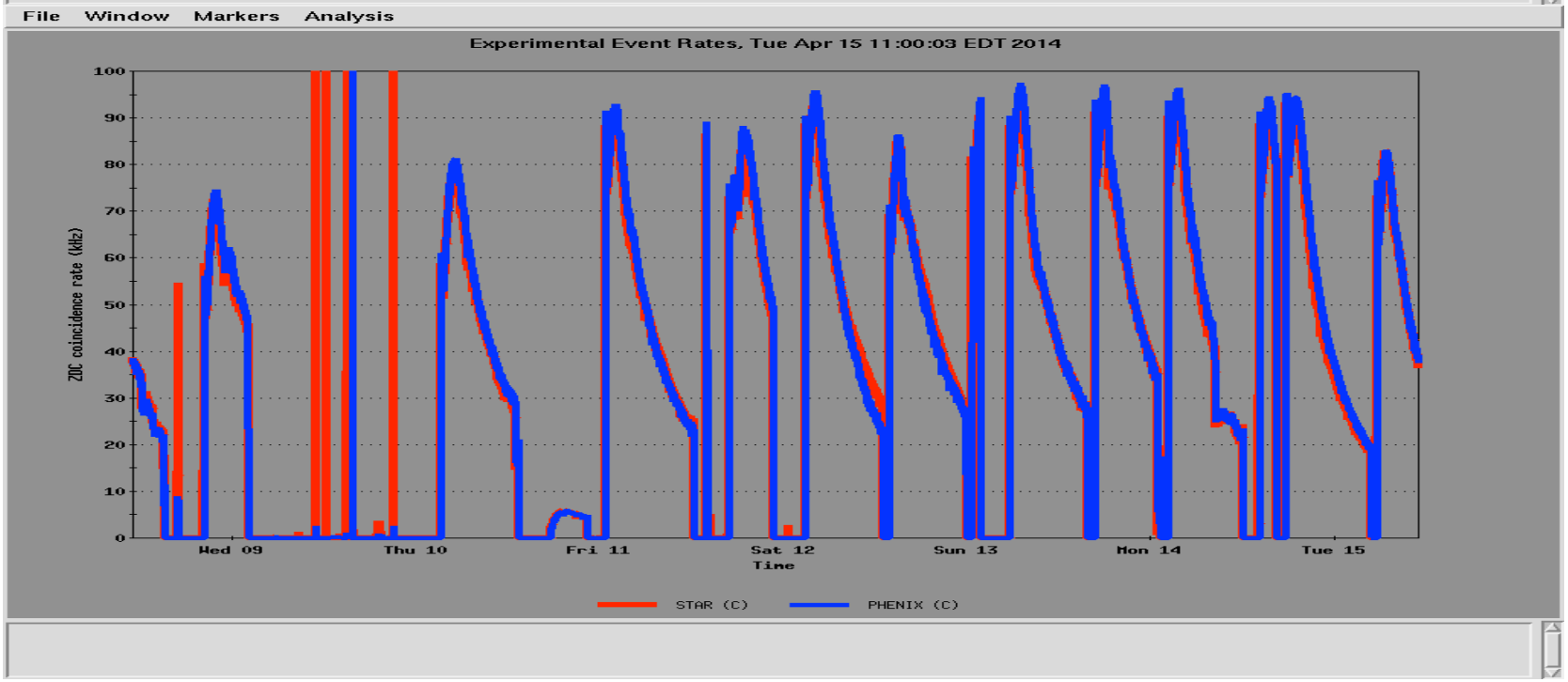
- Polarized protons setup running behind stores.

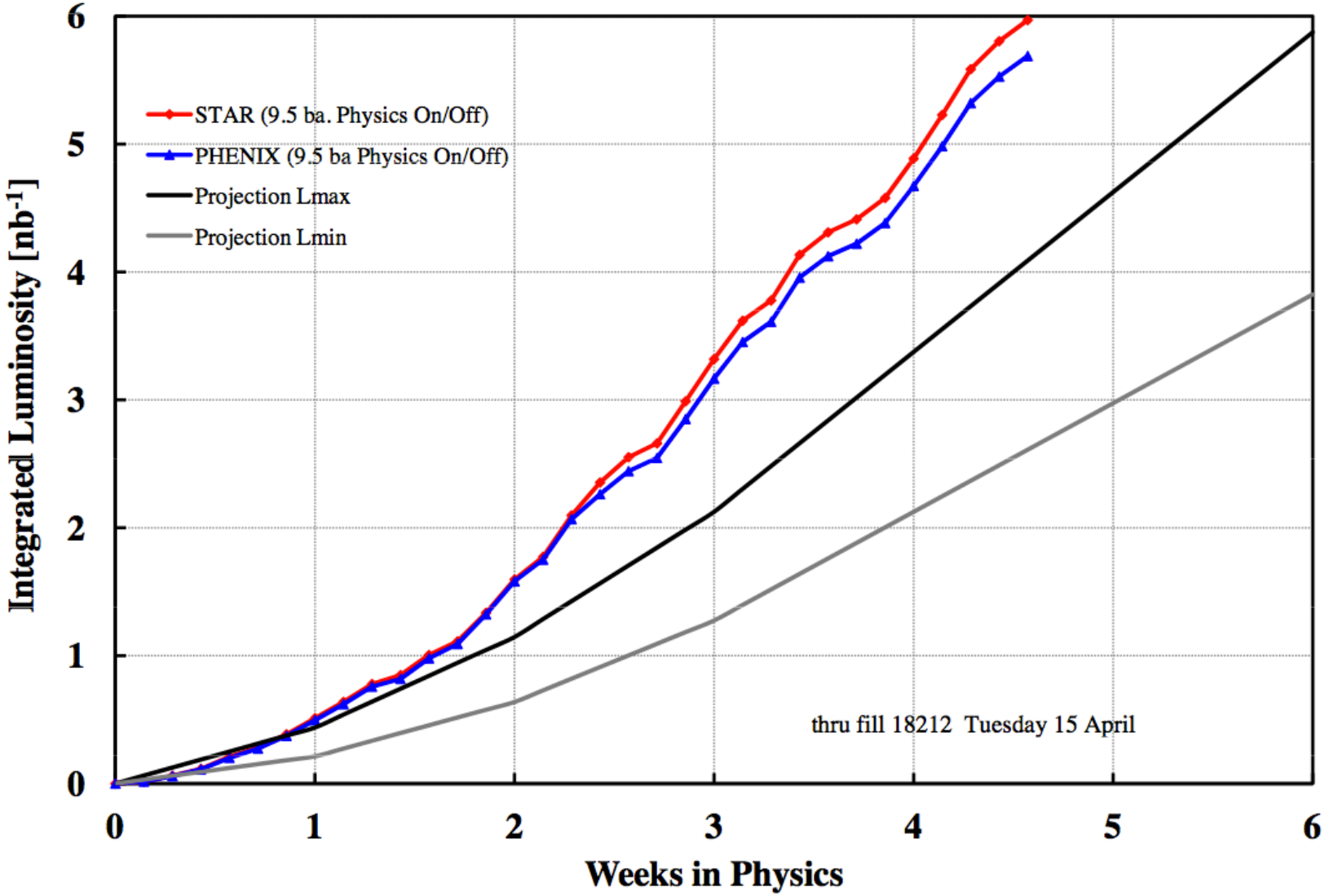
- Thursday (4/17): request for MD time to address PHENIX question on longitudinal position of collisions.

- 56 MHz SRF cavity commissioning in next few weeks, contingent on completion of all tasks scheduled for Maintenance.

