

Run 13 RHIC Machine/Experiments Meeting

14 May 2013

Agenda:

- Status Reports

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
- ✓ 5 April, reverted to Run 12 lattice

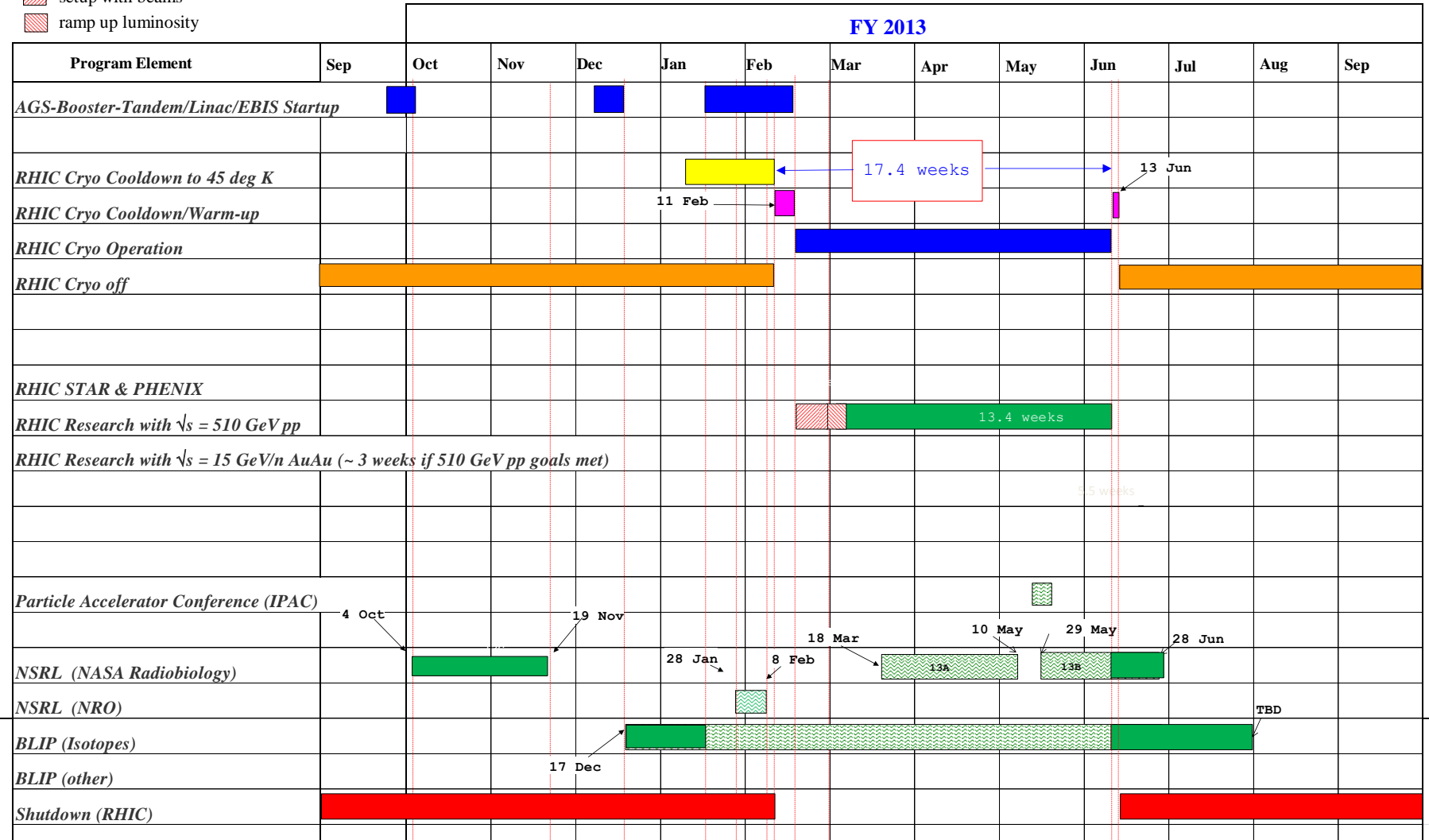
today, 14 May... run is extended by 3 days to allow experiments to run through the last weekend (budget permitting of course)

