

Run 13 RHIC Machine/Experiments Meeting

23 April 2013

Agenda:

- Status Reports
- Discussion on the STAR HFT pixel readiness and installation
- Other issues form the experiments

Run 13 plan based on 20 weeks cryo operation

and Fischer et.al. RHIC Collider Projections (FY 2013 – FY 2017), 27 Sep 2012

- ✓ 11 Feb, Begin cool-down to 4.5K
- ✓ 15 Feb, Cool-down to 4.5K in Blue and Yellow Ring complete, begin magnet setup
- ✓ 26 Feb, first collisions
- ✓ 15 Feb -1 Mar, RHIC $\sqrt{s} = 510$ GeV pp machine setup
- ✓ 1-8 Mar, machine ramp-up with 8 hr/night for experiment setup
- ✓ 9 Mar (store 17201), begin $\sqrt{s} = 510$ GeV pp physics run

today, 23 Apr...

- 27 May, end 15 cryo weeks
- 6 Jun, switch to $\sqrt{s} = 15$ GeV/n AuAu if pp goals are met and end 12.7 week $\sqrt{s} = 510$ GeV pp physics run
- 27 Jun, end ~ 2.5 week $\sqrt{s} = 15$ GeV/n AuAu physics run or 15.9 week $\sqrt{s} = 510$ GeV pp physics run, begin cryo warm-up
- 30 June, cryo warm-up \sim complete (19.9 cryo-weeks)

See <http://www.rhichome.bnl.gov/AP/Spin2013/> for the Run Coordinator's detailed plan

Run 13 plan based on 17 weeks cryo operation

- ✓ 11 Feb, Begin cool-down to 4.5K
- ✓ 15 Feb, Cool-down to 4.5K in Blue and Yellow Ring complete, begin magnet setup
- ✓ 26 Feb, first collisions
- ✓ 15 Feb -1 Mar, RHIC $\sqrt{s} = 510$ GeV pp machine setup
- ✓ 1-8 Mar, machine ramp-up with 8 hr/night for experiment setup
- ✓ 9 Mar (store 17201), begin $\sqrt{s} = 510$ GeV pp physics run

today, 23 Apr...

- 30 April, decision time for switch to $\sqrt{s} = 15$ GeV/n AuAu.

if decide to run AuAu for 2.5 weeks (2 weeks physics)

- 20 May (Monday), switch to 15 GeV/n AuAu – begin ½ week AuAu setup
- 24 May (Friday), begin 15 GeV/n AuAu physics
- 7 June (Friday), end ~2.0 week $\sqrt{s} = 15$ GeV/n AuAu physics run or 13.0 week $\sqrt{s} = 510$ GeV pp physics run, begin cryo warm-up
- 10 June, cryo warm-up ~complete (17.0 cryo-weeks)

FY2013 (Power costs)

Sept billed at \$68/MWhr actual cost \$53.28 – added \$241.8K to the bank Oct billed at \$60/MWhr actual cost \$61.59 -- \$25.7K withdrawn from bank Nov billed at \$60/MWhr actual cost \$83.87 -- \$377.3K withdrawn from bank Dec billed at \$60/MWhr actual cost \$39.32 -- \$320.7K added to the bank Jan billed at \$53/MWhr actual cost \$36.61 -- \$345.5K added to the bank Feb billed at \$53/MWhr actual cost \$28.89 -- \$627.0K added to the bank

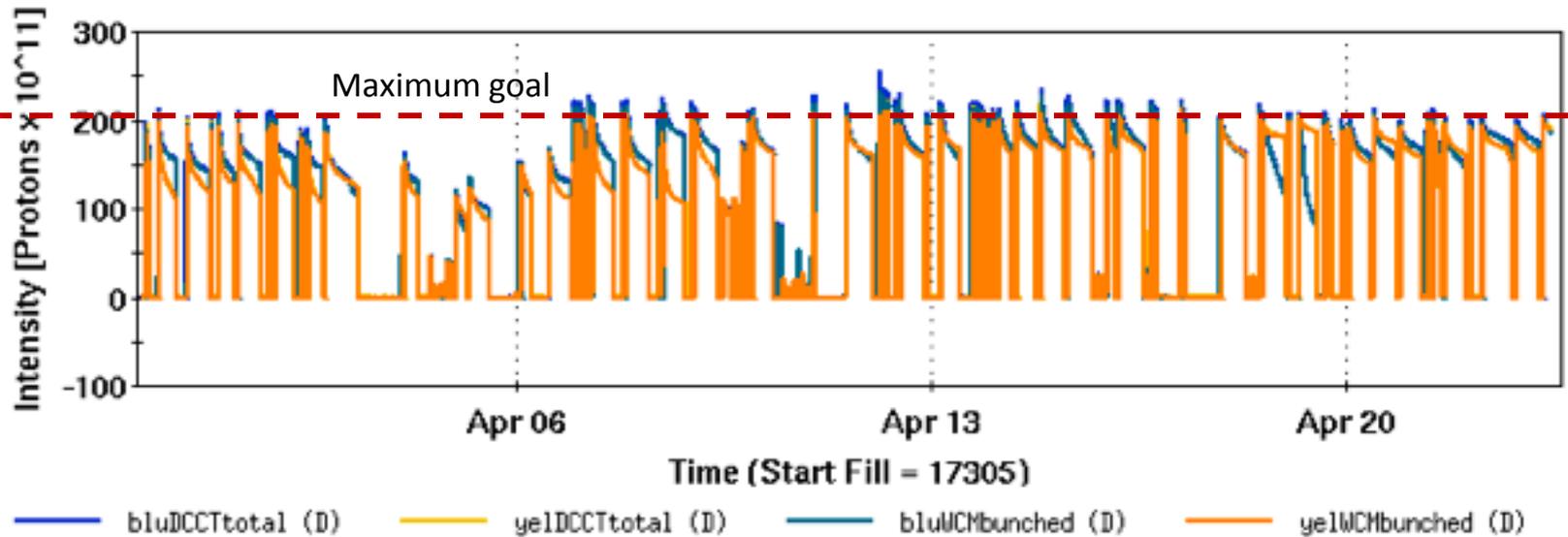
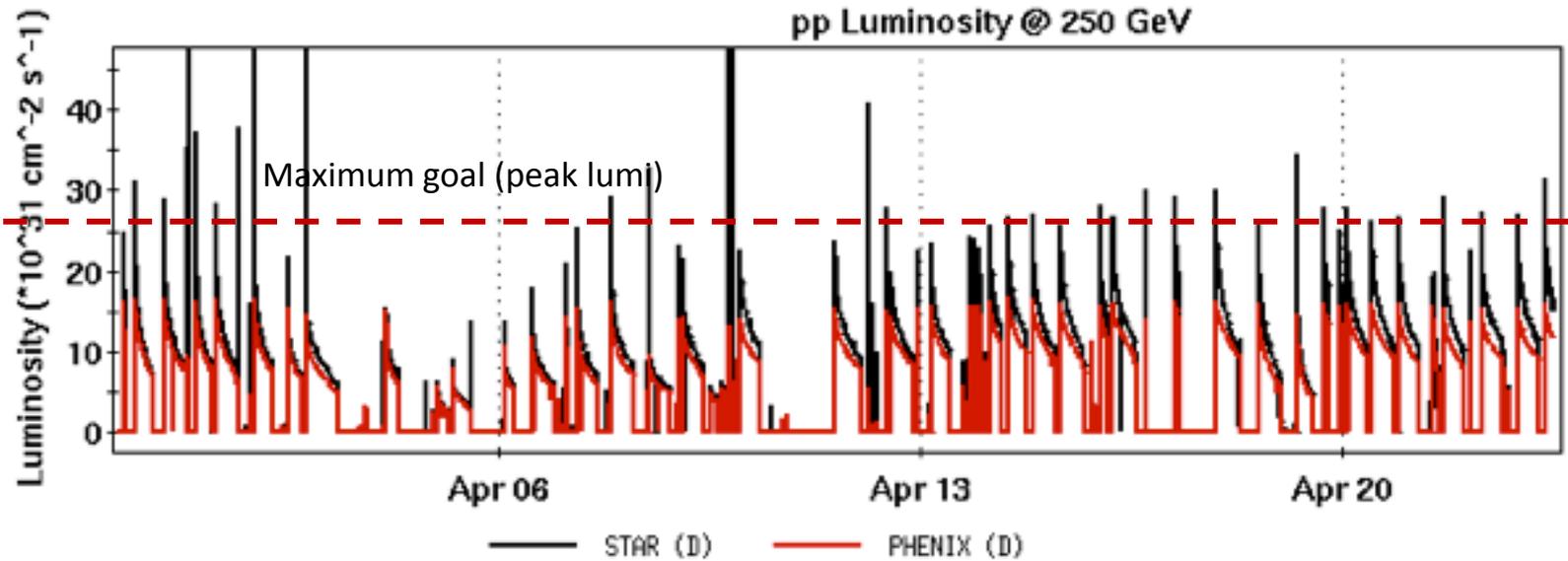
Mar billed at \$53/MWhr actual cost \$54.39 -- \$45.4K withdrawn from bankFY2013

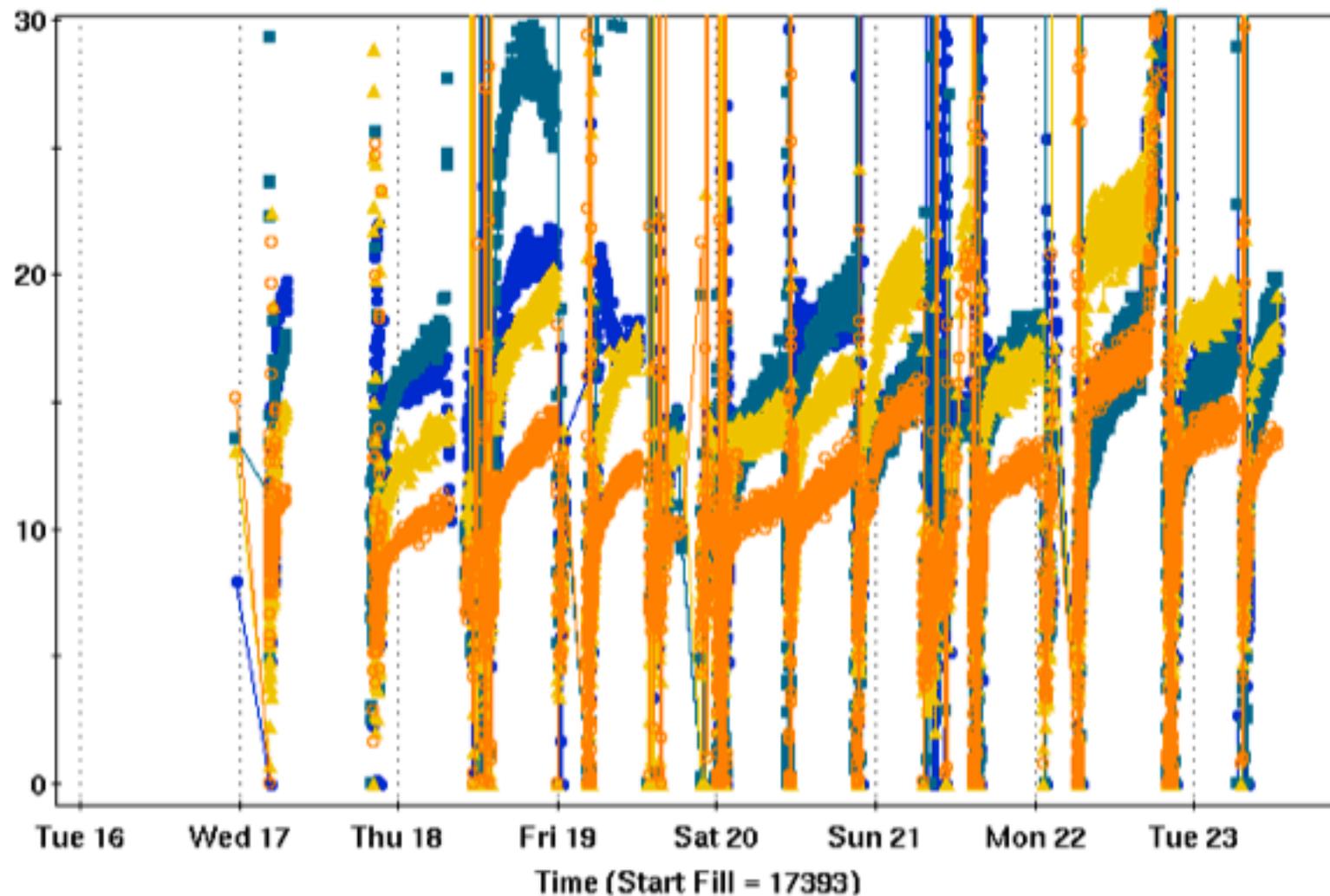
Bank Total = \$1,086,638

by Stephanie's accounting ~\$450K of this should come back to C-AD



File Window Markers Analysis





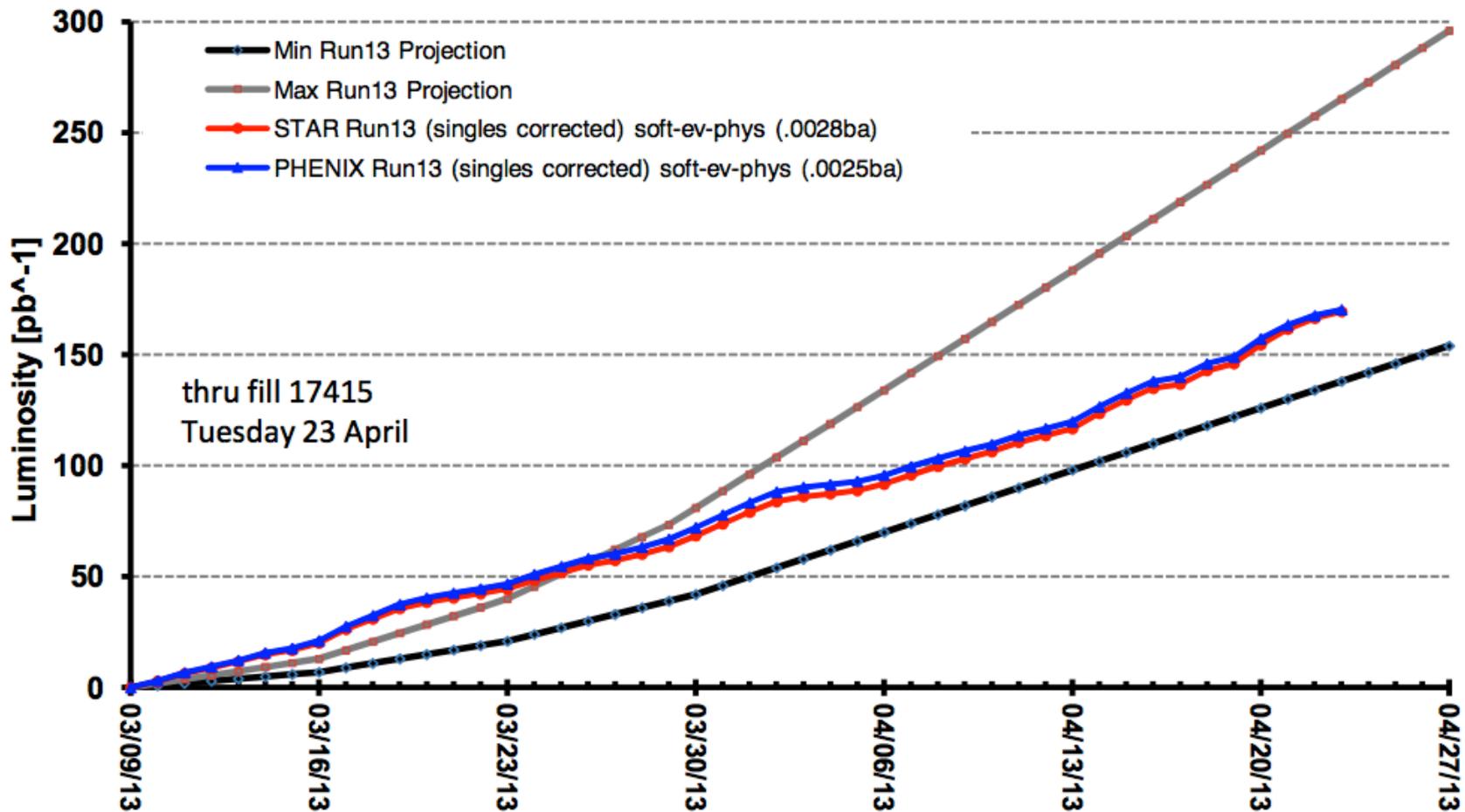
—●— RhicIpMnager.blue_horiz;normEmitt[.] (D)