- Maintenance tomorrow, APEX on 4/23.


File Window Markers Analysis
RHIC Beam Intensity, Tue Apr 15 10:59:47 EDT 2014
Intensity (Ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 09
Thu 10
Fri 11
Sat 12
Sun 13
Mon 14
Tue 15
Time
Blue (C)
Yellow (C)


File Window Markers Analysis
Experimental Event Rates, Tue Apr 15 11:00:03 EDT 2014
ZDC coincidence rate (kHz)
100
90
80
70
60
50
40
30
20
10
0
Wed 09
Thu 10
Fri 11
Sat 12
Sun 13
Mon 14
Tue 15
Time
STAR (C)
PHENIX (C)


STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmax
Projection Lmin
thru fill 18212 Tuesday 15 April
Integrated Luminosity [nb-1]
Weeks in Physics
0
1
2
3
4
5
6

Run14 Status – Apr. 8

- Operations running well, 12 stores over the past 7 days. Emittances through stores are monitored so that tunes can be moved around to maximize the effect of stochastic cooling.

- Recovery from maintenance was delayed "first by a cooling fault in the xq1 magnet and then by problems with G10 kicker fine delay controls" [OC log]. Tried a couple of 6x6 ramps to test RF settings too, but had miscommunication with P. Sampson about it. Lesson learned…

- AGS main magnet running with Siemens MG after switching from Westinghouse on Thursday (4/3).

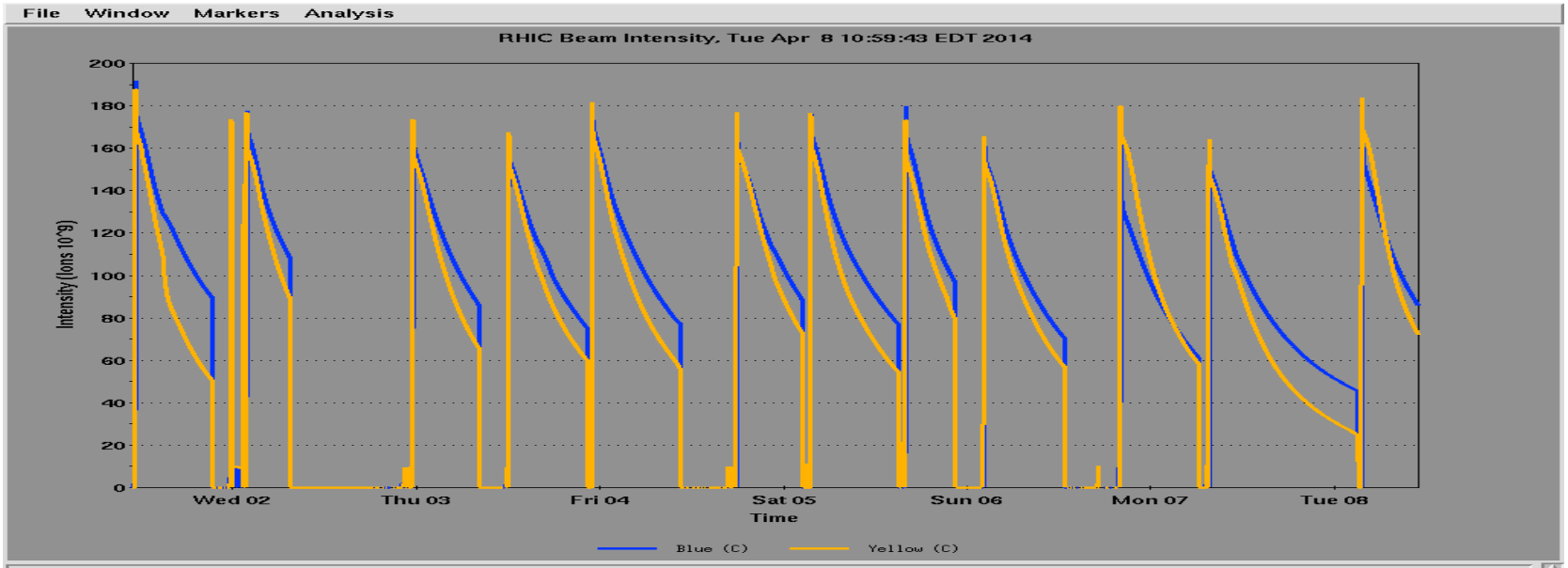
- Machine Development time was scheduled for Friday (4/4) AM, around PHENIX access to replace Teflon tubes:
  - end of store attempt failed due to orbit feedback using the wrong target orbit;
  - post PHENIX access, turns out ATR had other plans for us, and with increasing recovery time from this problem, priority was given to running physics, especially so close to the weekend. There was no beam in RHIC from ~11:00 to ~17:00.

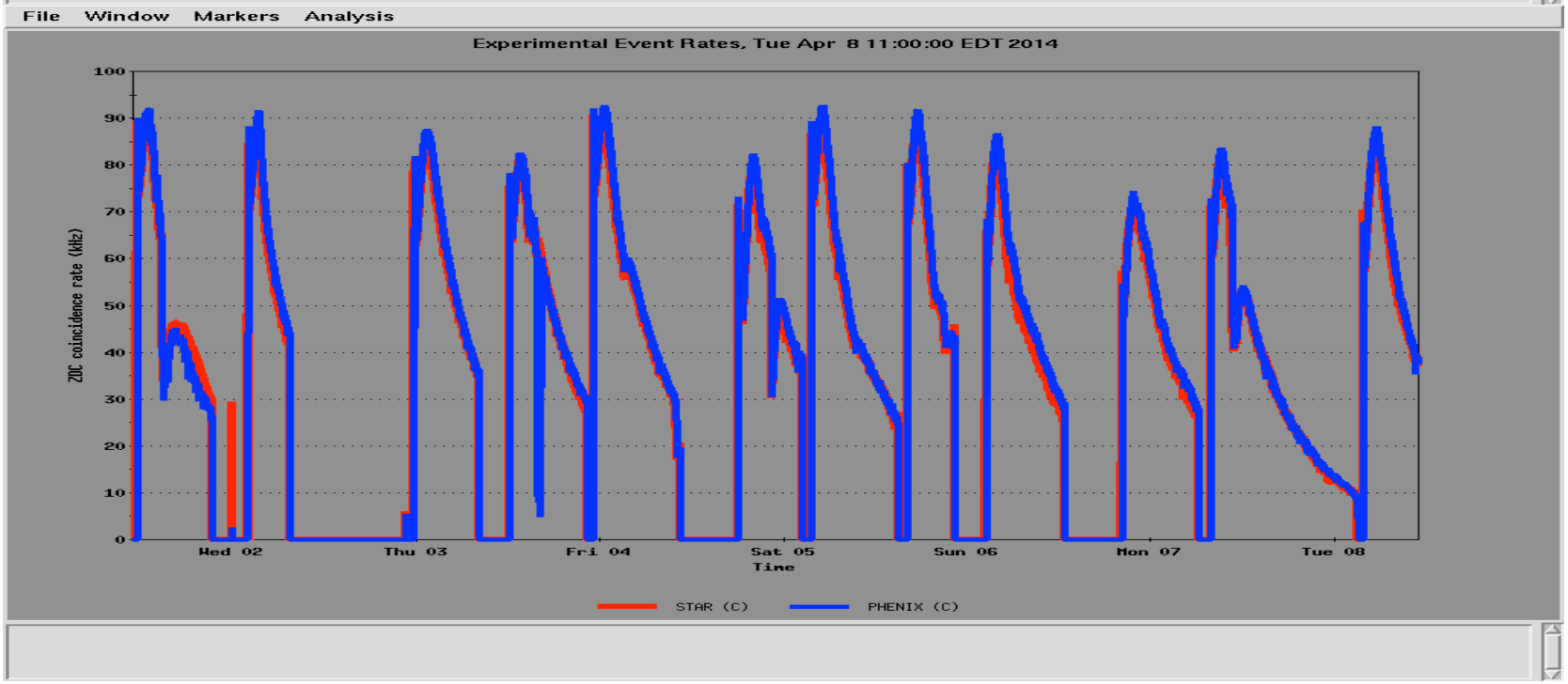
- Sunday (4/6): "QLI in blue and yellow rings that fired all the DX heaters and resulted in extended cryo recovery. The ultimate cause was found to be a bad 5V supply for the blue main dipole" [OC log].