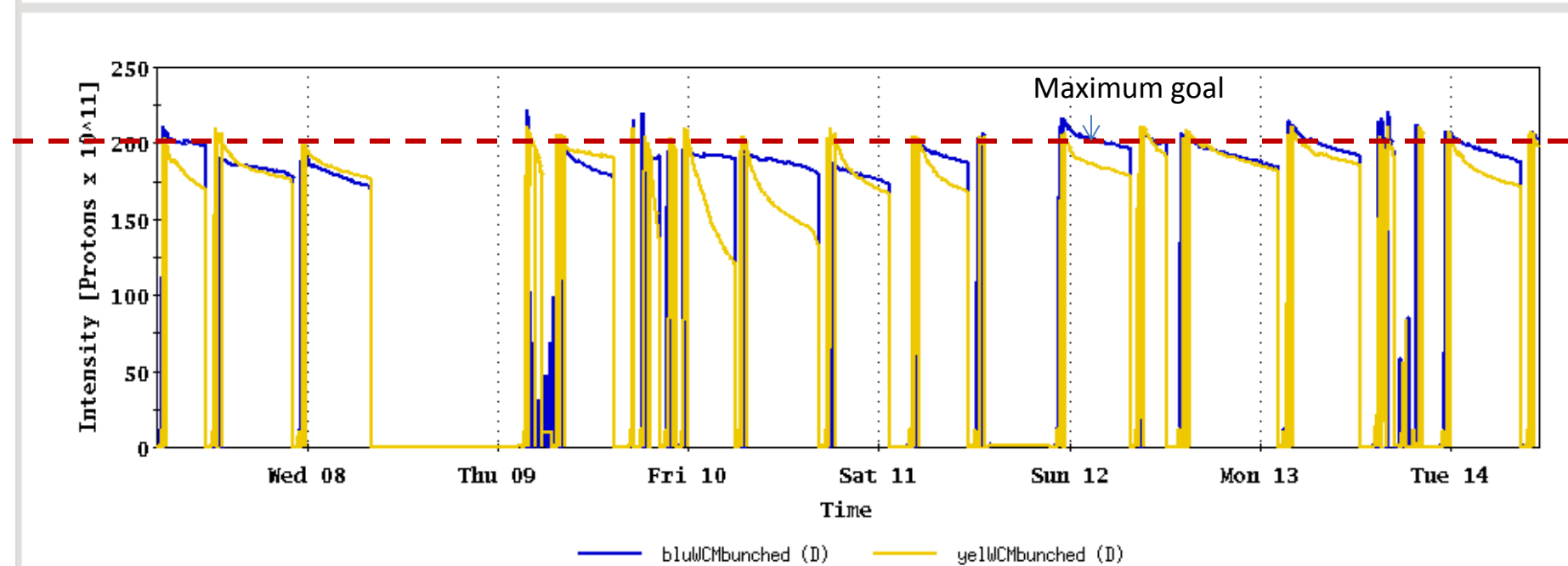
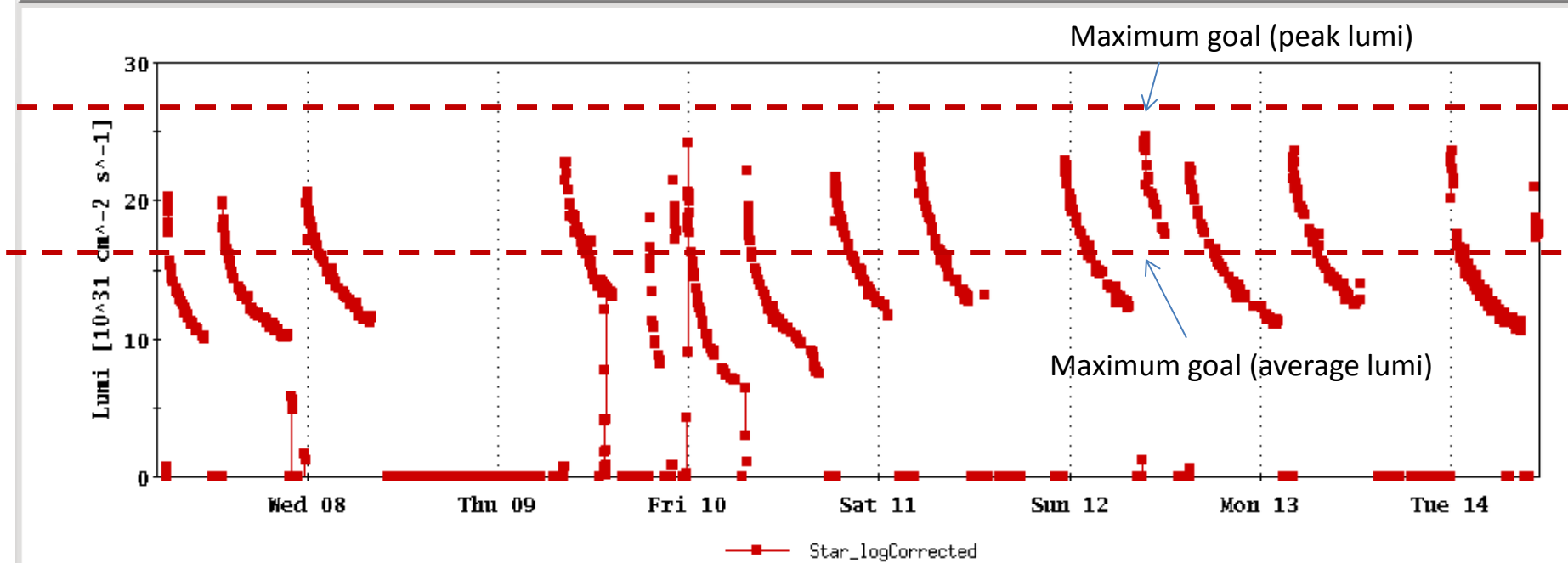
- 10 June (Monday, 0800), end 13.4 week $\sqrt{s} = 510$ GeV pp physics run, begin cryo warm-up
- 13 June, cryo warm-up ~complete (17.4 cryo-weeks)