—▲— RhicIpMnager.yellow_horiz;normEmitt[.] (D)

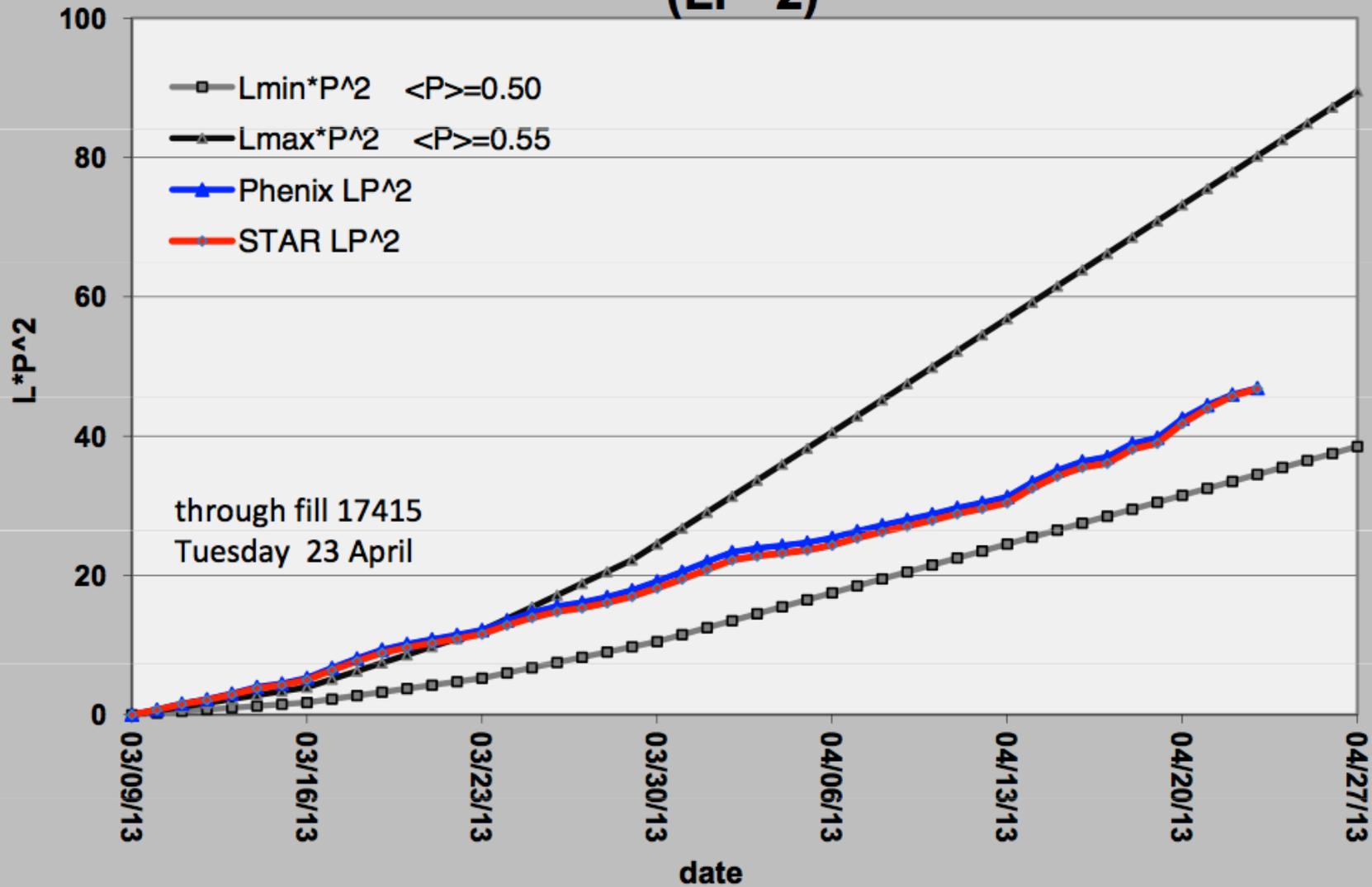
—■— RhicIpMnager.blue_vert;normEmitt[.] (D)

—○— RhicIpMnager.yellow_vert;normEmitt[.] (D)

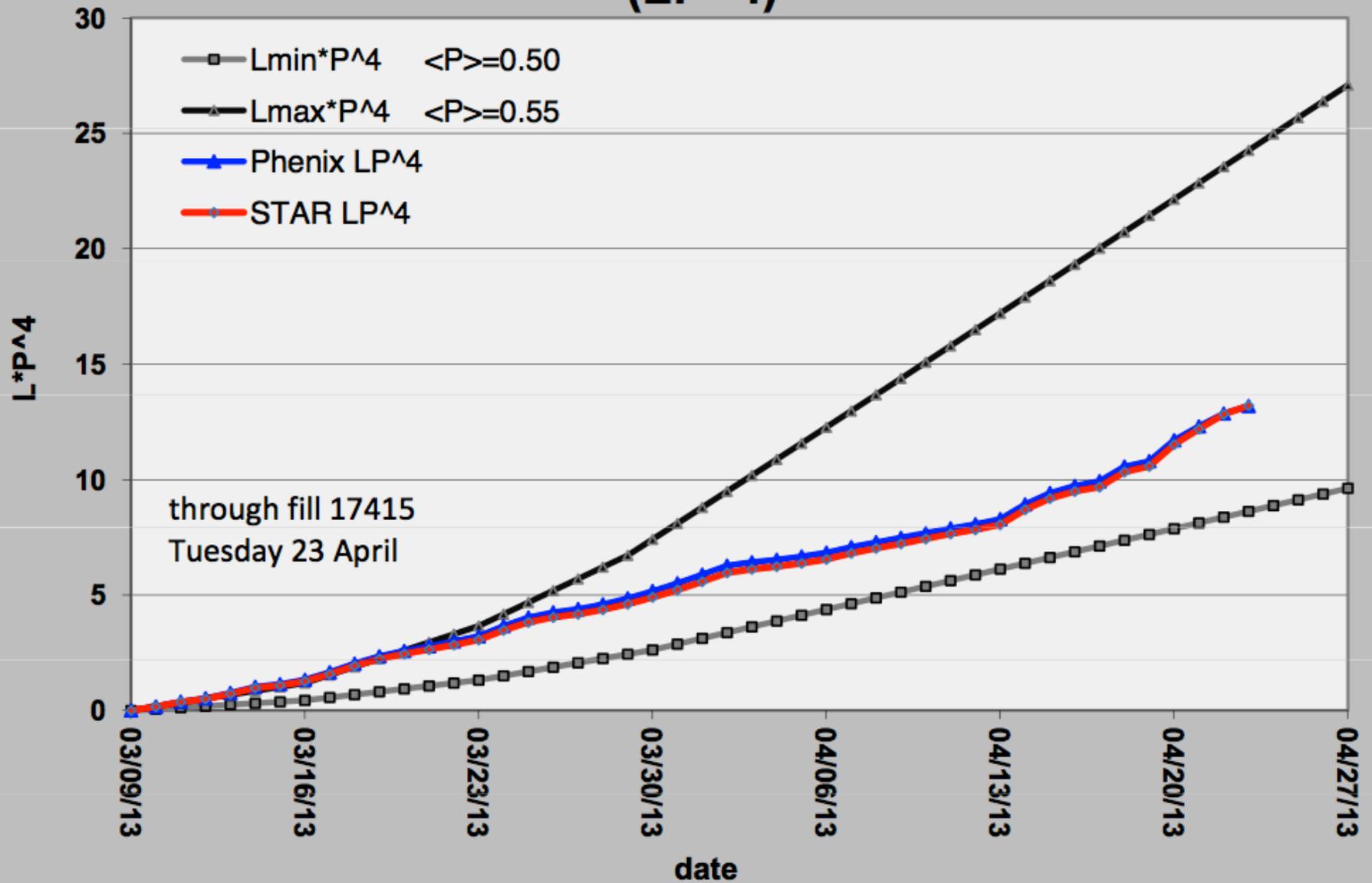
RHIC Run13 p^p^ Delivered Luminosity ($\sqrt{s}=510$ GeV)



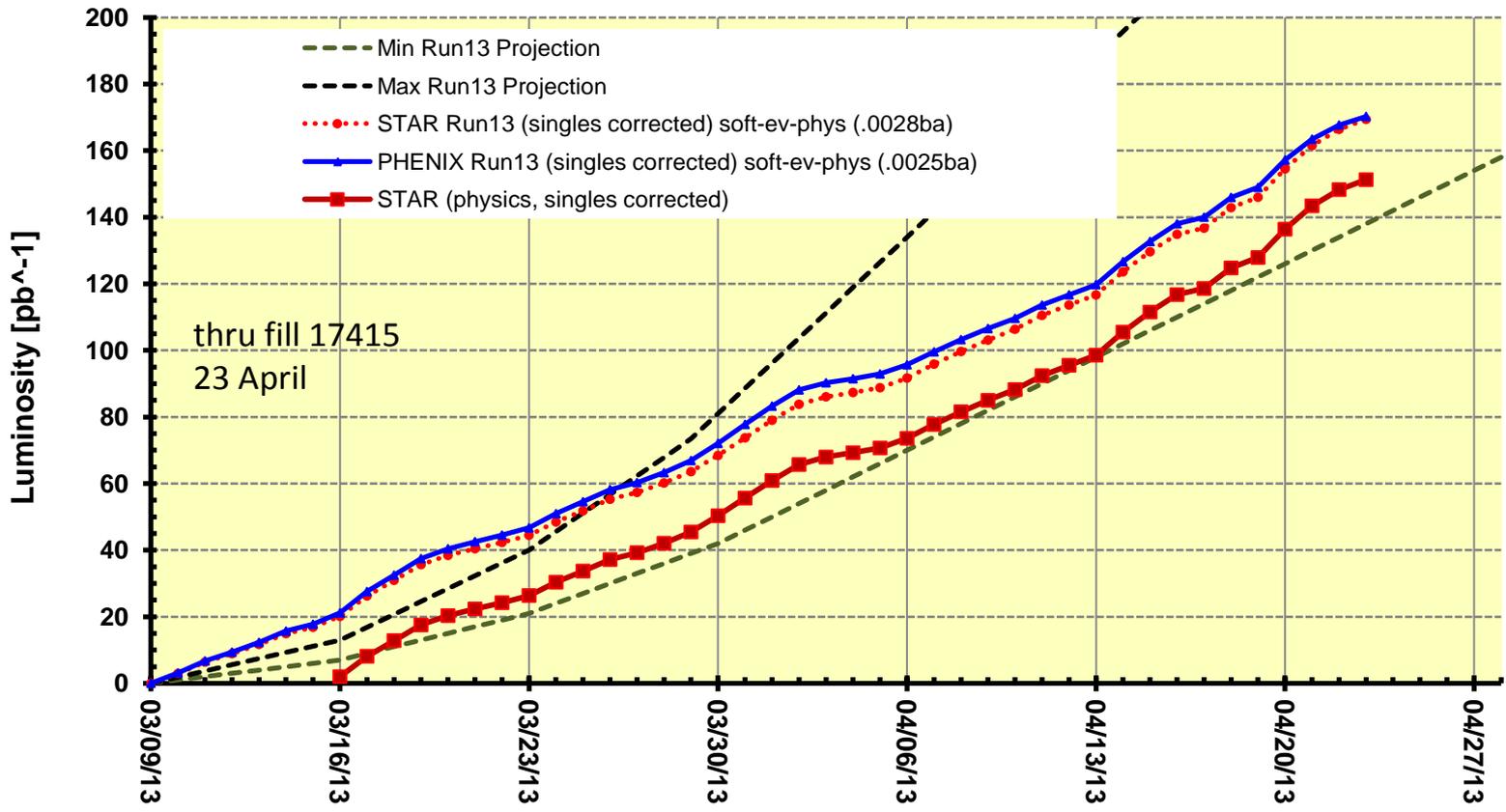
Run13 ($\sqrt{s}=510$ GeV) -- Figure of Merit (LP²)