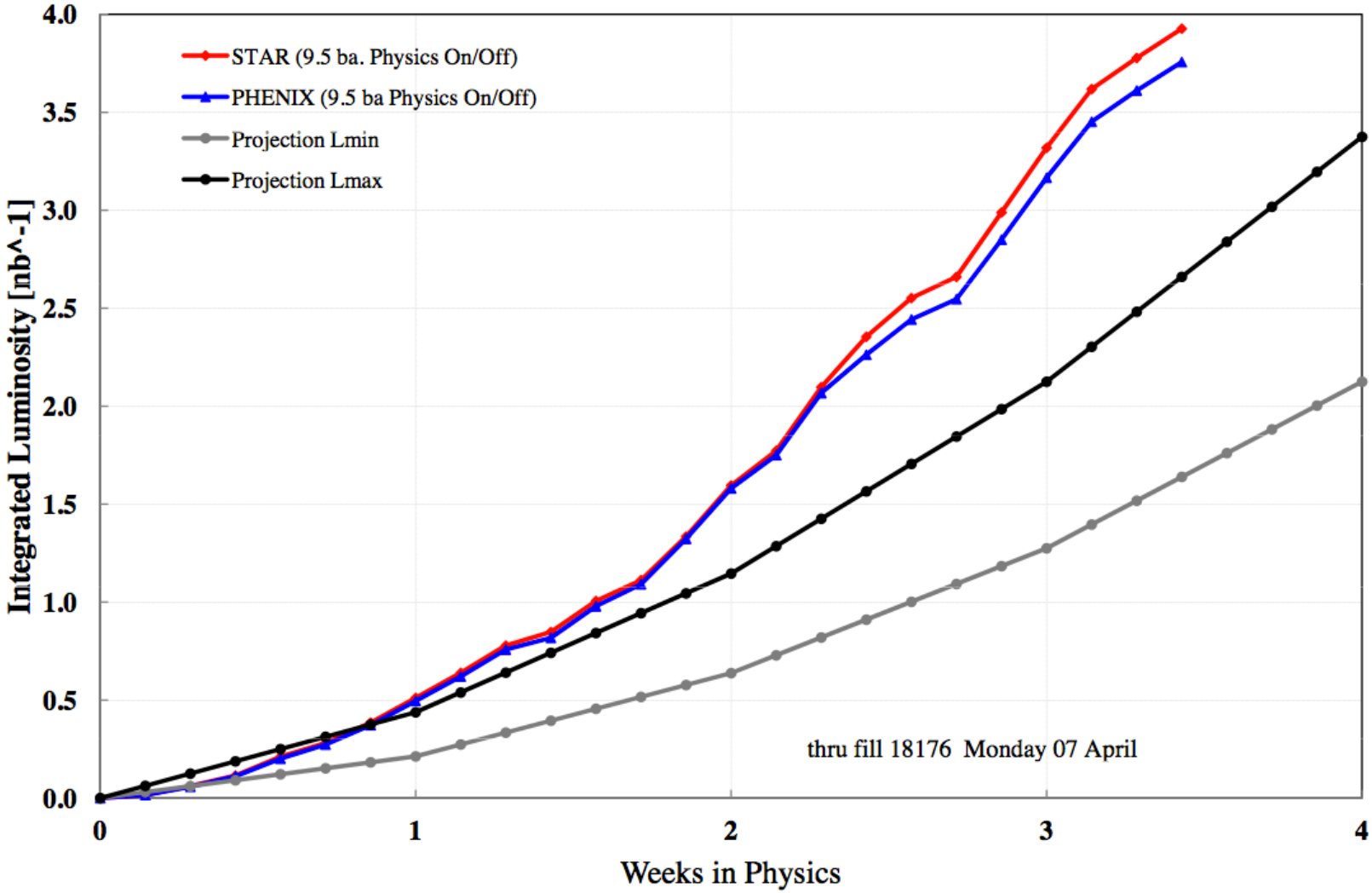
- MD pushed back to 2:45pm today: Ramp Optics measurement + beta* = 60cm commissioning for both Blue and Yellow beam.

- Thursday (4/10): low ZDC rates run, around 3-5 kHz only – translates to 0.25e9 ions/bunch with a 111x111 fill pattern. Need tests to make sure injectors and RHIC instrumentation can run this low.

- APEX tomorrow, Maintenance on 4/16.

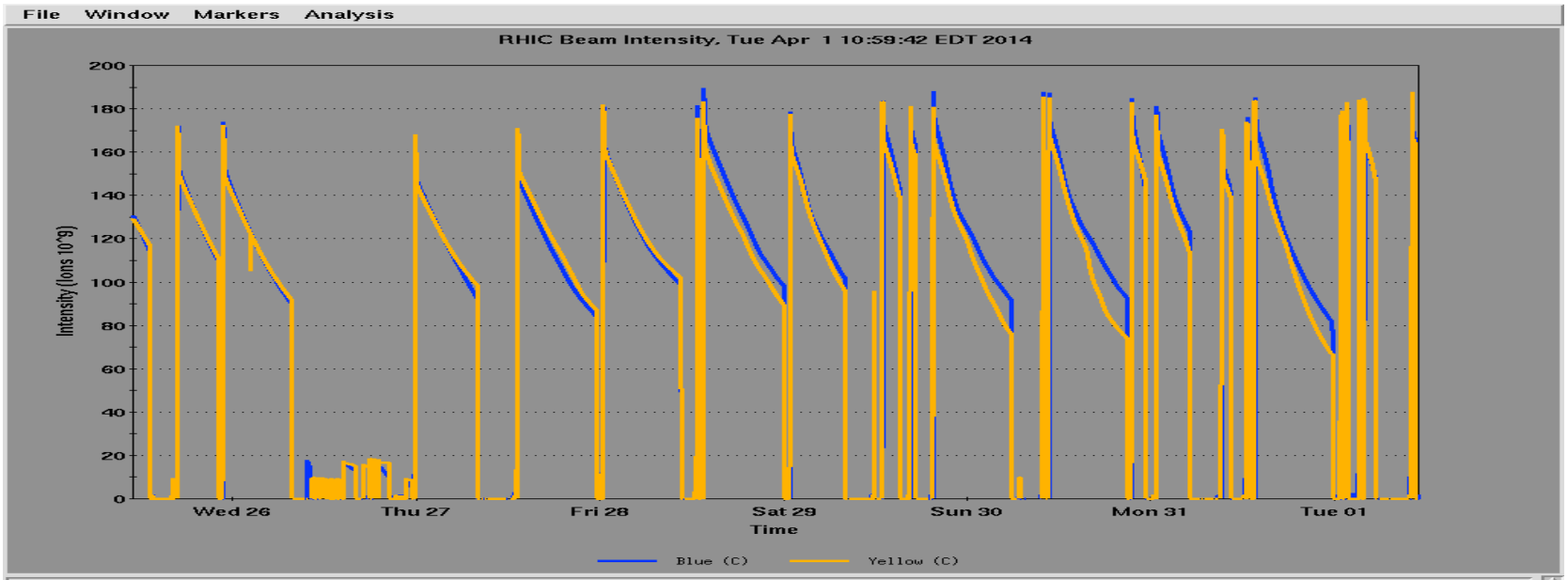

File Window Markers Analysis
RHIC Beam Intensity, Tue Apr 8 10:59:43 EDT 2014
Intensity (Ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 02
Thu 03
Fri 04
Sat 05
Sun 06
Mon 07
Tue 08
Time
Blue (C)
Yellow (C)