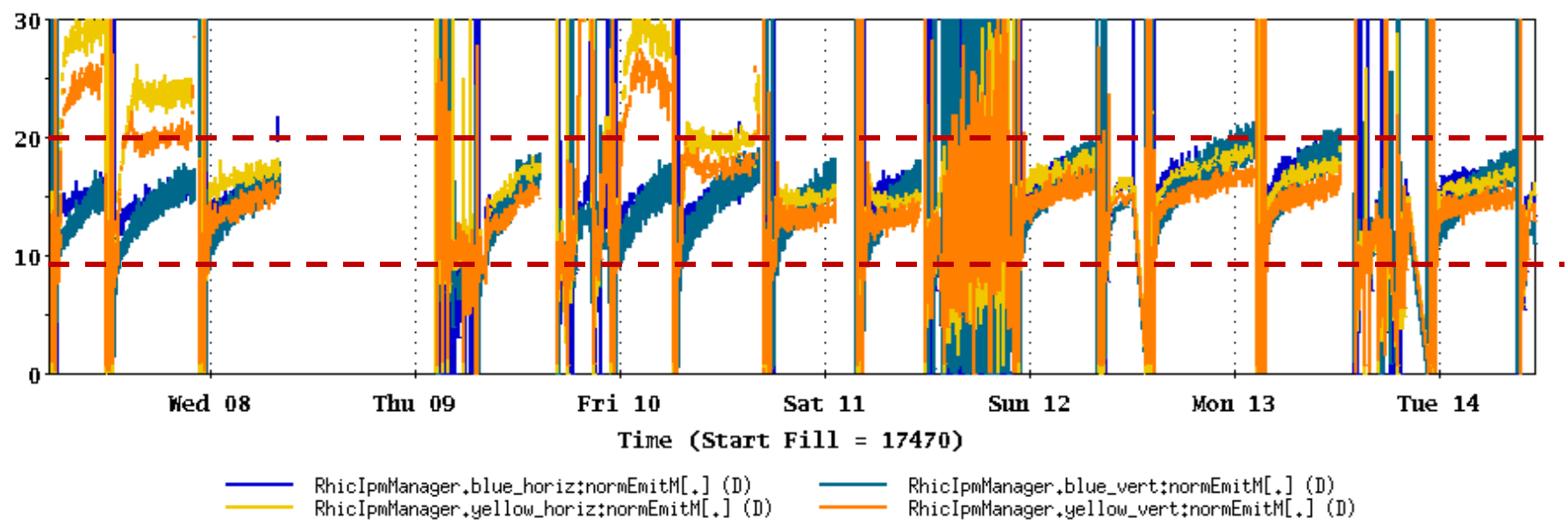
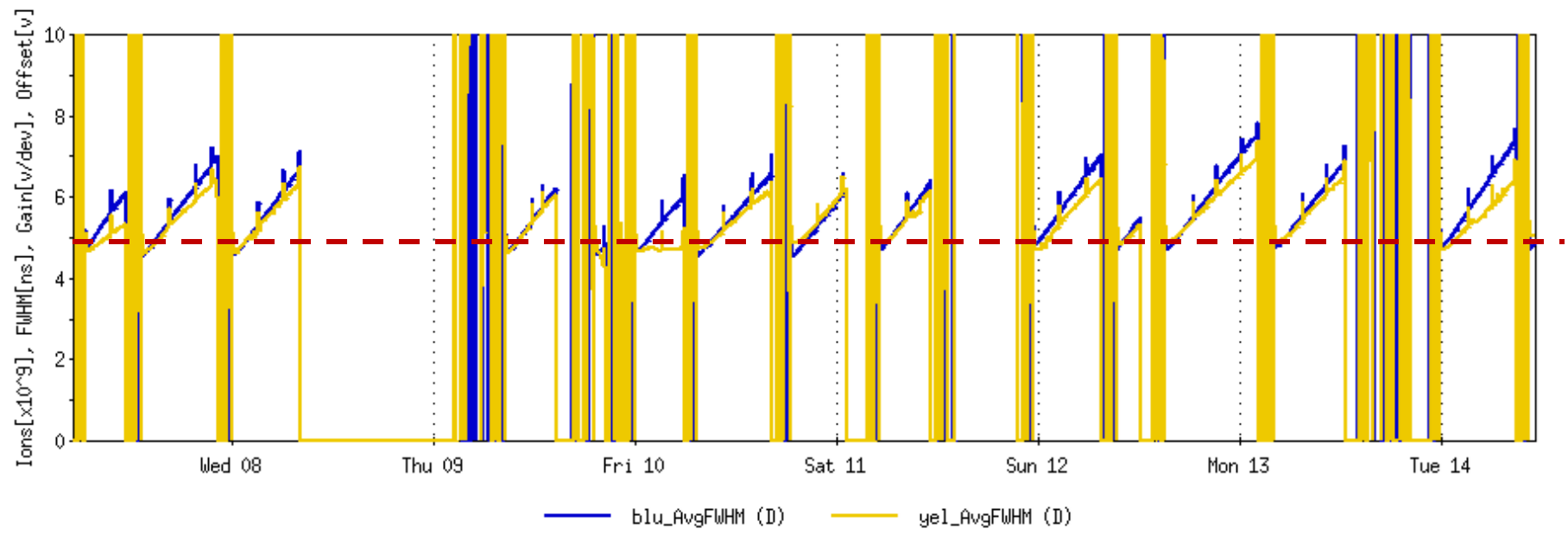
C-A Operations-FY13