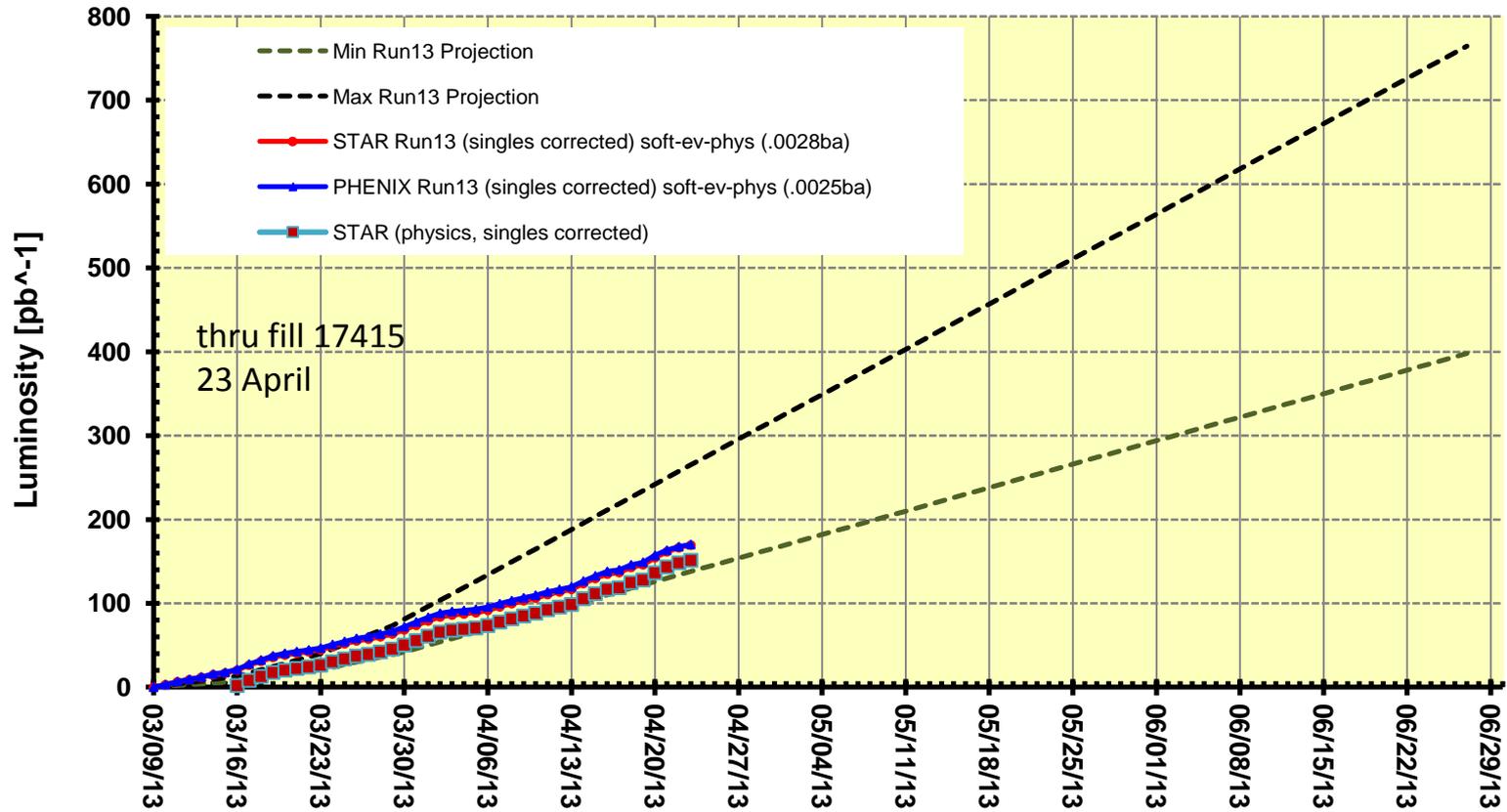
Run13 ($\sqrt{s}=510$ GeV) -- Figure of Merit (LP⁴)

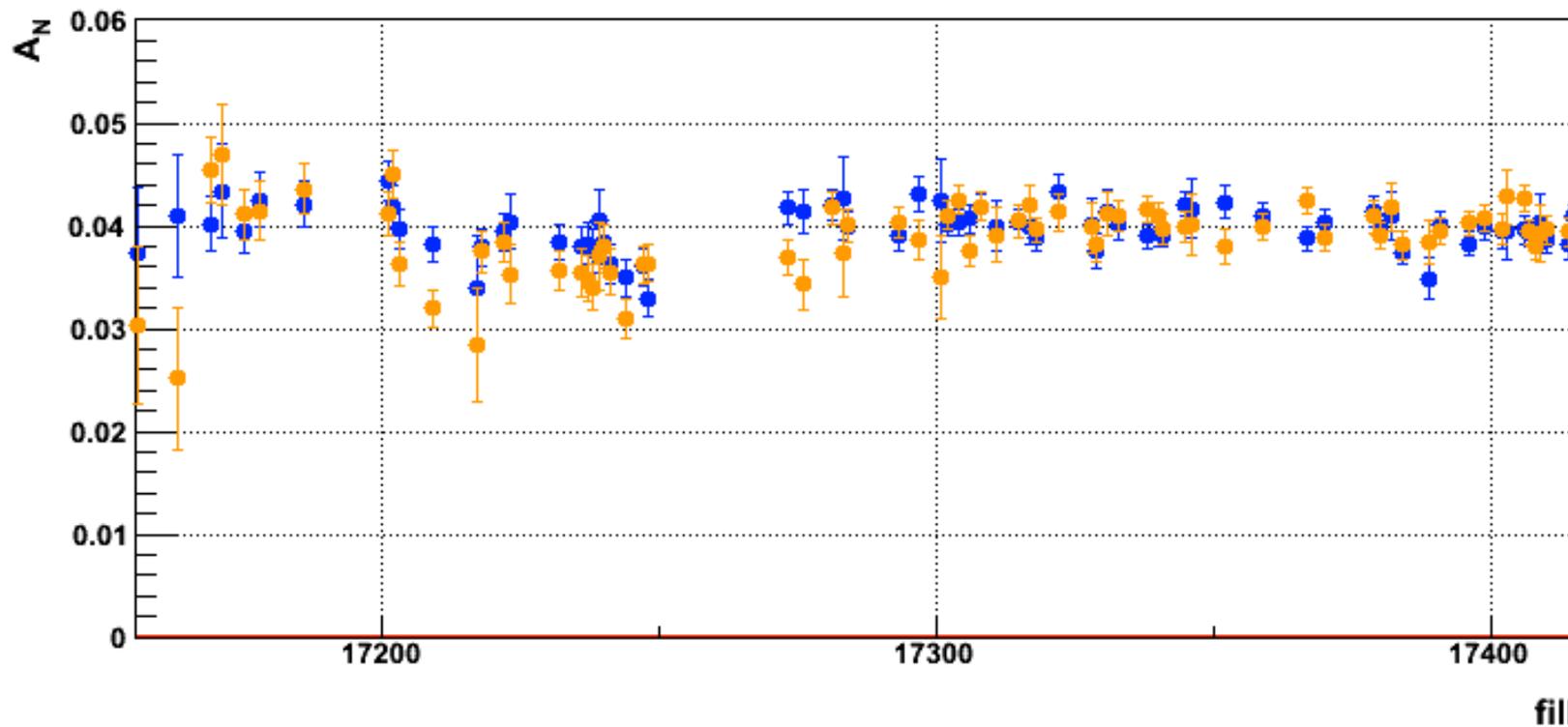
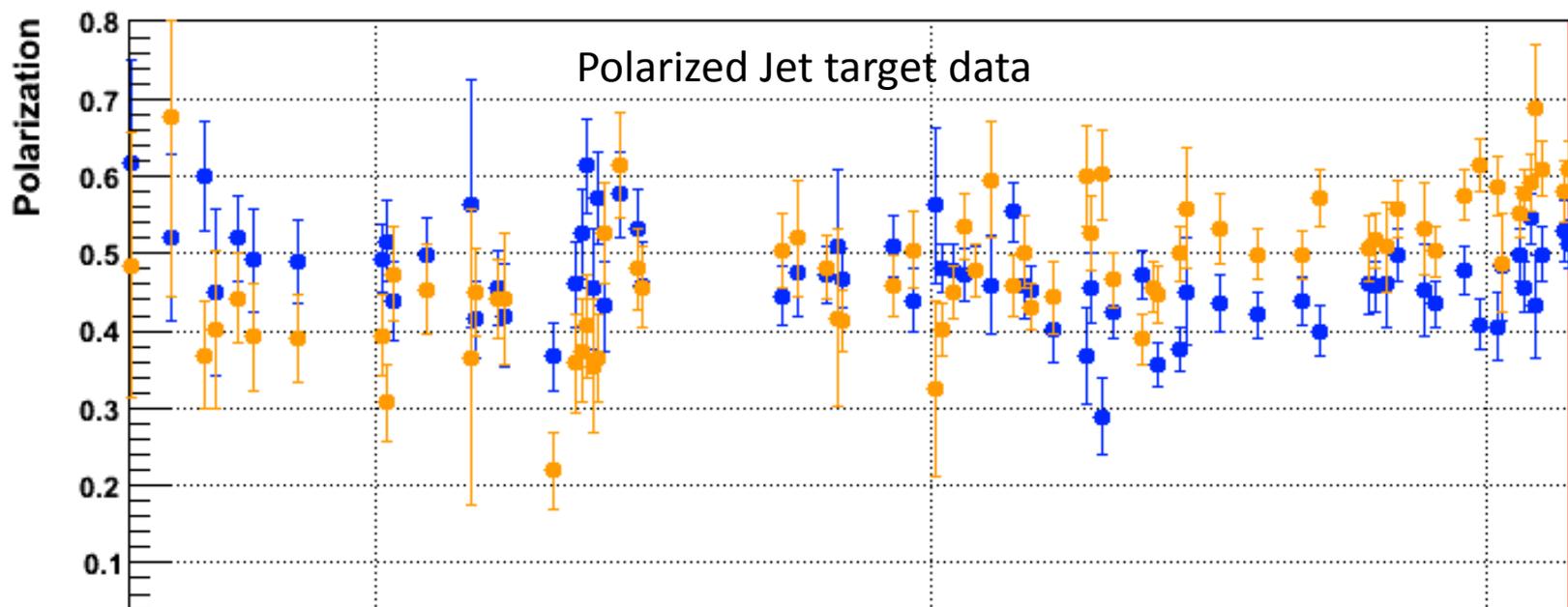


RHIC p⁺p⁺ Luminosity Run-13 ($\sqrt{s}=510$ GeV)



RHIC p^p Luminosity Run-13 ($\sqrt{s}=510$ GeV)



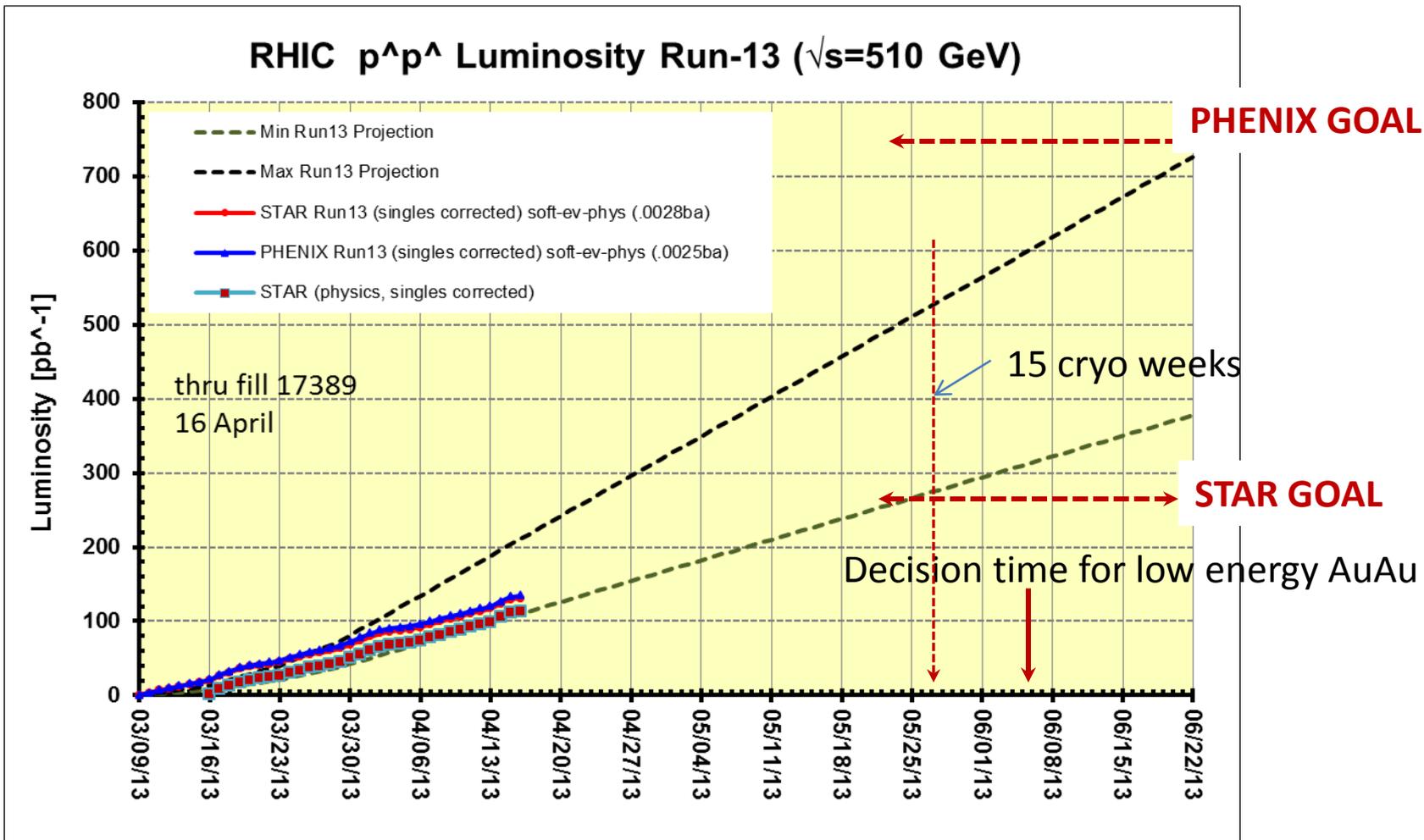


Additional Information

Preliminary, with Run 13 cross sections, PHENIX and STAR **log based singles correction**