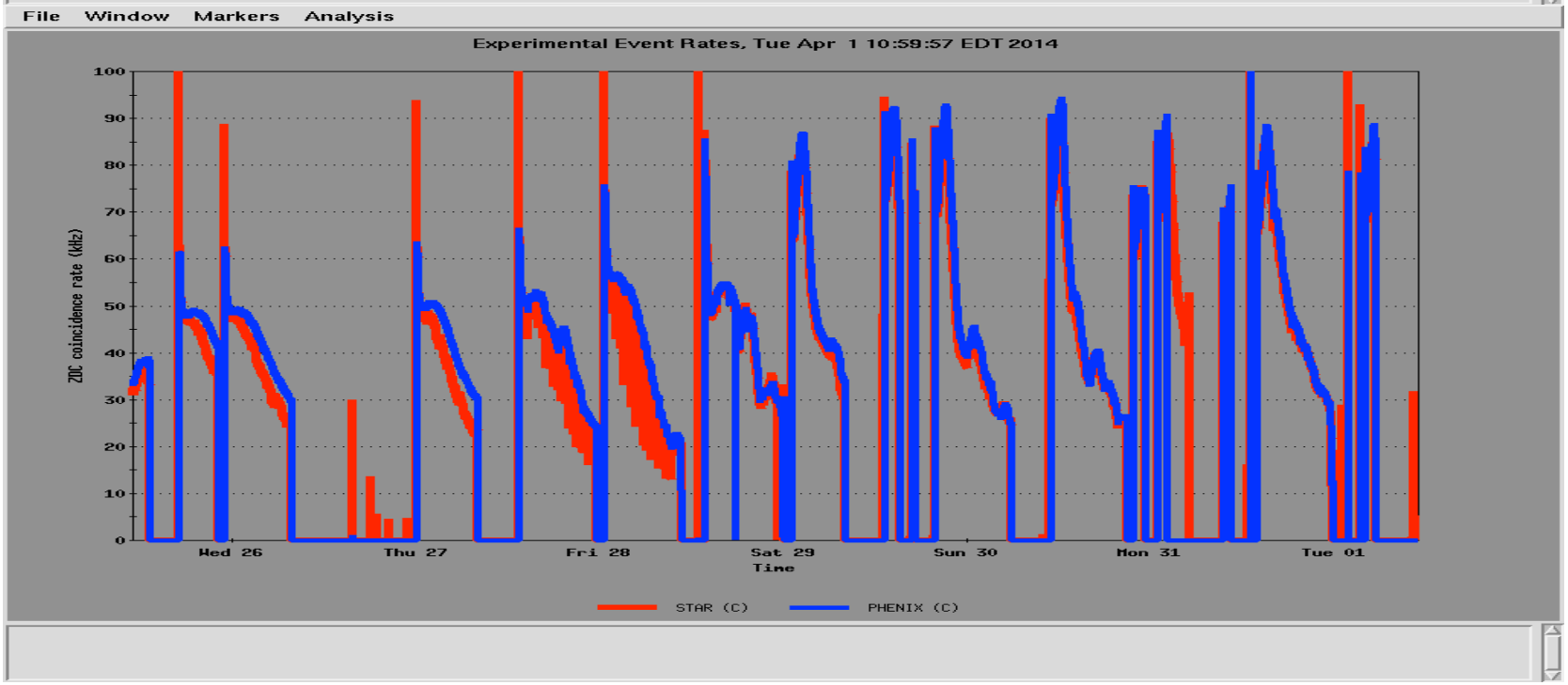

File Window Markers Analysis
Experimental Event Rates, Tue Apr 8 11:00:00 EDT 2014
ZDC coincidence rate (kHz)
100
90
80
70
60
50
40
30
20
10
0
Wed 02
Thu 03
Fri 04
Sat 05
Sun 06
Mon 07
Tue 08
Time
STAR (C)
PHENIX (C)

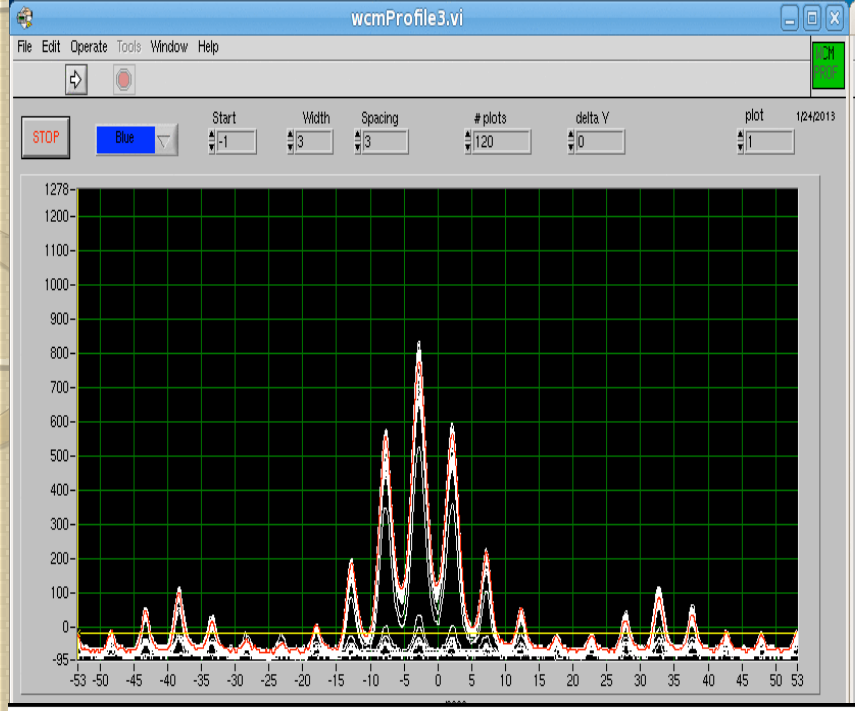

STAR (9.5 ba. Physics On/Off)
PHENIX (9.5 ba Physics On/Off)
Projection Lmin
Projection Lmax
thru fill 18176 Monday 07 April
Integrated Luminosity [nb^-1]
Weeks in Physics
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
0
1
2
3
4