planned, budget permitting

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



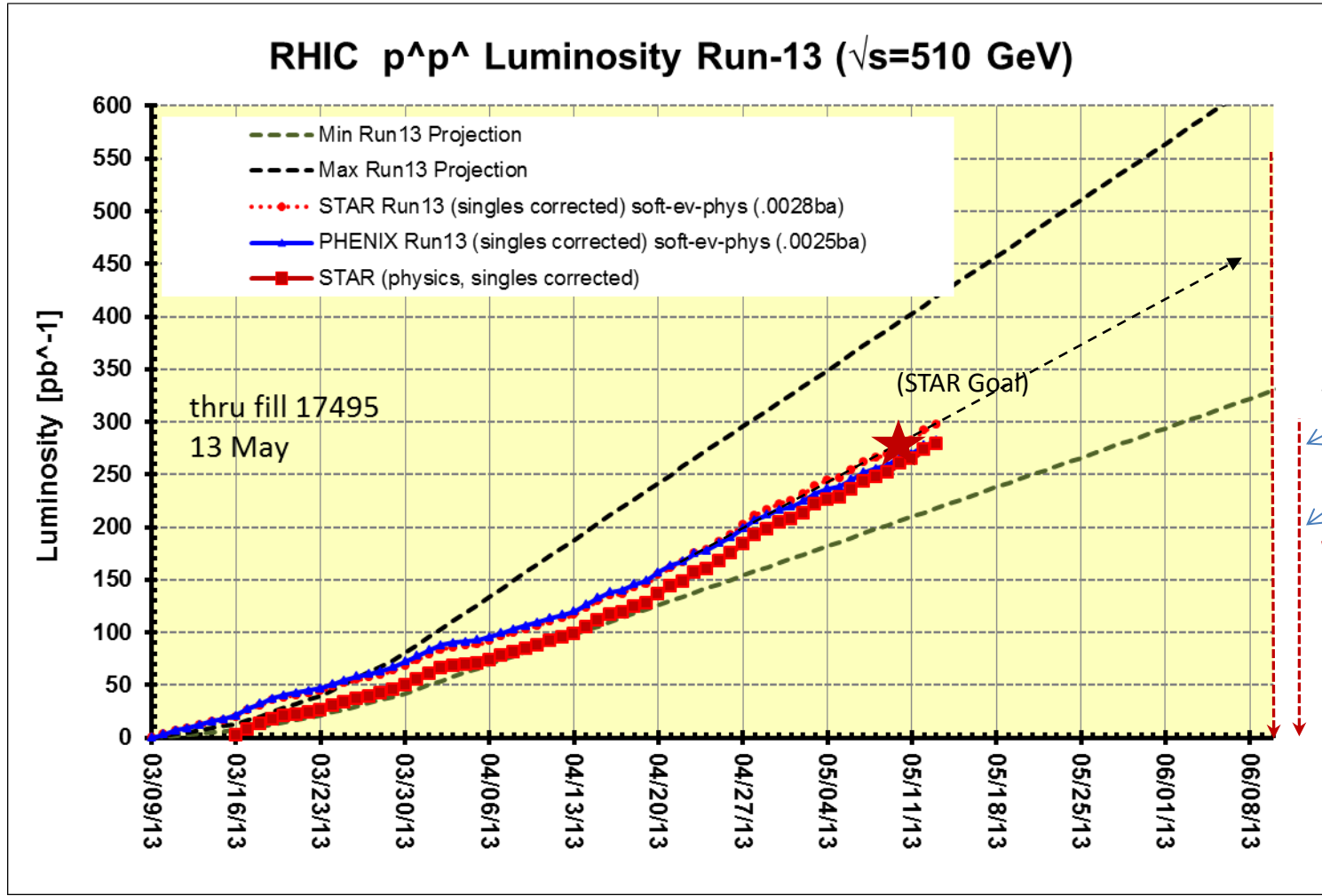




Preliminary, with Run 13 cross sections, PHENIX and STAR **log based singles correction**

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 = $47.7 \pm 0.7\%$

Average = 46.0%

stores 17201-17322 (eLens lattice)