PHENIX Goal, 250 pb⁻¹ recorded, 750 pb⁻¹ delivered, ≥ 55% polarization

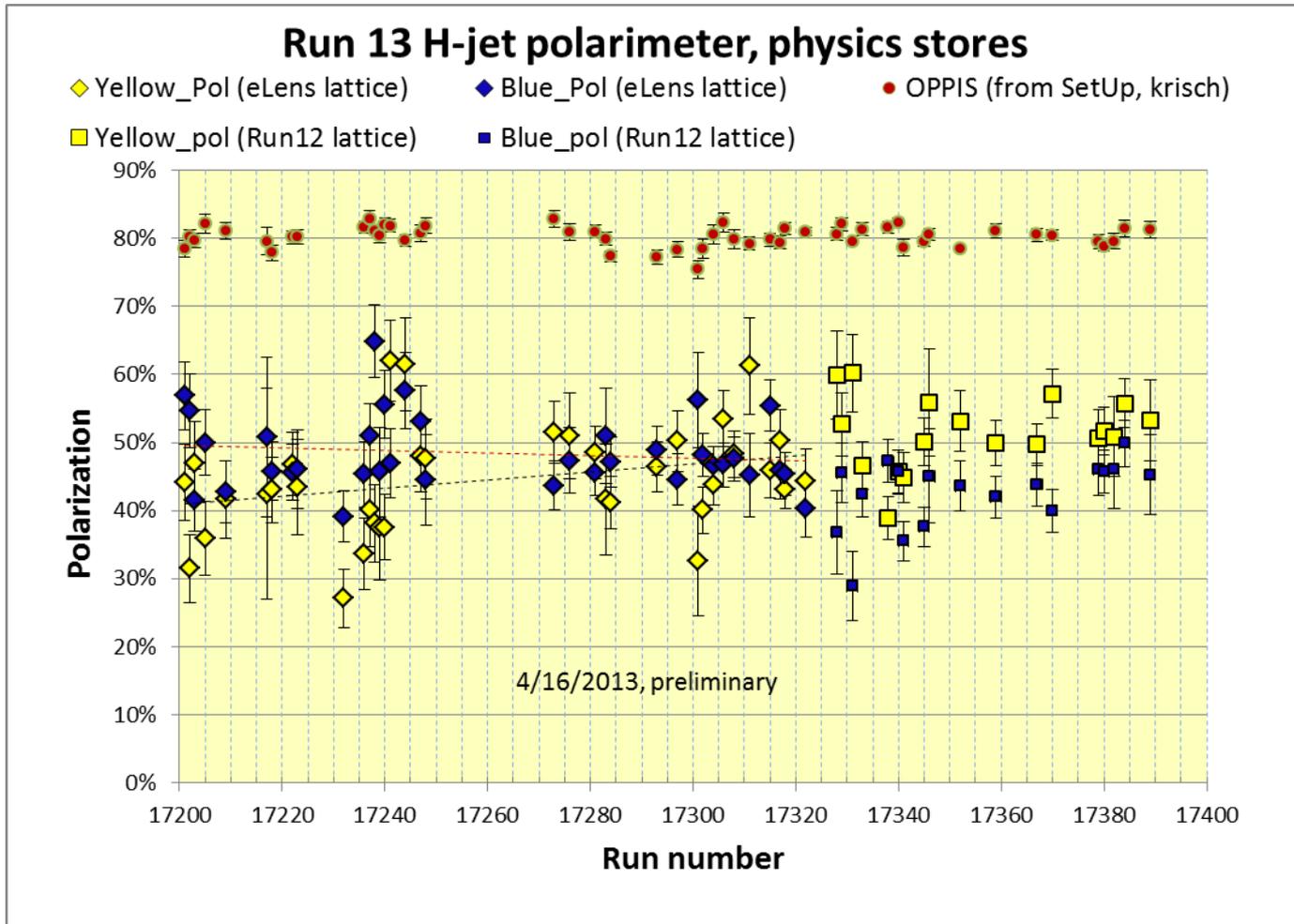
STAR Goal, 165 pb⁻¹ recorded, 275 pb⁻¹ delivered, ≥ 55% polarization



Preliminary, with Run 13 cross sections, singles corrected

Yellow average = $44.3 \pm 0.8\%$
Blue average = $47.7 \pm 0.7\%$
stores 17201-17322 (eLens lattice)

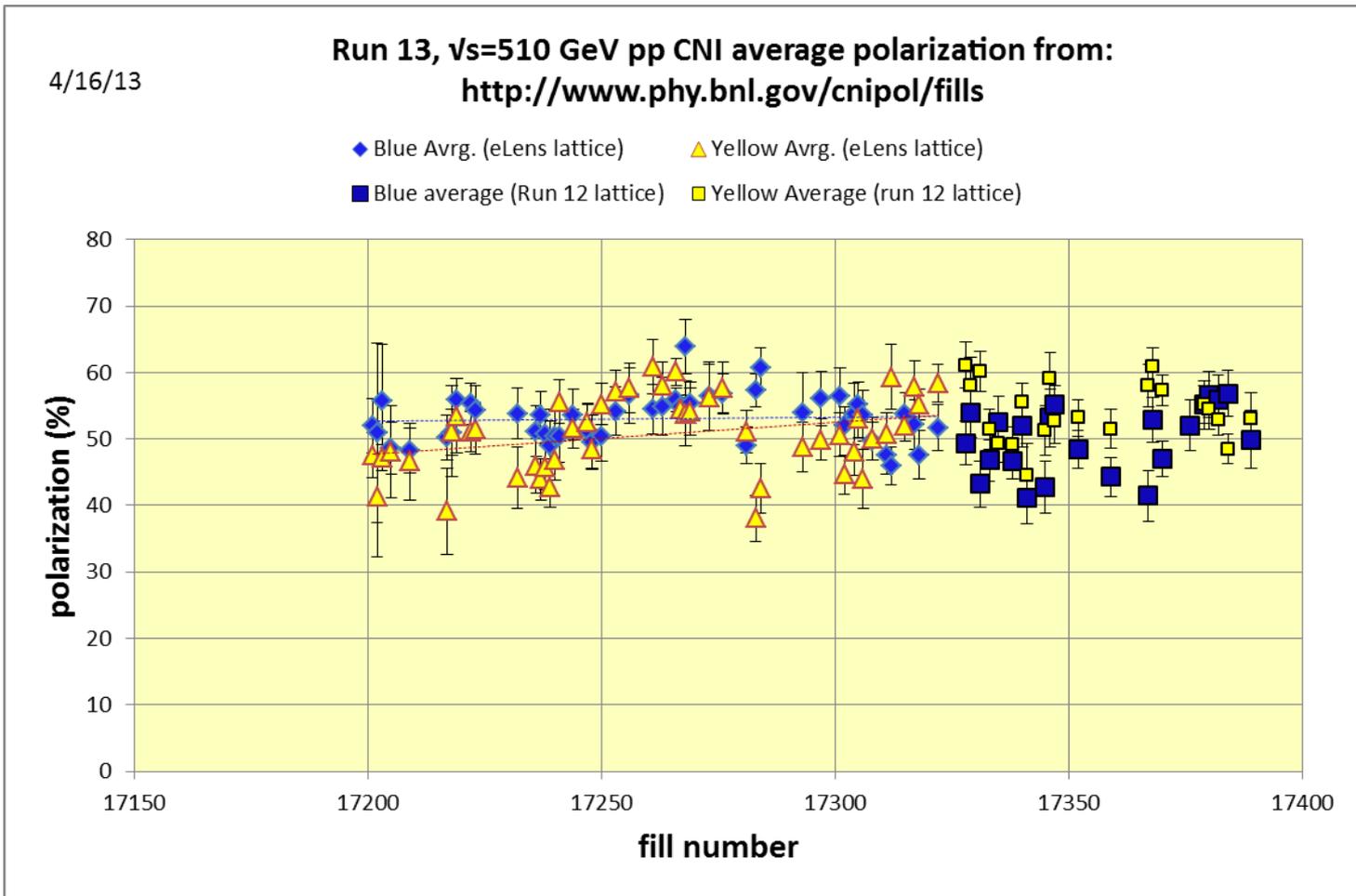
Yellow average = $50.0 \pm 0.9\%$
Blue average = $42.6 \pm 0.9\%$
stores 17328 – 17389 (Run 12 lattice)



<https://wiki.bnl.gov/rhicspin/Polarimetry/H-jet/Run13>

Yellow average = $52.3 \pm 0.5\%$
Blue average = $53.5 \pm 0.5\%$
Average = 52.9%
stores 17201-17322 (eLens lattice)

Yellow average = $54.0 \pm 0.7\%$
Blue average = $49.7 \pm 0.7\%$
Average = 51.9%
stores 17328-17389 (Run 12 lattice)

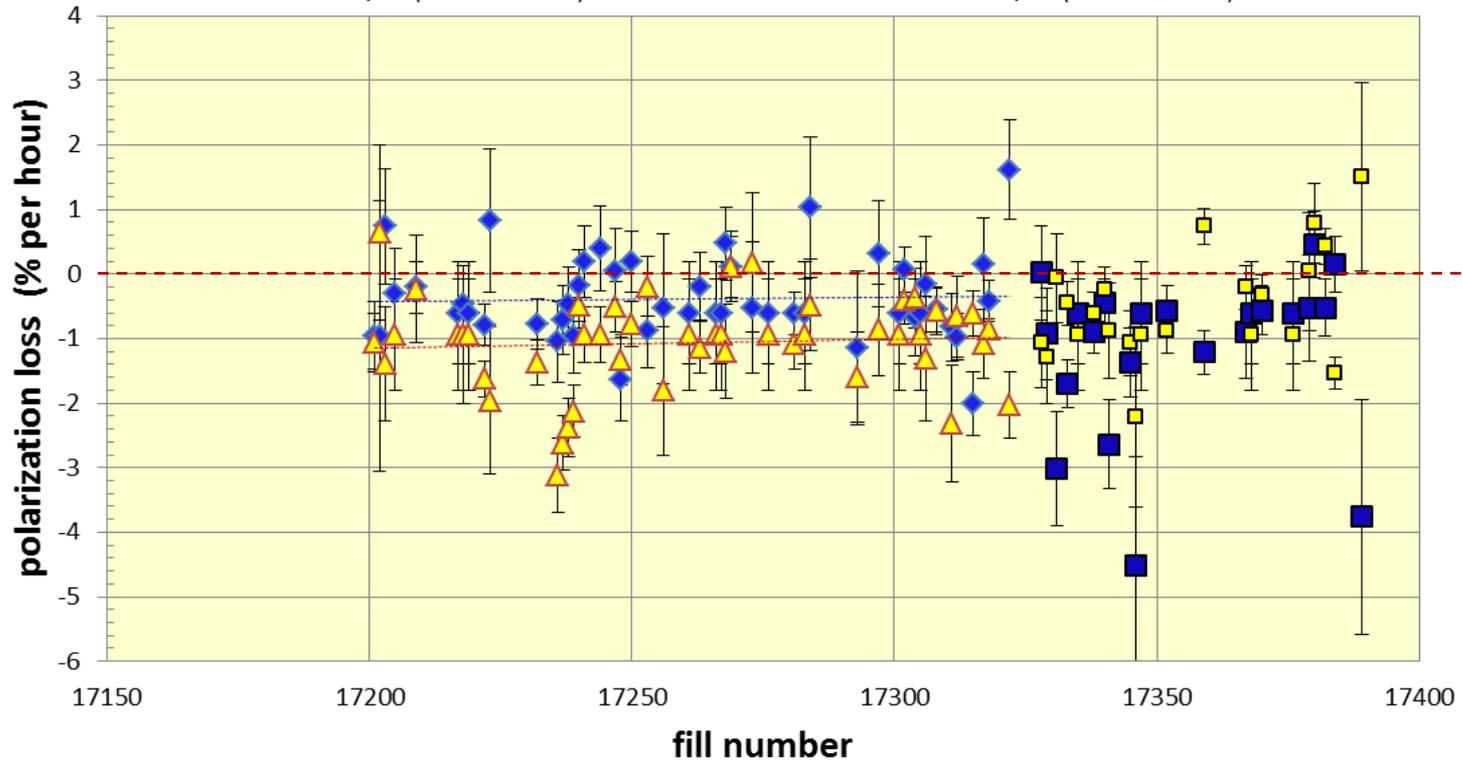


With 4/16/2013 update to all measurements

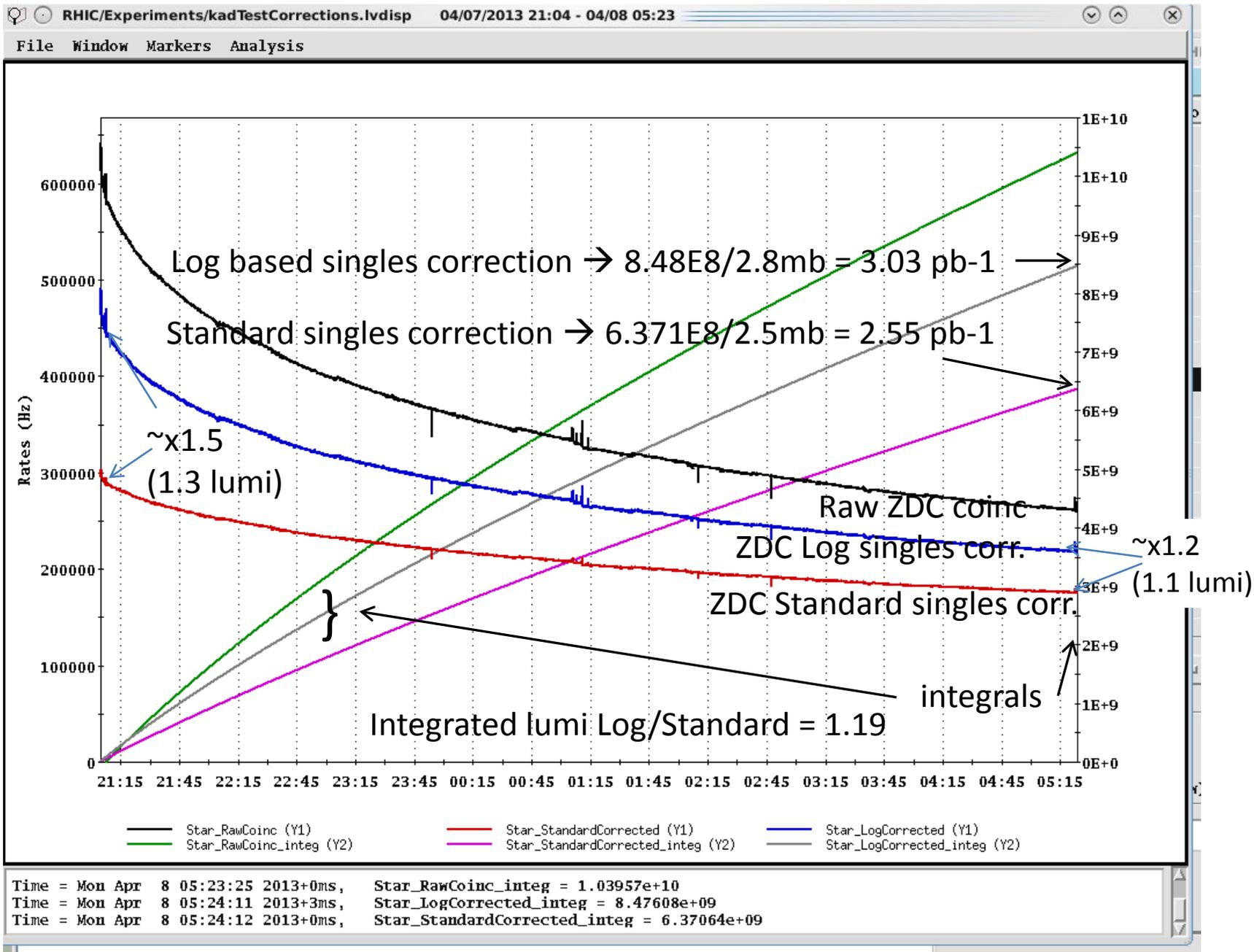
4/16/13

Run 13, $\sqrt{s}=510$ GeV pp CNI polarization loss at store, from:
<http://www.phy.bnl.gov/cnipol/fills>