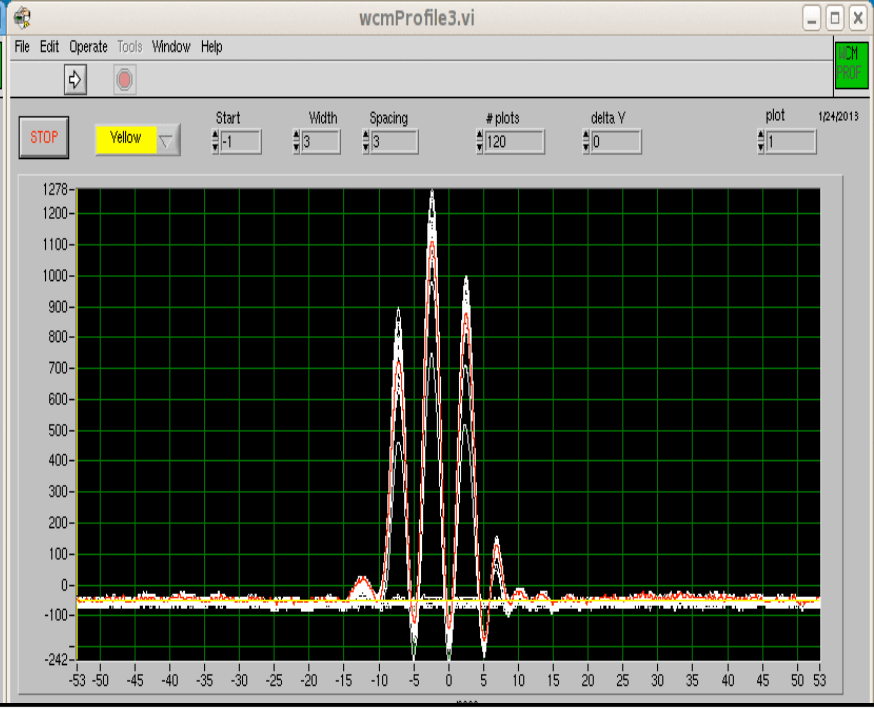
Run14 Status – Apr. 1

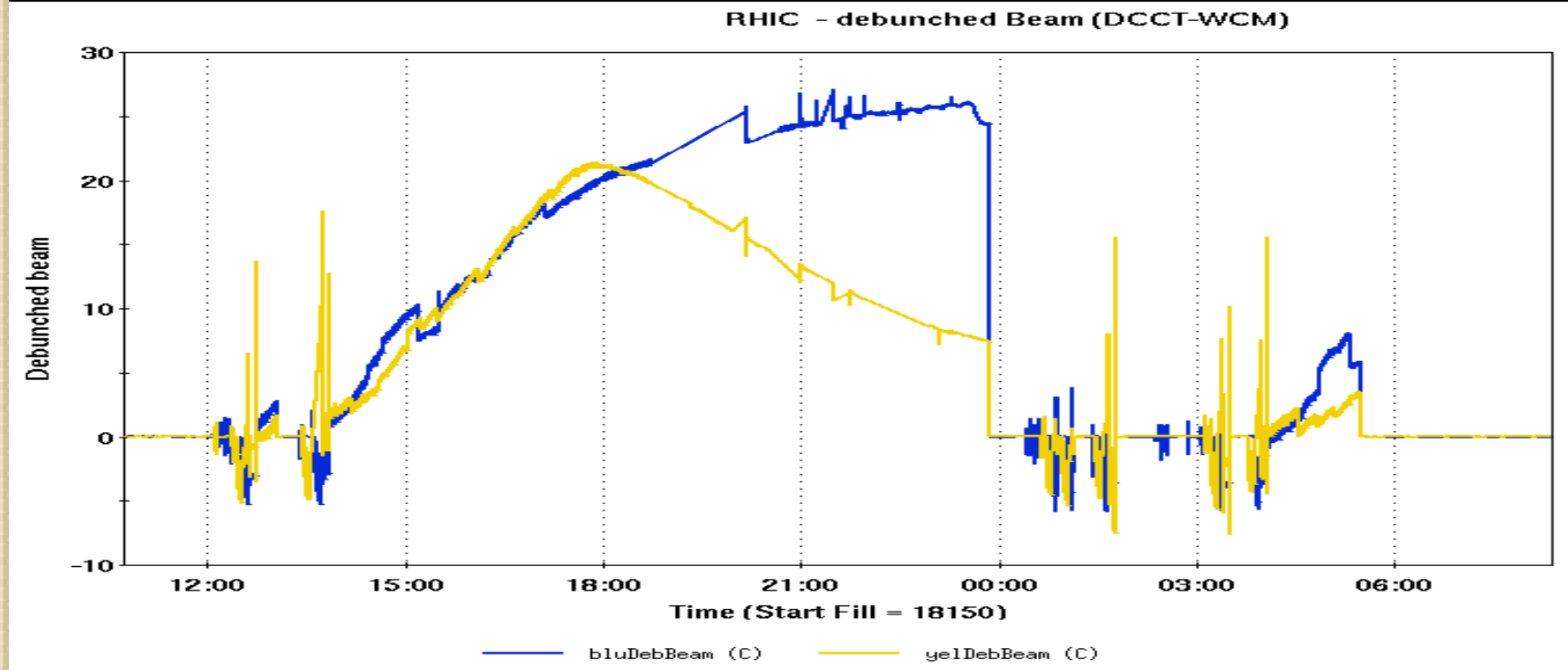
- Stochastic Cooling: all 3 planes B+Y since 3/28; monitoring the effect of Yellow cooling on Blue emittances as the store progresses. Additionally, yesterday (3/31) the fast gate for longitudinal cooling in Yellow was turned on: main bunch and first 2 satellites only are being cooled
- First APEX on 3/26 was a success; dynamic β^* squeeze tested, will turn operational.
- First commissioning test of e-lens with beam, using last bunch(es) of train.
- Investigated Blue QLI's on the down ramp: no conclusive results, diagnostics hard considering the low frequency of events.
- Corrected store orbit feedback procedure to reduce orbit drift and seesaw ZDC rates.
- Recorded 2 Yellow Abort Kicker prefires.
- AC problems in 6 buildings: main problem was on 3/29, causing 2 QLI's at store due to a quench detector in 1006B affected to the AC tripping.
- Maintenance tomorrow, APEX on 4/9.


File Window Markers Analysis
RHIC Beam Intensity, Tue Apr 1 10:59:42 EDT 2014
Intensity (Ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 26
Thu 27
Fri 28
Sat 29
Sun 30
Mon 31
Tue 01
Time
Blue (C)
Yellow (C)


File Window Markers Analysis
Experimental Event Rates, Tue Apr 1 10:59:57 EDT 2014
ZDC coincidence rate (kHz)
100
90
80
70
60
50
40
30
20
10
0
Wed 26
Thu 27
Fri 28
Sat 29
Sun 30
Mon 31
Tue 01
Time
STAR (C)
PHENIX (C)