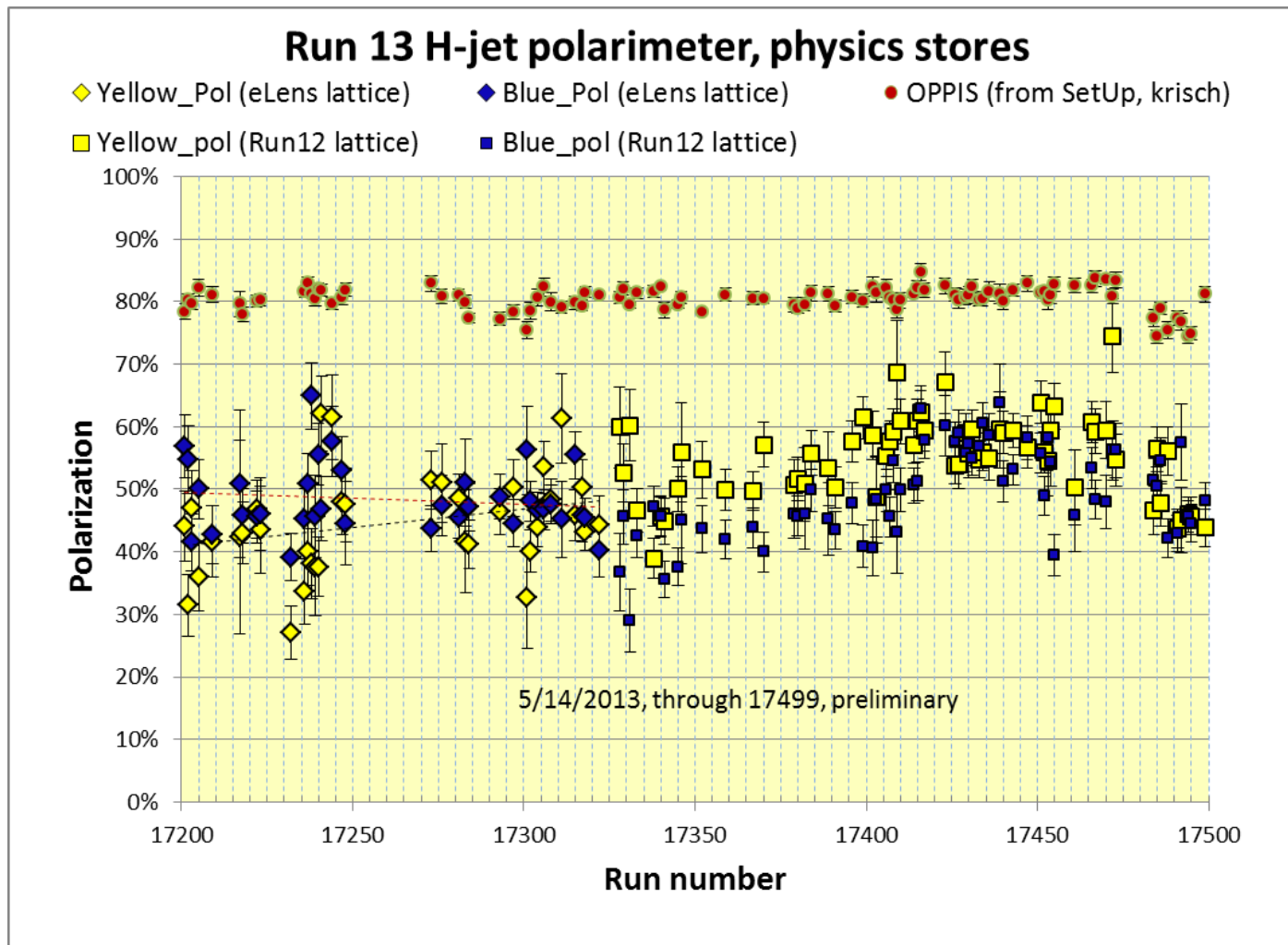
Yellow average = $54.5 \pm 0.5\%$

Blue average = $49.2 \pm 0.4\%$

Average = 51.9%

stores 17328 – 17499 (Run 12 lattice)

Average for all fills: Blue = $48.8 \pm 0.4\%$, Yellow = $52.0 \pm 0.4\%$



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

Yellow average = $52.7 \pm 0.5\%$

Blue average = $53.3 \pm 0.5\%$

Average = 53.0%

stores 17201-17322 (eLens lattice)