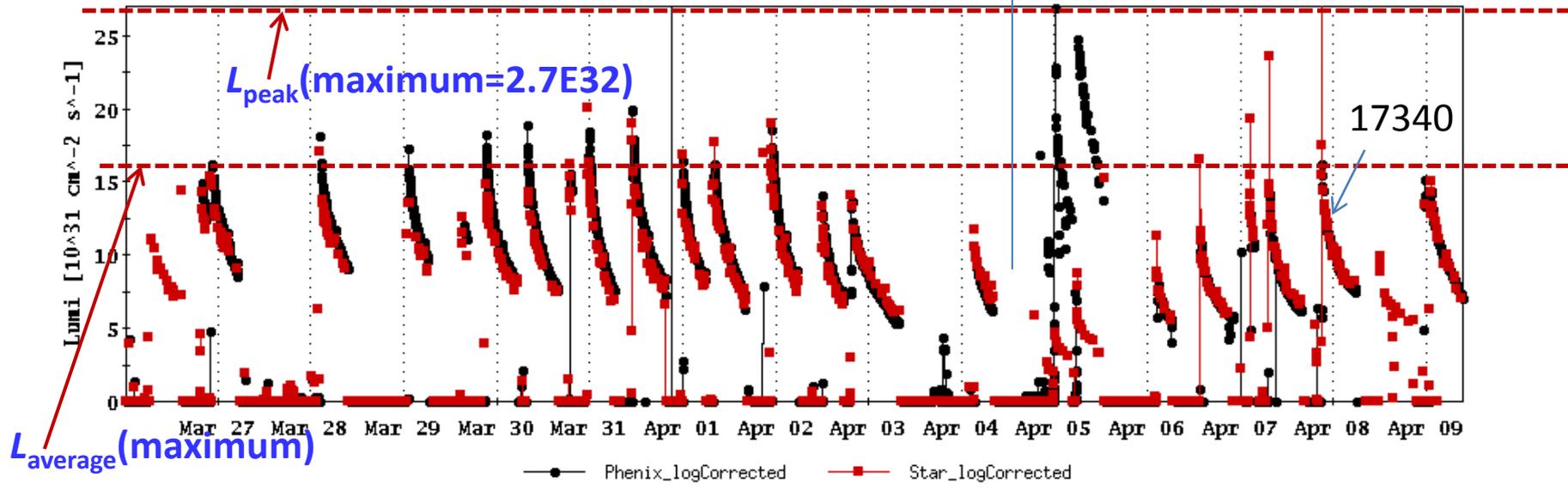
- ◆ Blue dP/dT (eLens lattice)
- ▲ Yellow dP/dT (eLens lattice)
- Blue dP/dT (Run 12 lattice)
- Yellow dP/dT (Run 12 lattice)



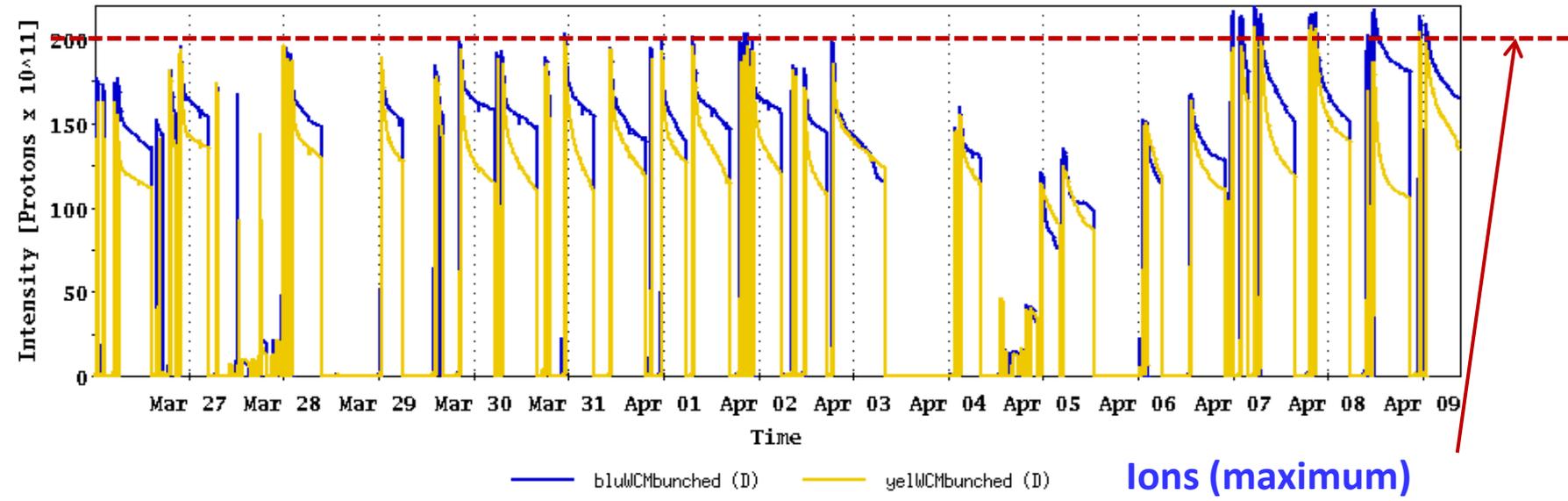
Example Store for STAR (17340) with "physics" time cuts



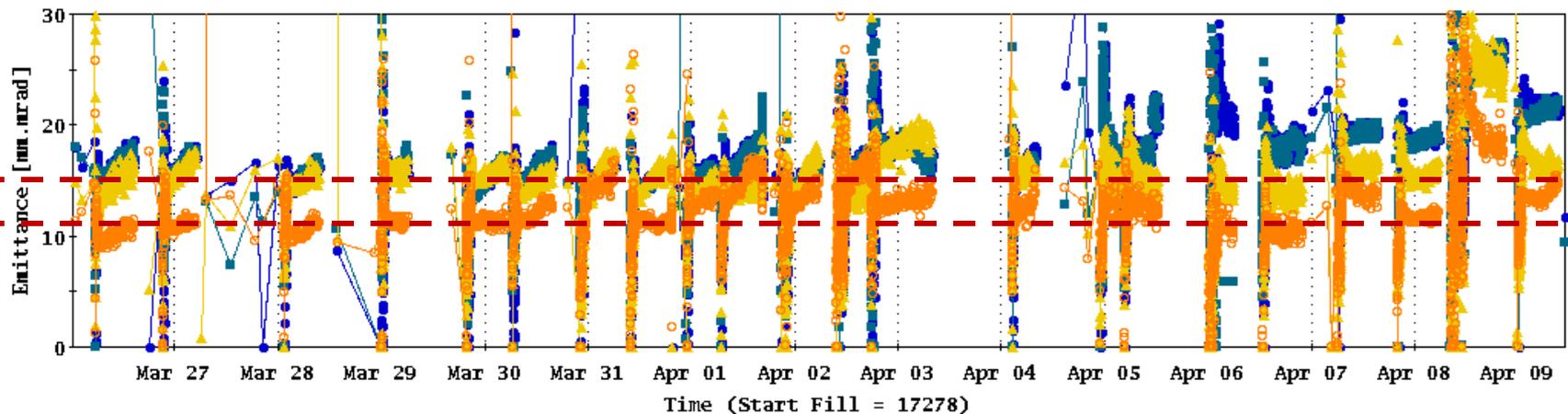
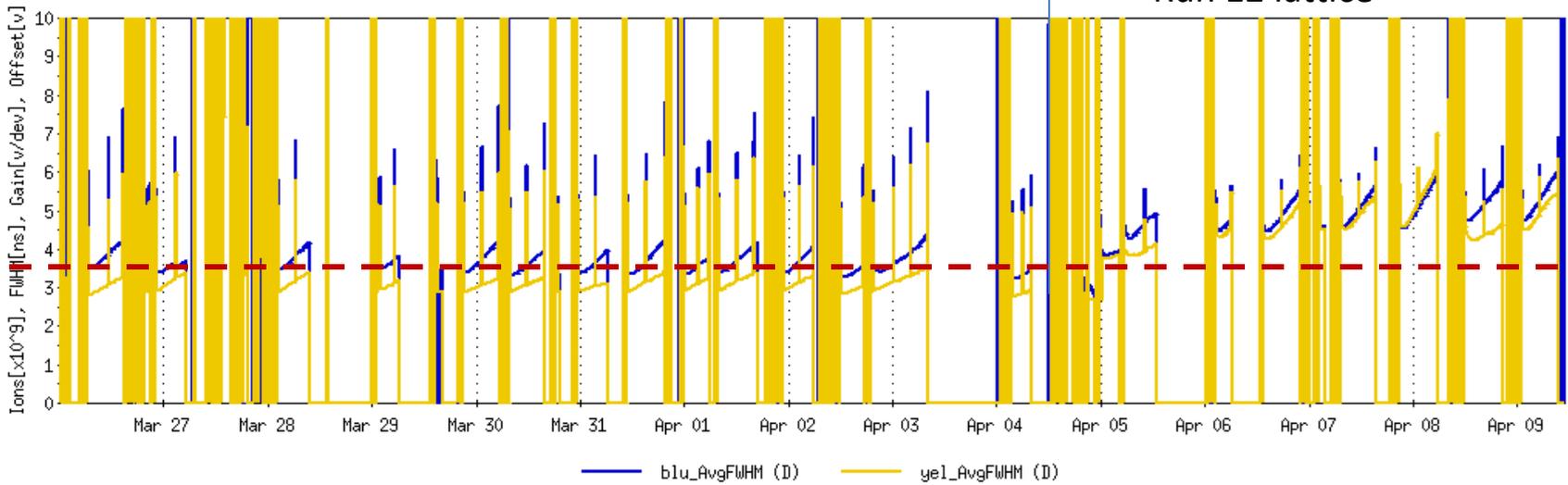
Physics stores



Using Run 13 cross sections with log based singles correction



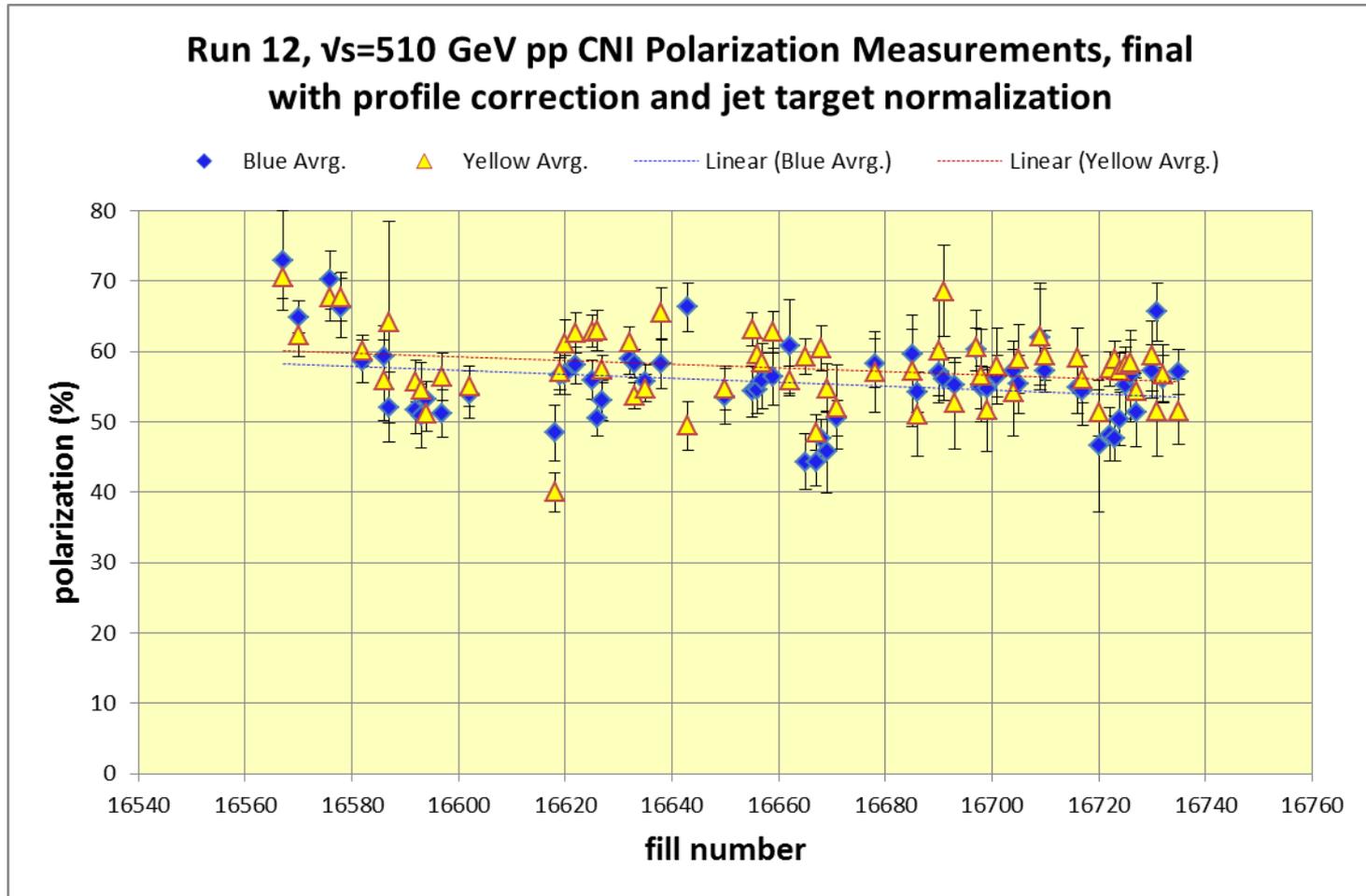
Past 2 Weeks



- RhicIpMManager.blue_horiz;normEmitt;valueAndTime[.] (I)
- RhicIpMManager.blue_vert;normEmitt;valueAndTime[.] (I)
- RhicIpMManager.yellow_horiz;normEmitt;valueAndTime[.] (I)
- RhicIpMManager.yellow_vert;normEmitt;valueAndTime[.] (I)