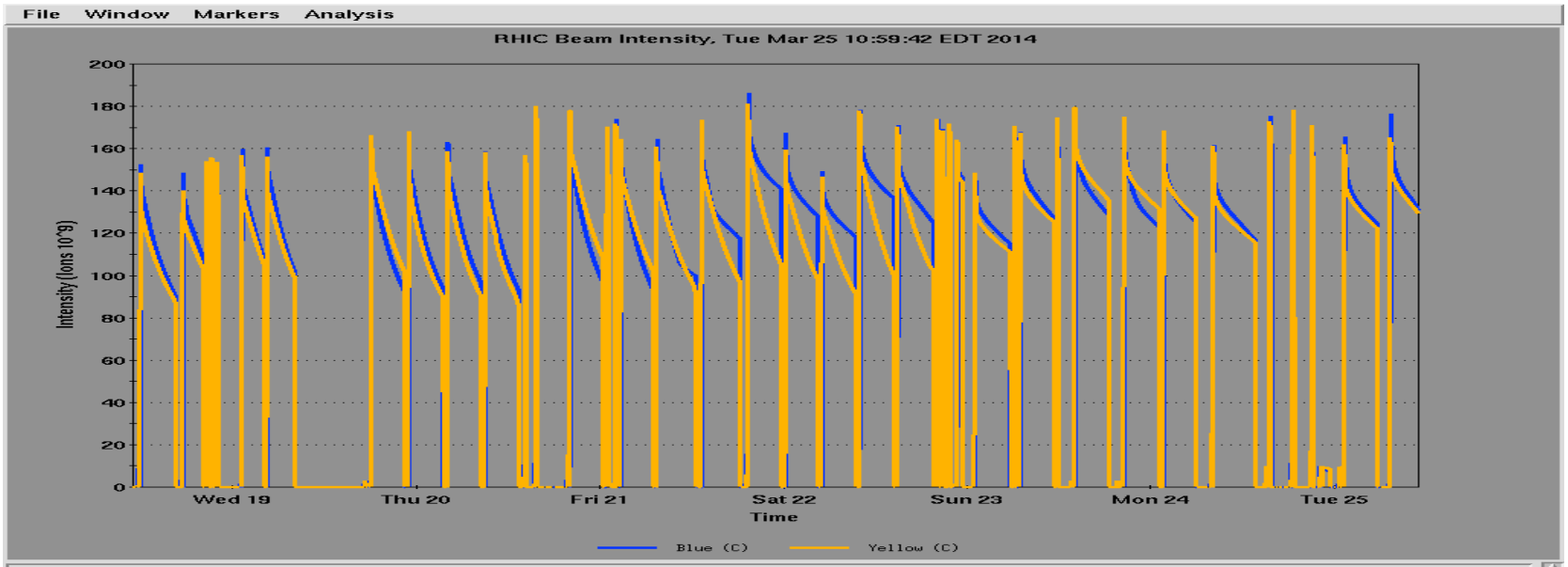

wcmProfile3.vi
File Edit Operate Tools Window Help
STOP
Blue
Start
Width
Spacing
plots
delta Y
plot
1/24/2013

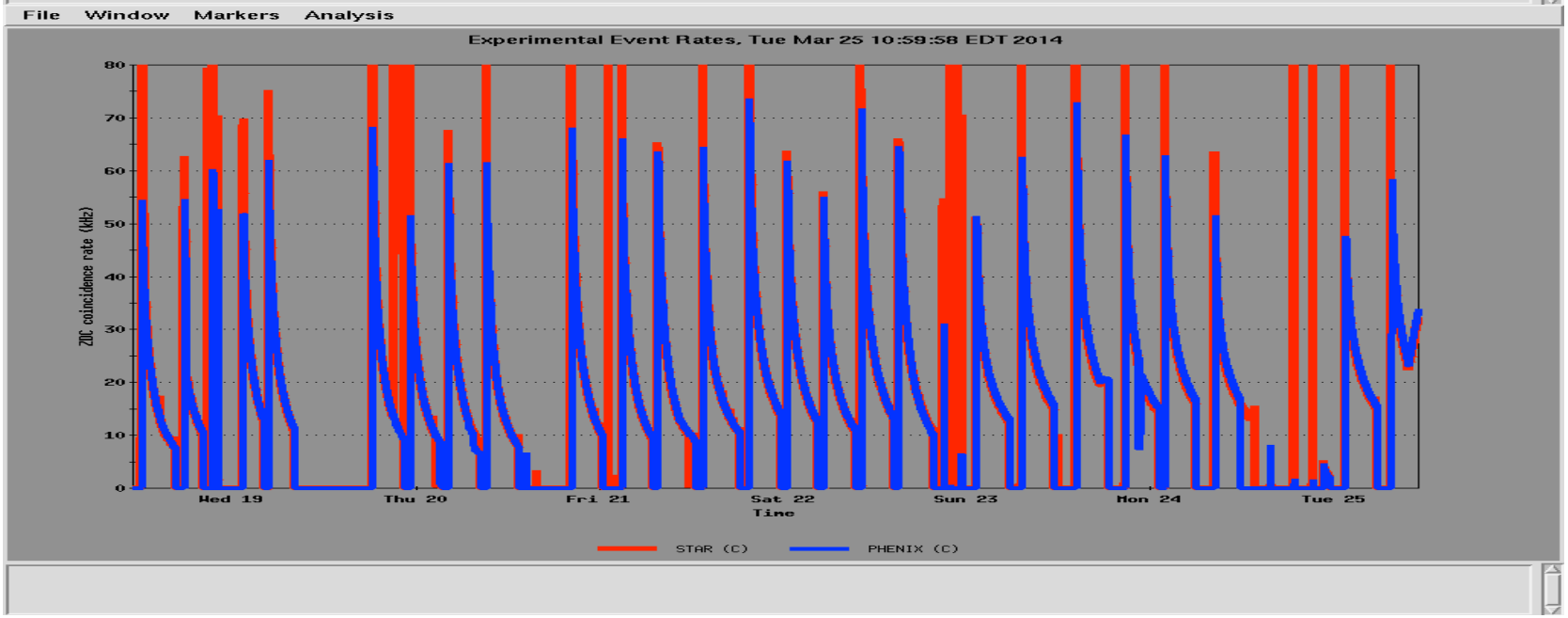

wcmProfile3.vi
File Edit Operate Tools Window Help
STOP
Yellow
Start
Width
Spacing
plots
delta Y
plot
1/24/2013