Yellow average = $55.5 \pm 0.3\%$

Blue average = $54.1 \pm 0.4\%$

Average = 54.8%

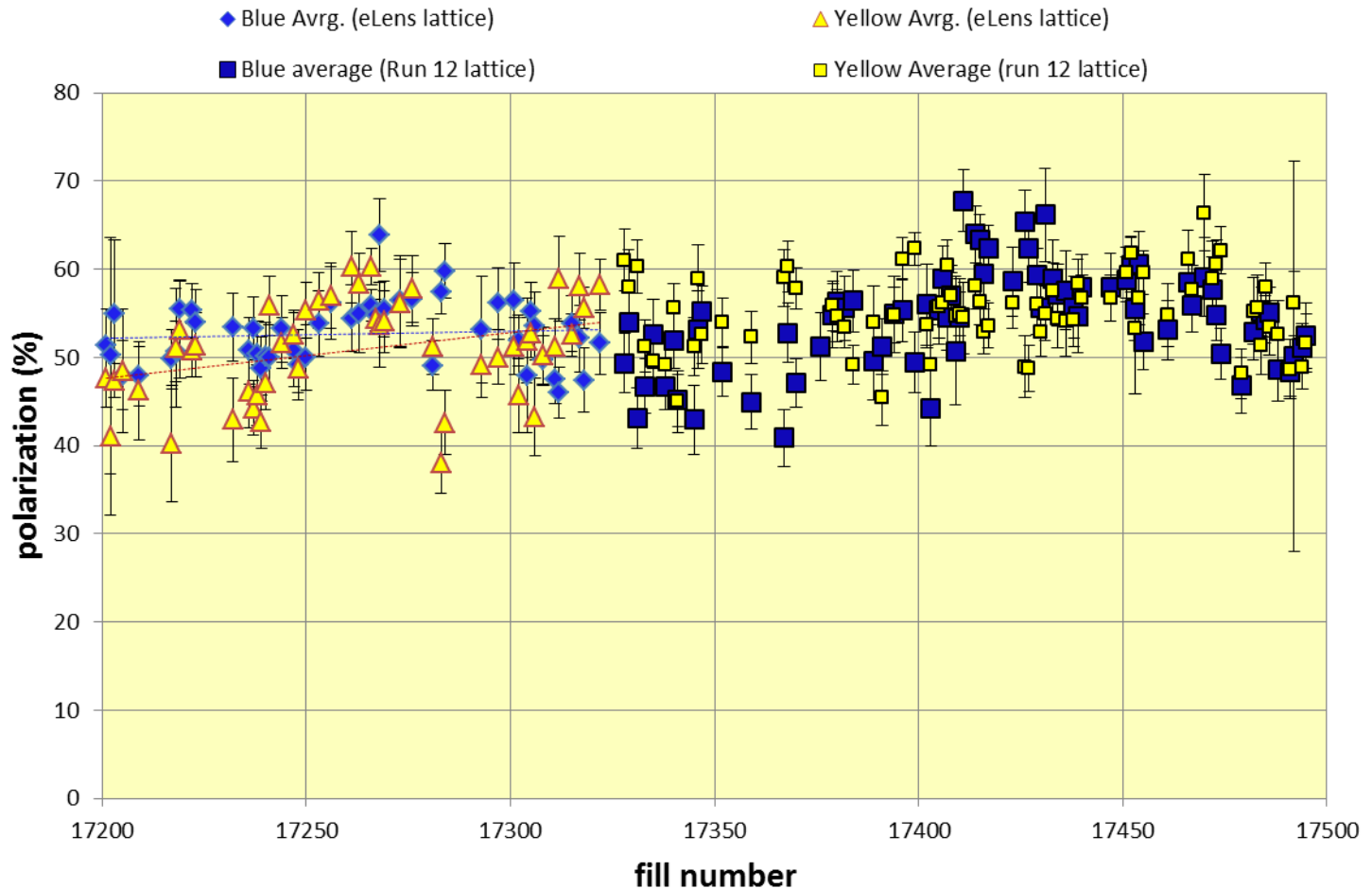
stores 17328-17495 (Run 12 lattice)