Yellow average = $48.12 \pm 0.4\%$

Blue average = $53.1 \pm 0.5\%$

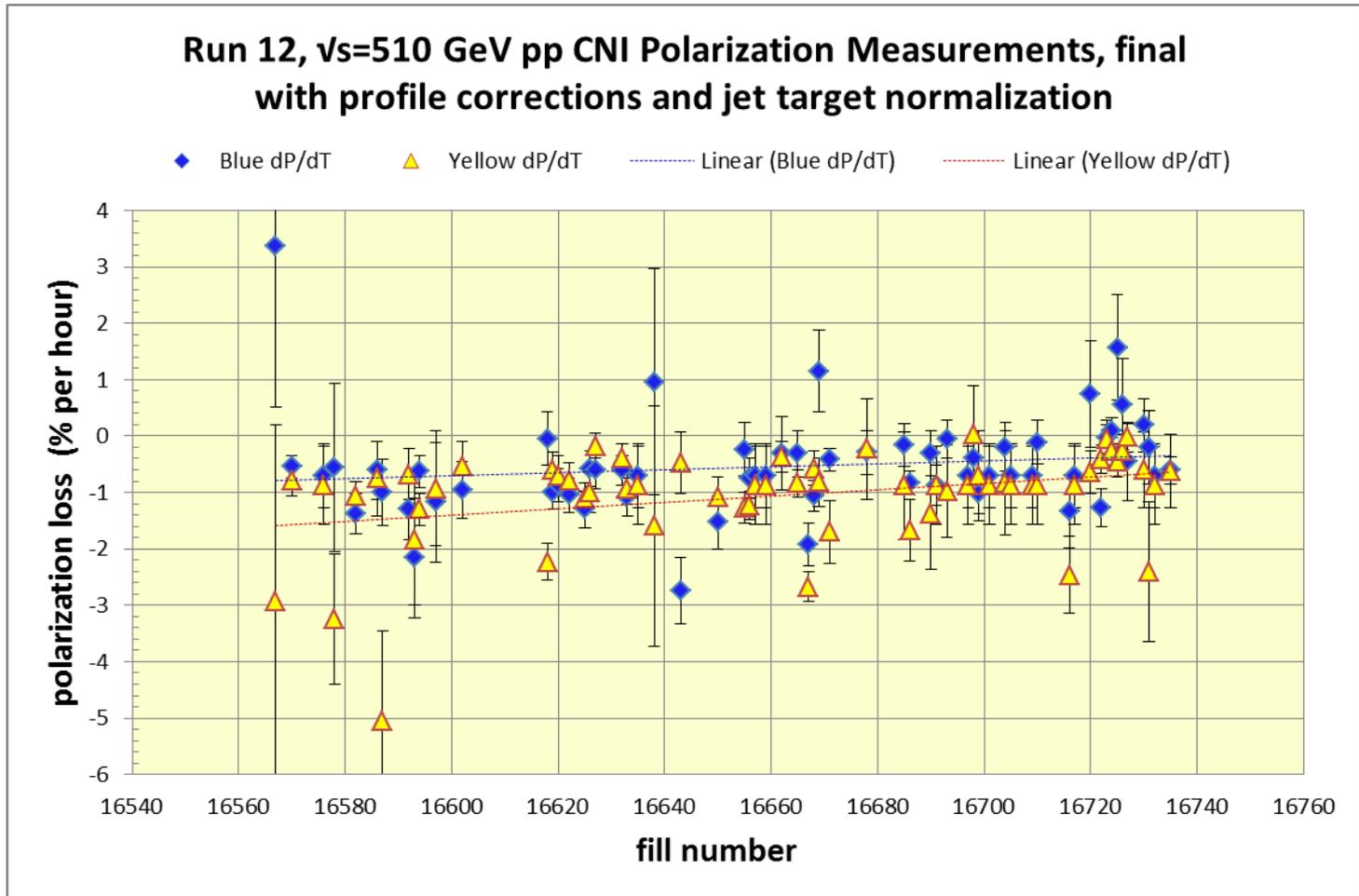


<http://www.phy.bnl.gov/cnipol/fills/>

Yellow average = $57.7 \pm 0.4\%$

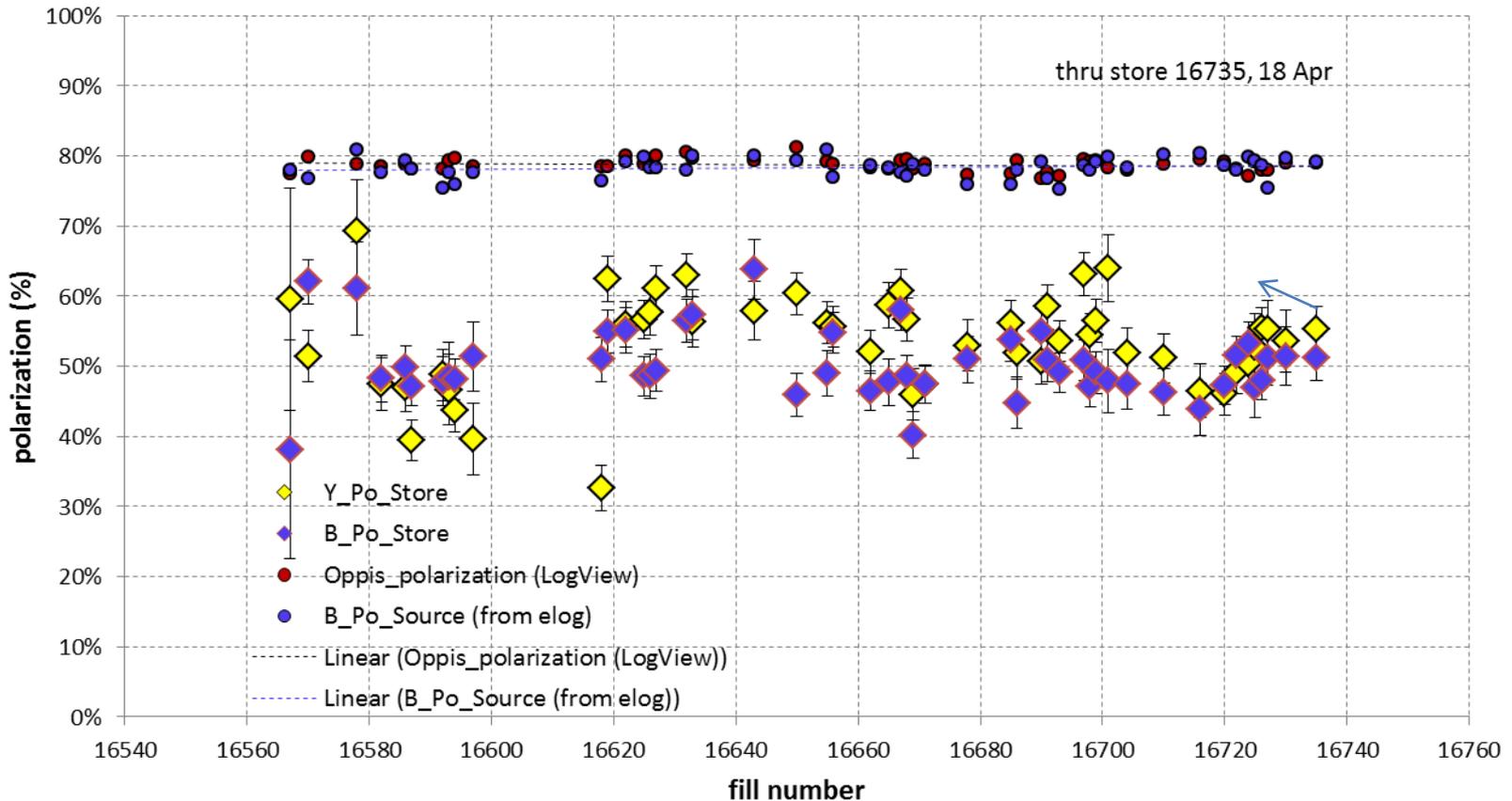
Blue average = $55.9 \pm 0.4\%$

Average = 56.8%



<http://www.phy.bnl.gov/cnipol/fills/>

Run12 255 x 255 Gev pp Jet target Polarization final results



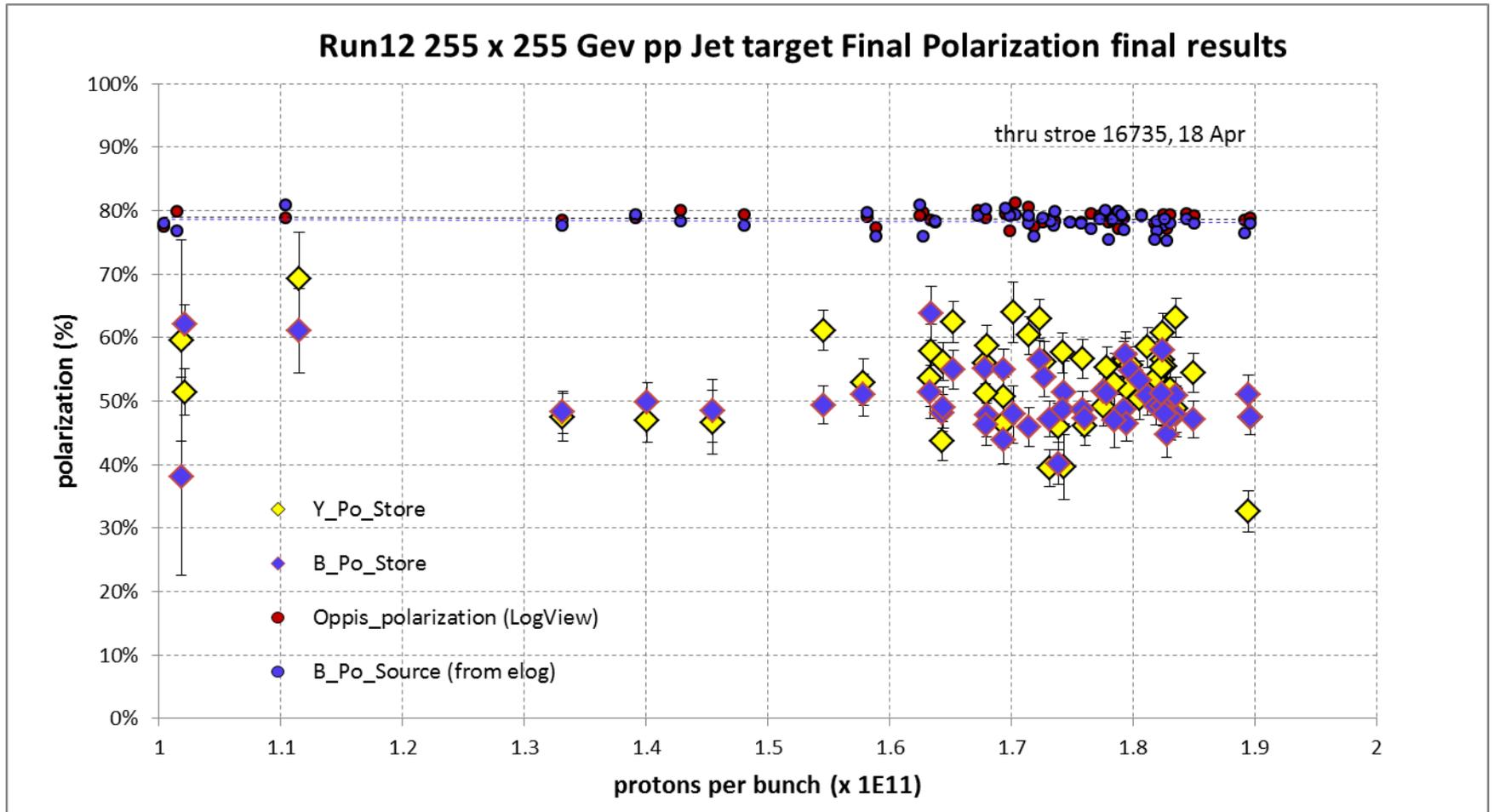
And Yellow beam at injection jet target Run 12 result = $63.0 \pm 4.4\%$