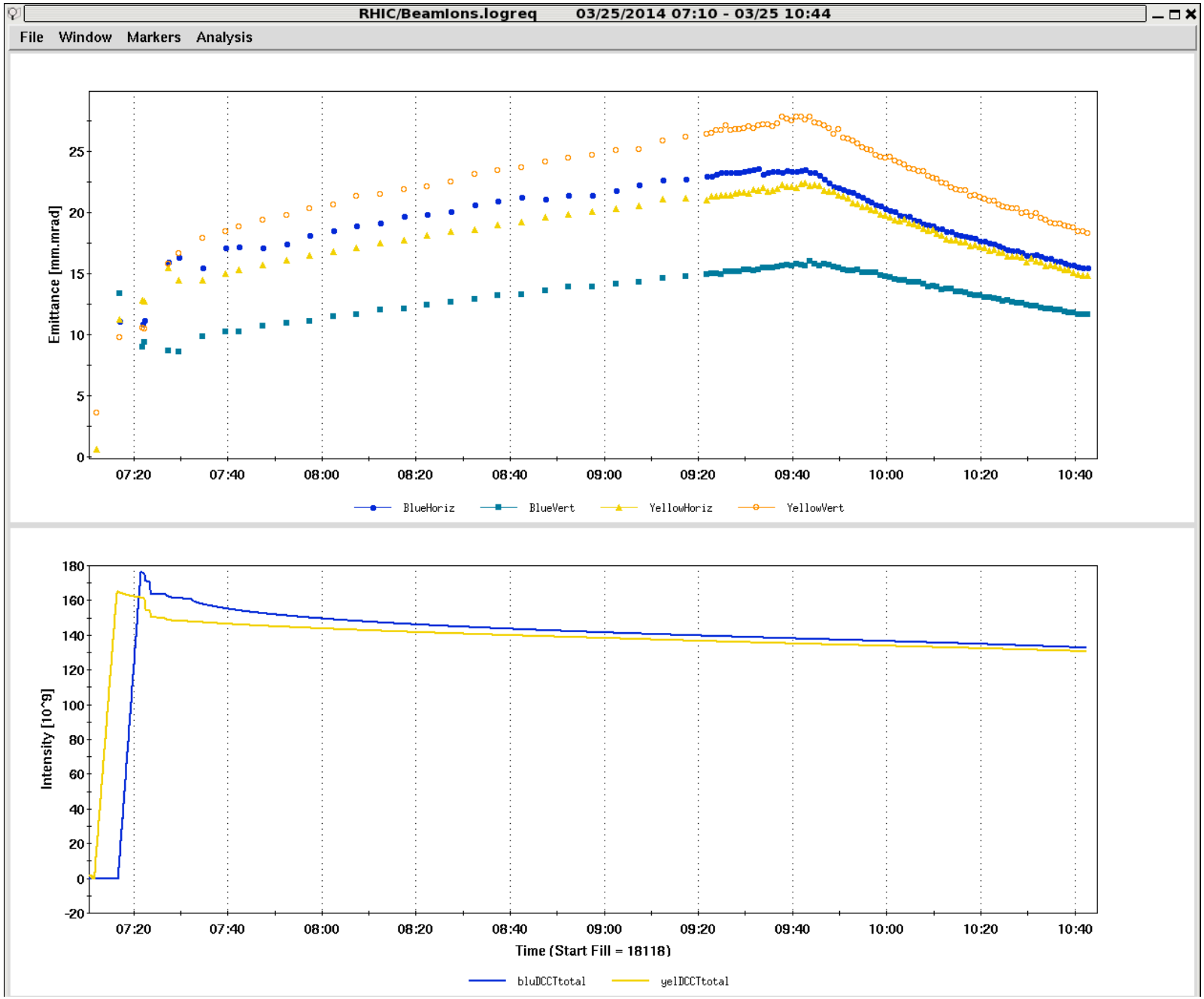

RHIC - debunched Beam (DCCT-WCM)
Debunched beam
Time (Start Fill = 18150)
12:00
15:00
18:00
21:00
00:00
03:00
06:00
bluDebBeam (C)
yelDebBeam (C)

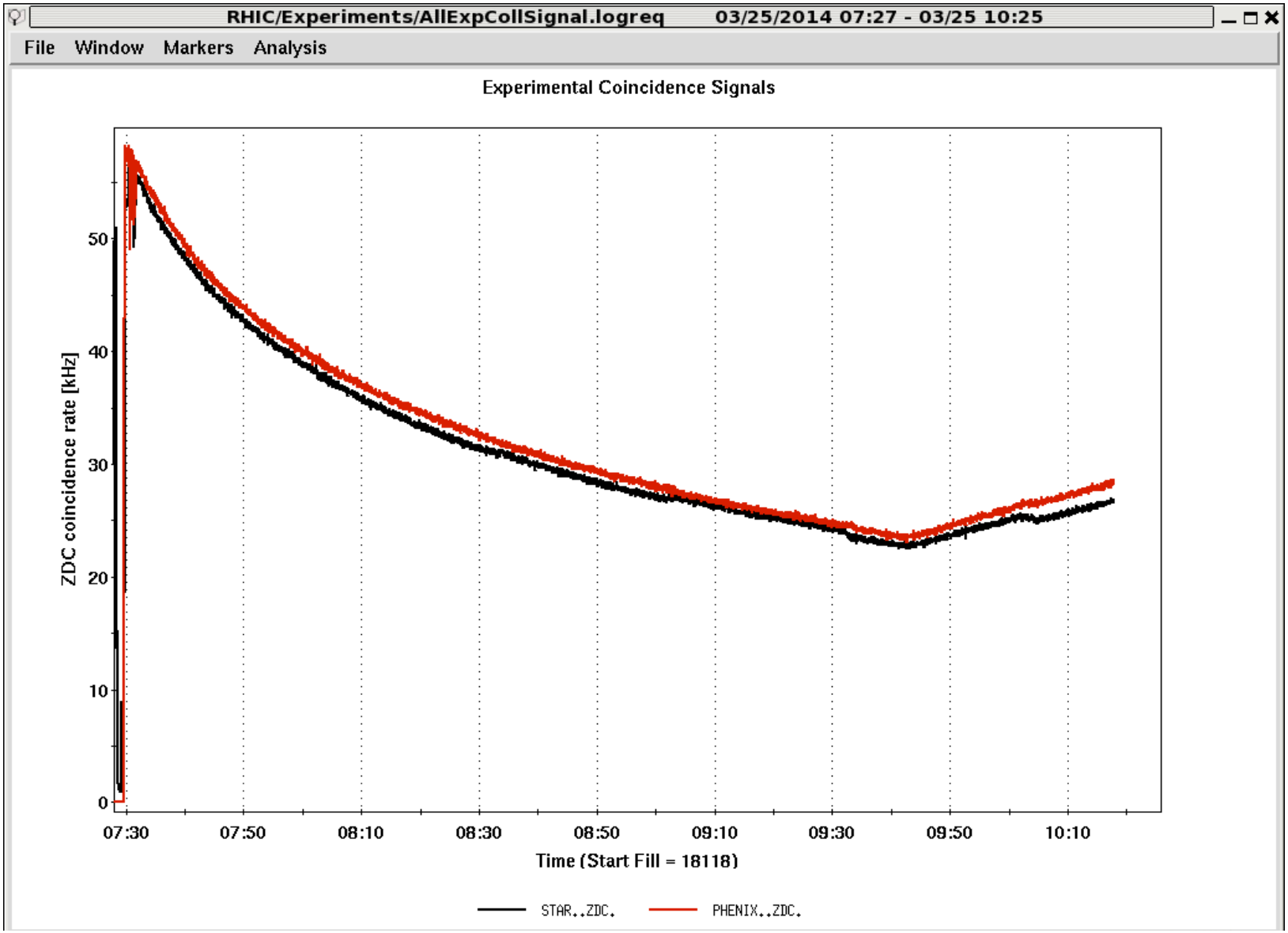
Run14 Status – Mar. 25

- 111x111 fills at 1.6e9 ions/bunch w/ rebucketing at store; scrubbing essentially done.
- New record peak luminosity for Fill 18093 with **L > 60e26 $cm^{-2}s^{-1}$**.
- Stochastic Cooling: longitudinal in B+Y since 3/21, horizontal just about operational.
- Few hiccups with intensities from EBIS.
- Sat. to Sun. (from eLog): "2 failed ramps due to Landau trips, a bad BPM messing up orbit, and a blue [QLI] that occurred when yellow feedback was engaged at store". => all problems were addressed and solved/understood
- BS3-4 storage cavities tripping; work ongoing to troubleshoot, solution imminent.
- Fix for main magnet regulator loop card, to reduce risks of QLI on up/down ramps.
- First APEX: 16 hours tomorrow (3/26), back in physics for the following OWL shift.


File Window Markers Analysis
RHIC Beam Intensity, Tue Mar 25 10:59:42 EDT 2014
Intensity (Ions 10^9)
200
180
160
140
120
100
80
60
40
20
0
Wed 19
Thu 20
Fri 21
Sat 22
Sun 23
Mon 24
Tue 25
Time
Blue (C)
Yellow (C)