Blue jet target weighted average = $50.3\% \pm 0.5\%$

Yellow jet target weighted average = $53.4\% \pm 0.5\%$

Yellow average = $53.4 \pm 0.5\%$

Blue average = $50.3 \pm 0.5\%$

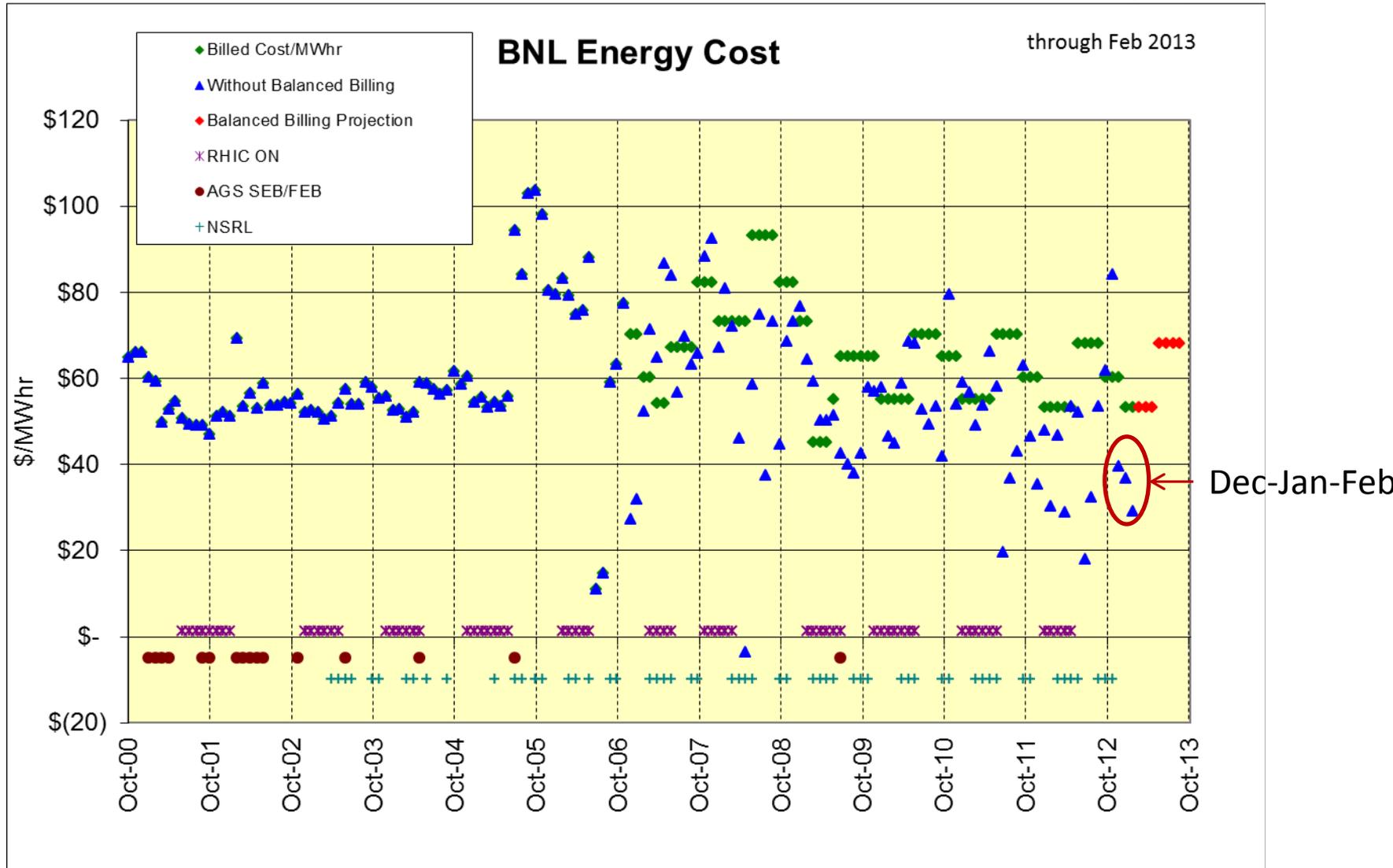


Feb 2013 bill

\$28.89 actual

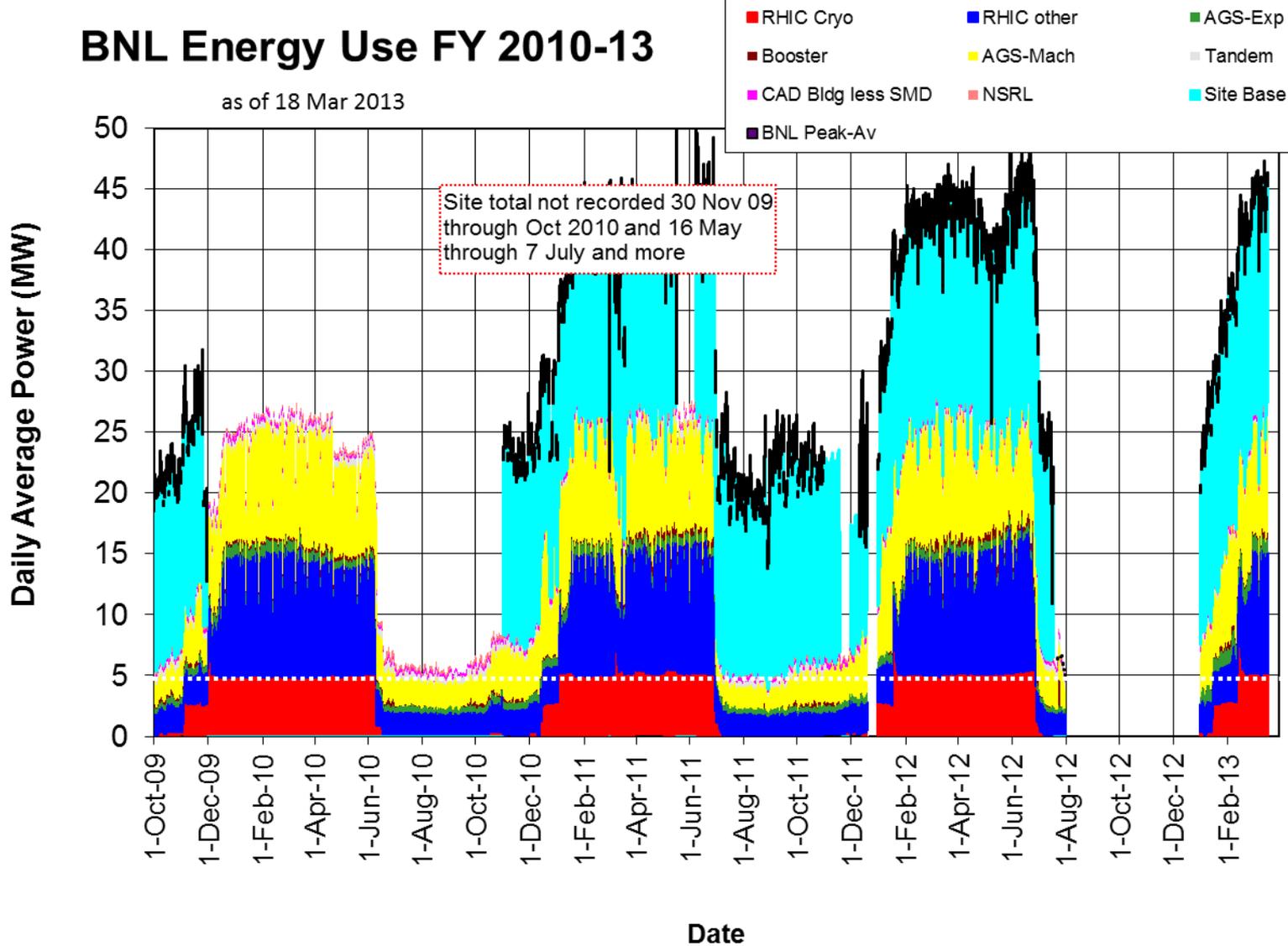
billed at \$53/Mwhr

+\$1,132K in BNL bank through Feb 2013



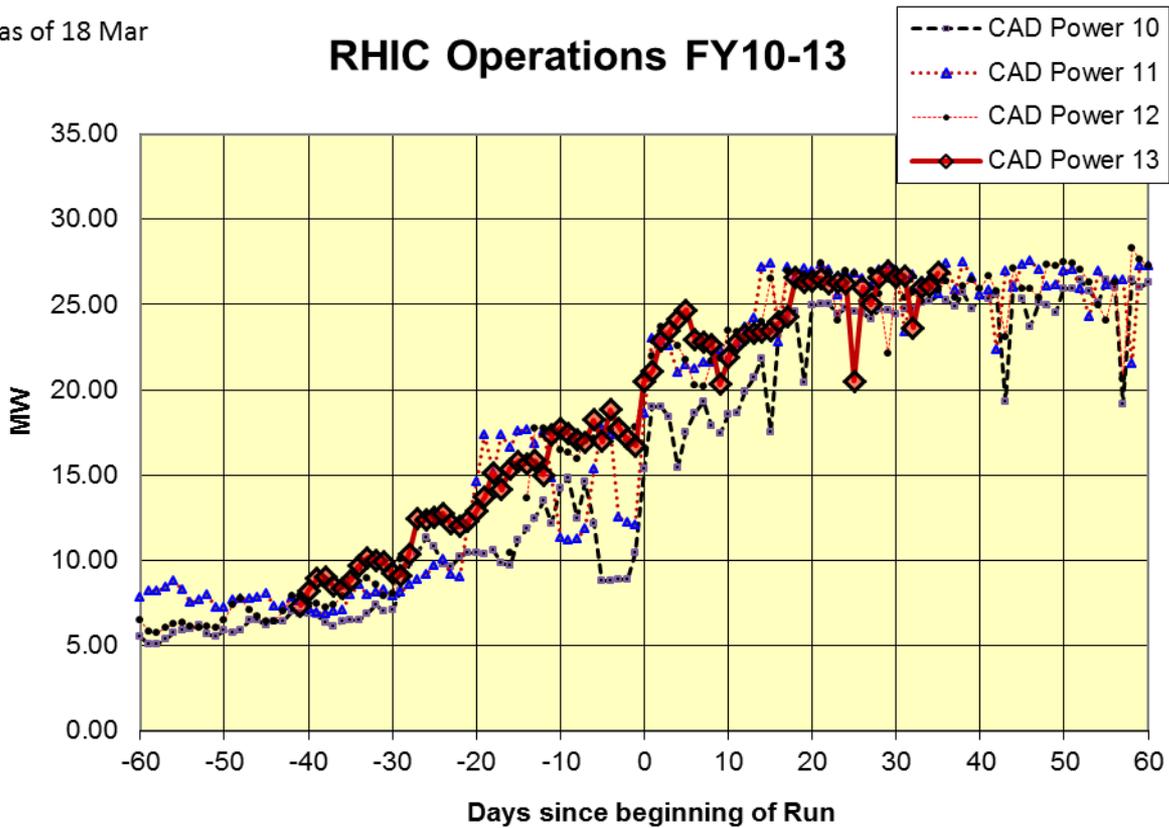
BNL Energy Use FY 2010-13

as of 18 Mar 2013



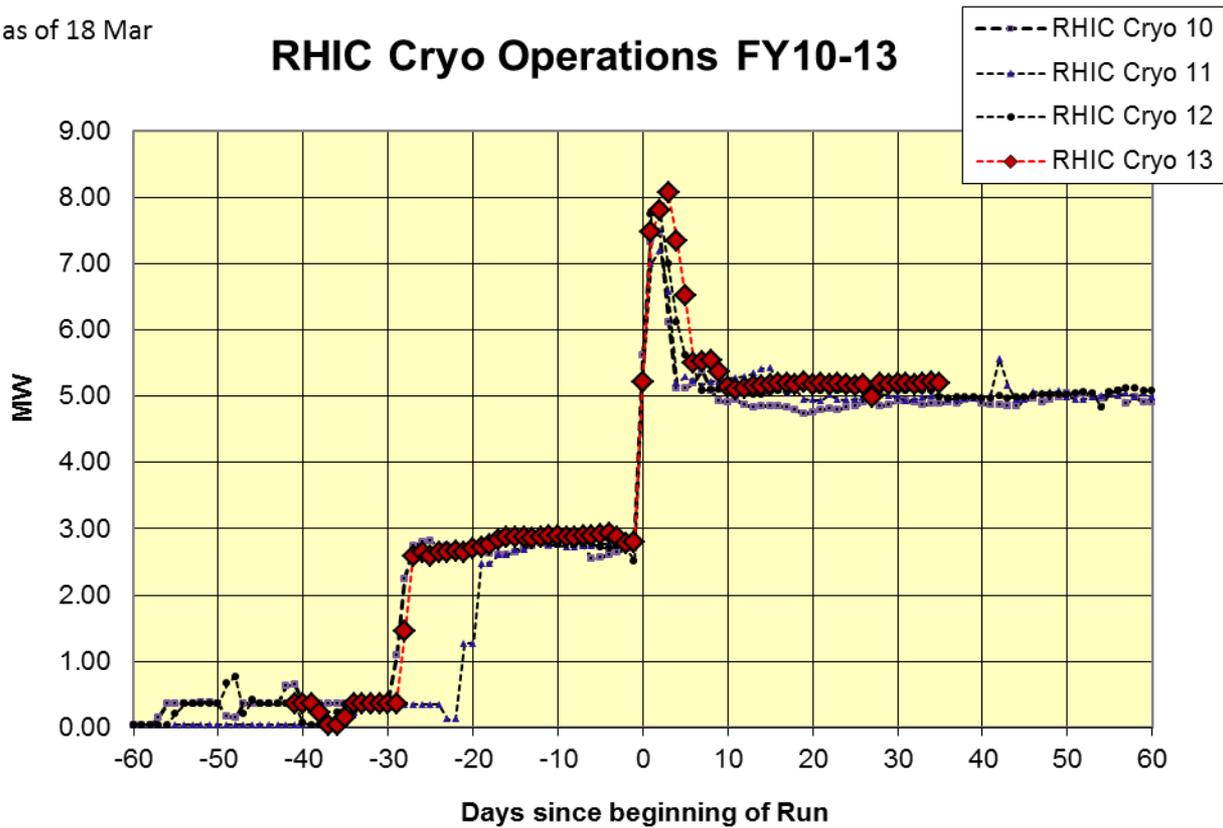
as of 18 Mar

RHIC Operations FY10-13



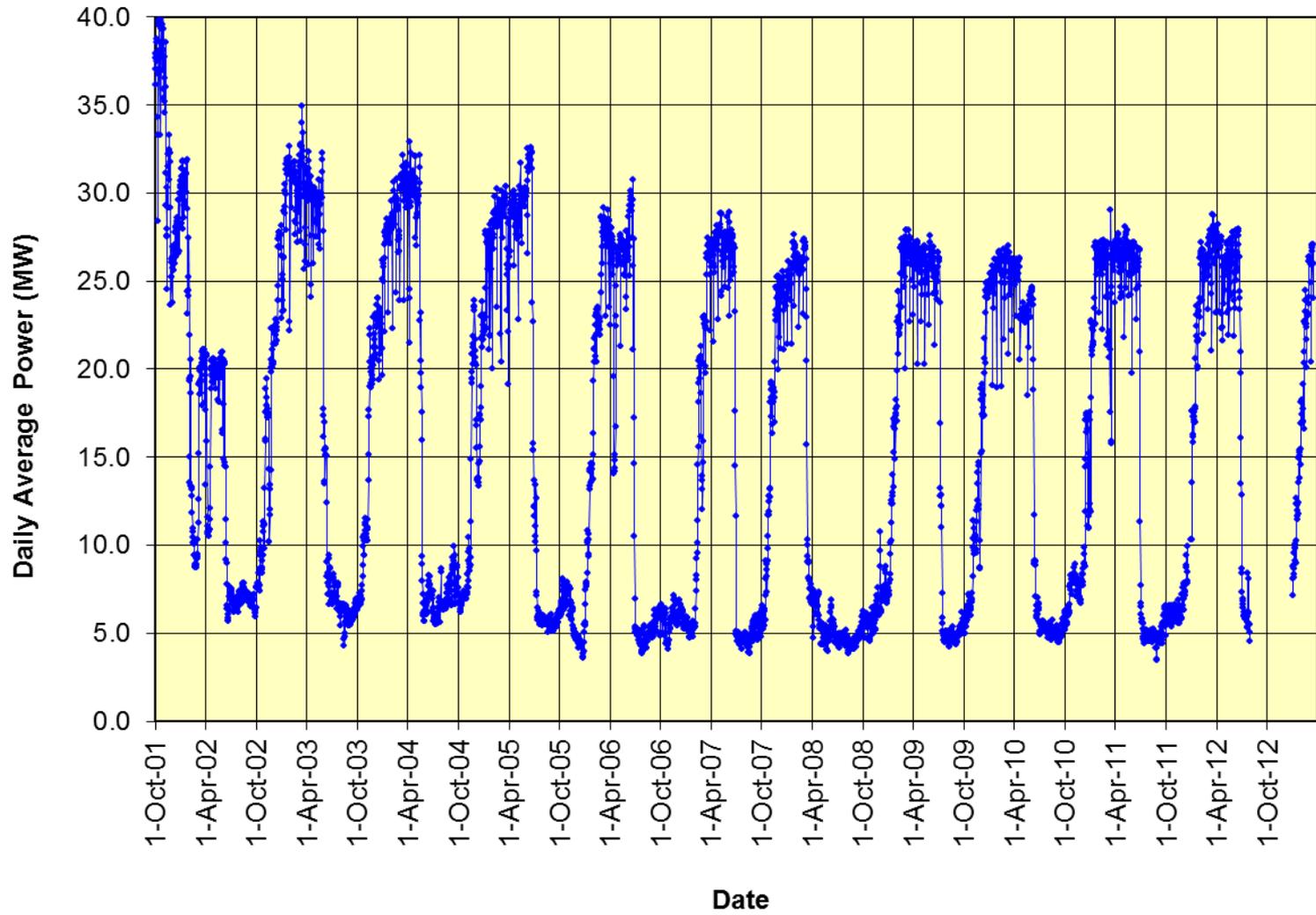
as of 18 Mar

RHIC Cryo Operations FY10-13

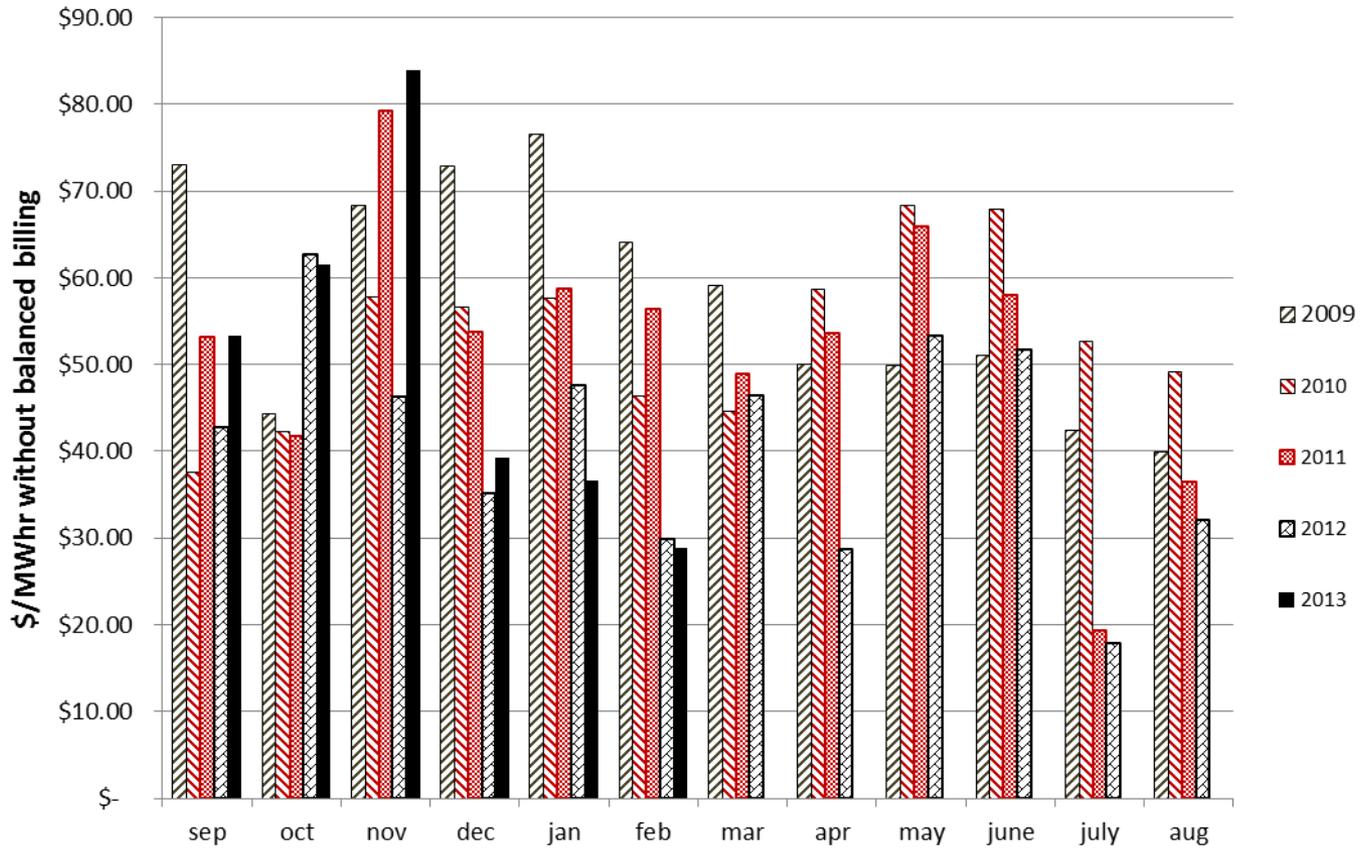


as of 18 Mar 2013

C-AD Energy Use FY 2002-13



BNL Electricity Cost

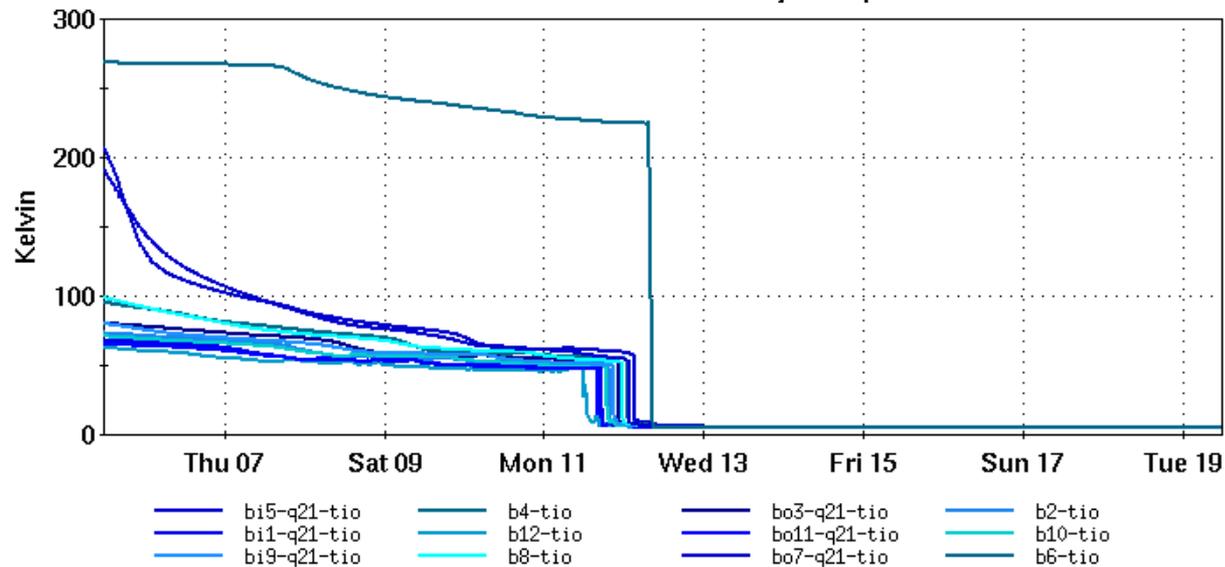


Cryogenic Blue & Yellow Rings (14 days)

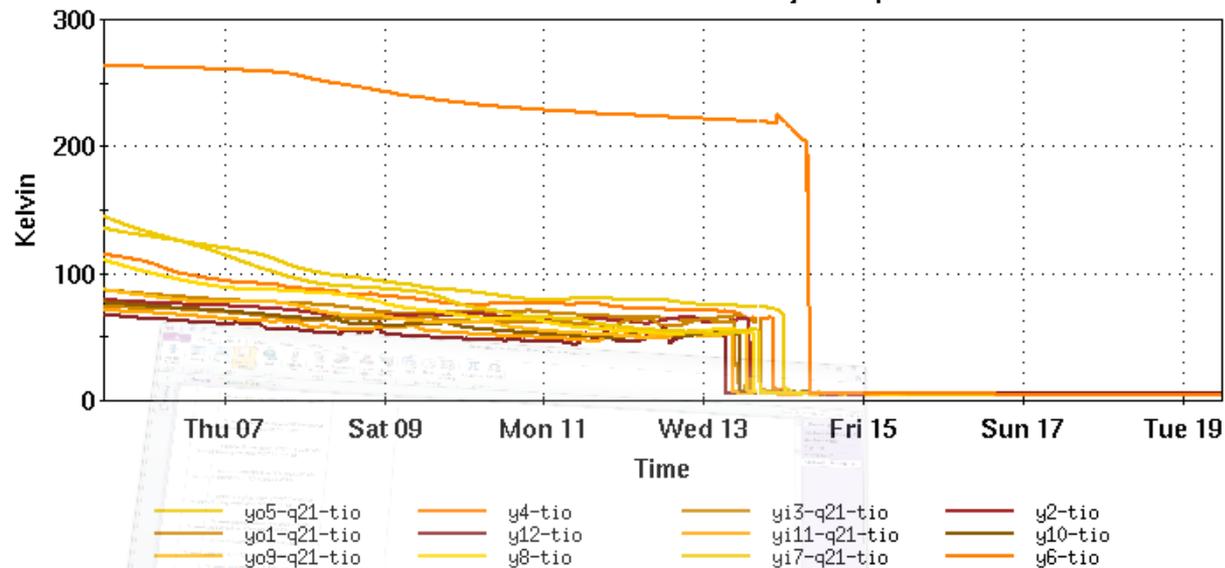