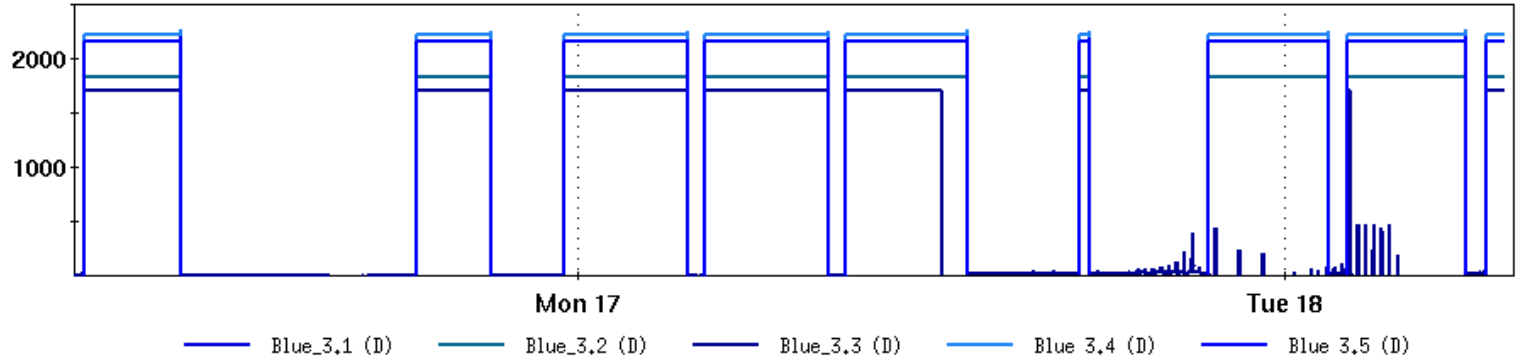

File Window Markers Analysis
Experimental Event Rates, Tue Mar 25 10:59:58 EDT 2014
ZDC coincidence rate (kHz)
80
70
60
50
40
30
20
10
0
Wed 19
Thu 20
Fri 21
Sat 22
Sun 23
Mon 24
Tue 25
Time
STAR (C)
PHENIX (C)

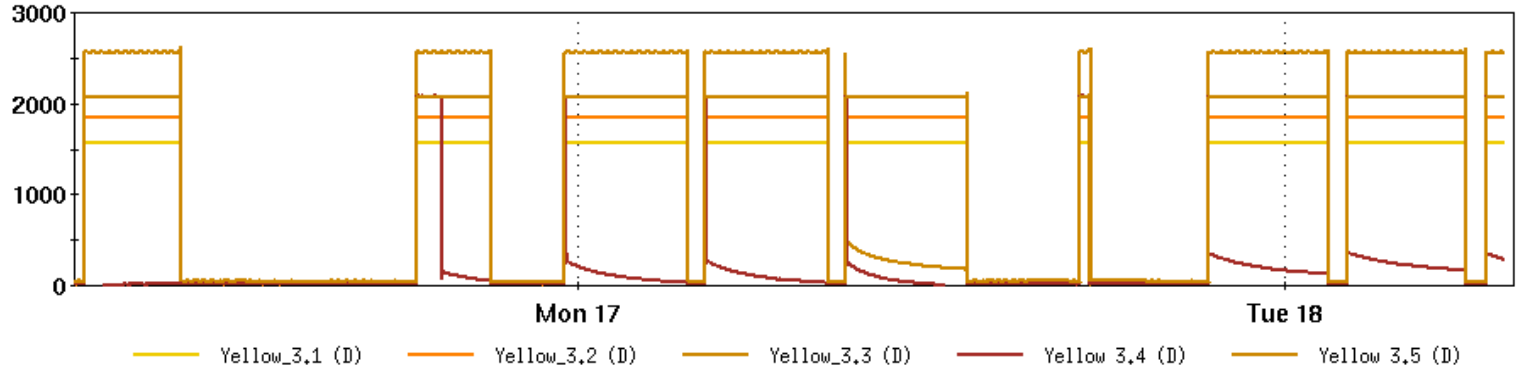

RHIC/BeamIons.logreq 03/25/2014 07:10 - 03/25 10:44
File Window Markers Analysis
Emittance [mm.mrad]
0
5
10
15
20
25
07:20
07:40
08:00
08:20
08:40
09:00
09:20
09:40
10:00
10:20
10:40
BlueHoriz
BlueVert
YellowHoriz
YellowVert
Intensity [10^9]
-20
0
20
40
60
80
100
120
140
160
180
Time (Start Fill = 18118)
bluDCCTtotal
yelDCCTtotal

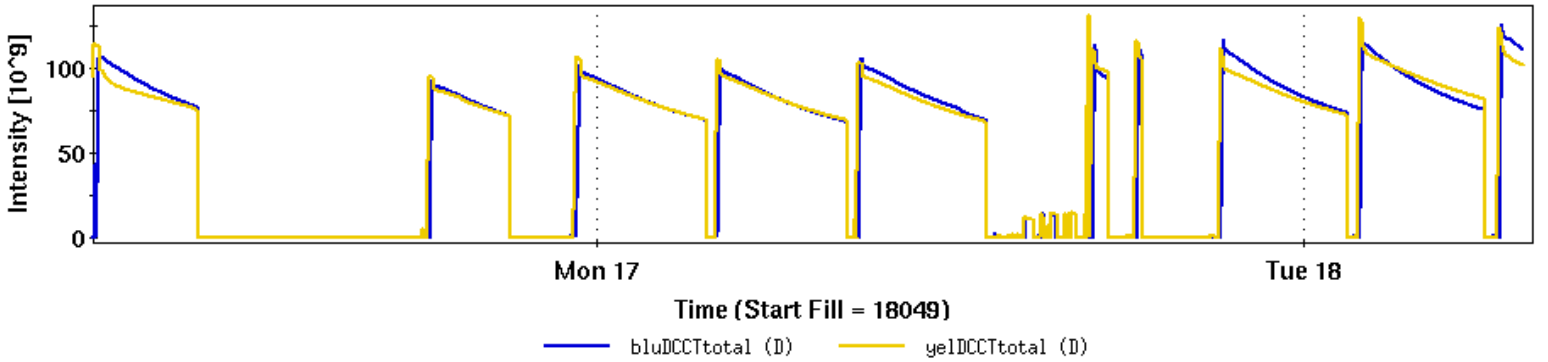

RHIC/Experiments/AllExpCollSignal.logreq 03/25/2014 07:27 - 03/25 10:25
File Window Markers Analysis
Experimental Coincidence Signals
ZDC coincidence rate [kHz]
0
10
20
30
40
50
07:30
07:50
08:10
08:30
08:50
09:10
09:30
09:50
10:10
Time (Start Fill = 18118)
STAR..ZDC.
PHENIX..ZDC.

Run14 Status – Mar. 18

- Switched over from Low Energy Run on 3/11, with first beam circulating in RHIC at regular injection energy at 04:00 on 3/12. First 6x6 ramp at 11:30 on 3/13.
- Set up orbit bumps for pre-fire protection in both rings: initial peak amplitude was 30mm, but caused repeated QLI's with every regular beam dump. Amplitude scaled down to 20mm after careful aperture scan on 3/13-14.
- 111x111 fills at 0.8e9 ions/bunch w/ rebucketing at store since 3/15 at 02:00. **Physics declared with Fill 18046, 14:10 on 3/15.**
- Slowly increasing the bunch intensity for scrubbing; goal is 1.3e9 by 3/19 at 08:00 (prior to Maintenance Day).
- Continuing work on Landau cavities; Stochastic Cooling commissioning (all 3 planes) should start right after we recover from Maintenance.
- Chromaticity measured at injection, store and along the ramp (via radial offset); linear optics measured at injection and store.
- eLens commissioning running in parallel to operations.


2000
1000
Mon 17
Tue 18
Blue_3.1 (D)
Blue_3.2 (D)
Blue_3.3 (D)
Blue 3.4 (D)
Blue 3.5 (D)


3000
2000
1000
0
Mon 17
Tue 18
Yellow_3.1 (D)
Yellow_3.2 (D)
Yellow_3.3 (D)
Yellow 3.4 (D)
Yellow 3.5 (D)


Intensity [10^9]
100
50
0
Mon 17
Tue 18
Time (Start Fill = 18049)
bluDCCTtotal (D)
yelDCCTtotal (D)