[Ring Summary \(1 day\)](#) [Sector Plots \(1 day\)](#) [Sector Plots \(14 days\)](#)

File Window Markers Analysis

Blue Cryo Temperatures



Yellow Cryo Temperatures

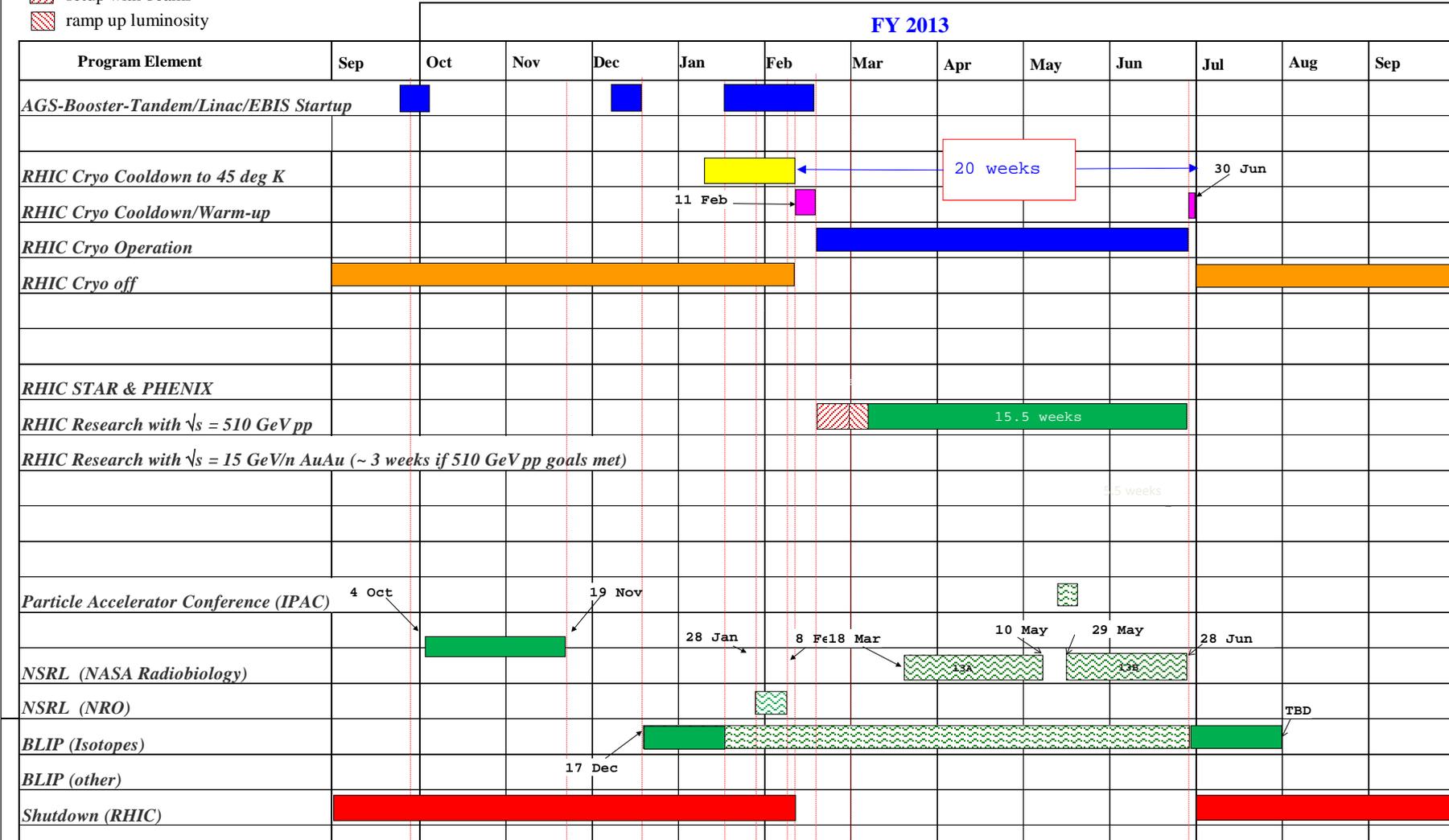


C-A Operations-FY13

planned, budget permitting, Preliminary

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

FY 2013



For Run 13 the PAC recommends the following (*in order of priority*):

1. Running with polarized proton collisions at 500 GeV to provide an integrated luminosity of 750 pb^{-1} at an average polarization of 55%.
2. Depending on the amount of running time remaining after priority #1
 - a. If less than 3 weeks remain, a week of 200 GeV Au+Au collisions.
 - b. If at least 3 weeks of running time remain, 3 weeks of 15 GeV Au+Au collisions.
3. 8 days of 62 GeV p+p collisions.
4. At the discretion of the ALD, 4 days of low-luminosity running to accomplish the pp2pp goals.