Average for all fills: Blue = $53.8\% \pm 0.3\%$, Yellow = $54.385\% \pm 0.3\%$

5/13/13

Run 13, $\sqrt{s}=510$ GeV pp CNI average polarization from:

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

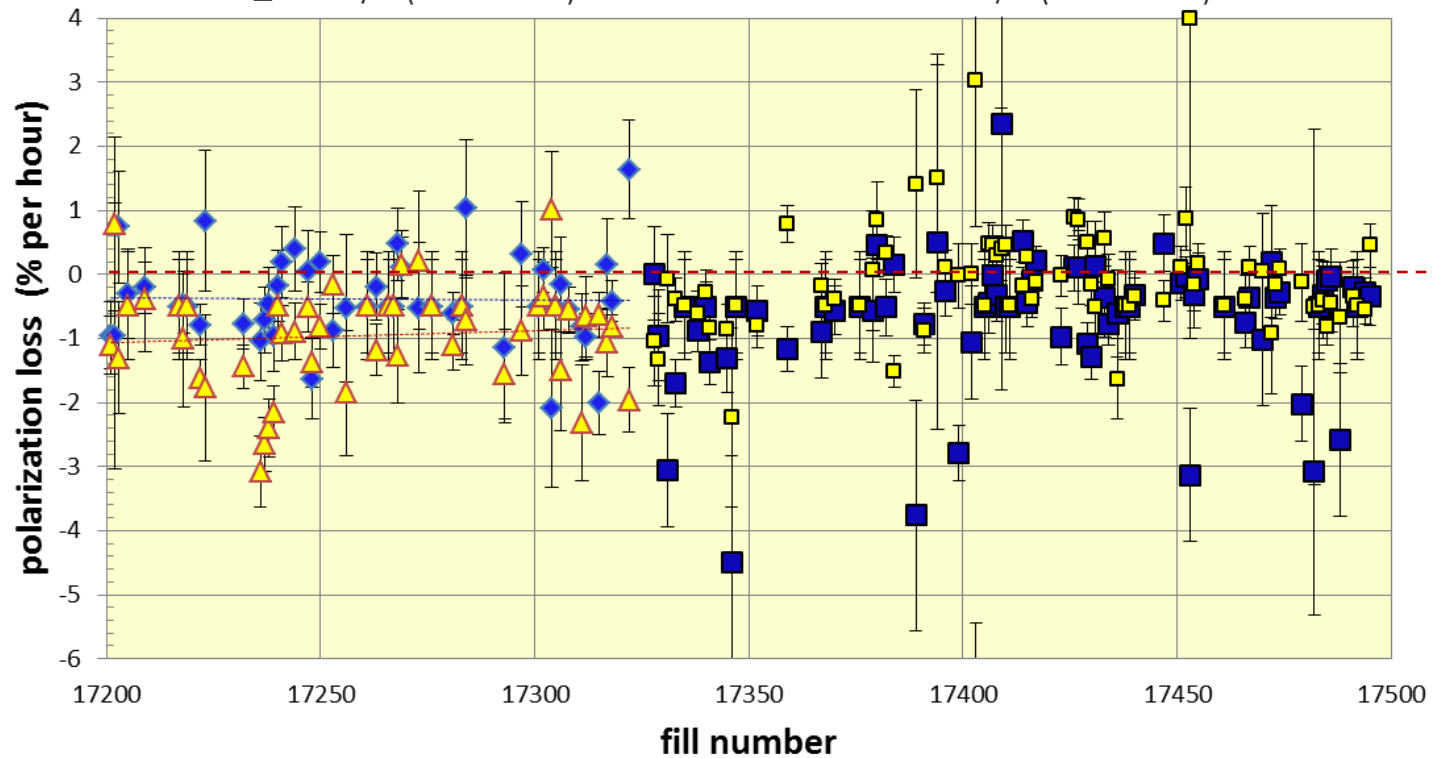


Analysis as of 5/14/13

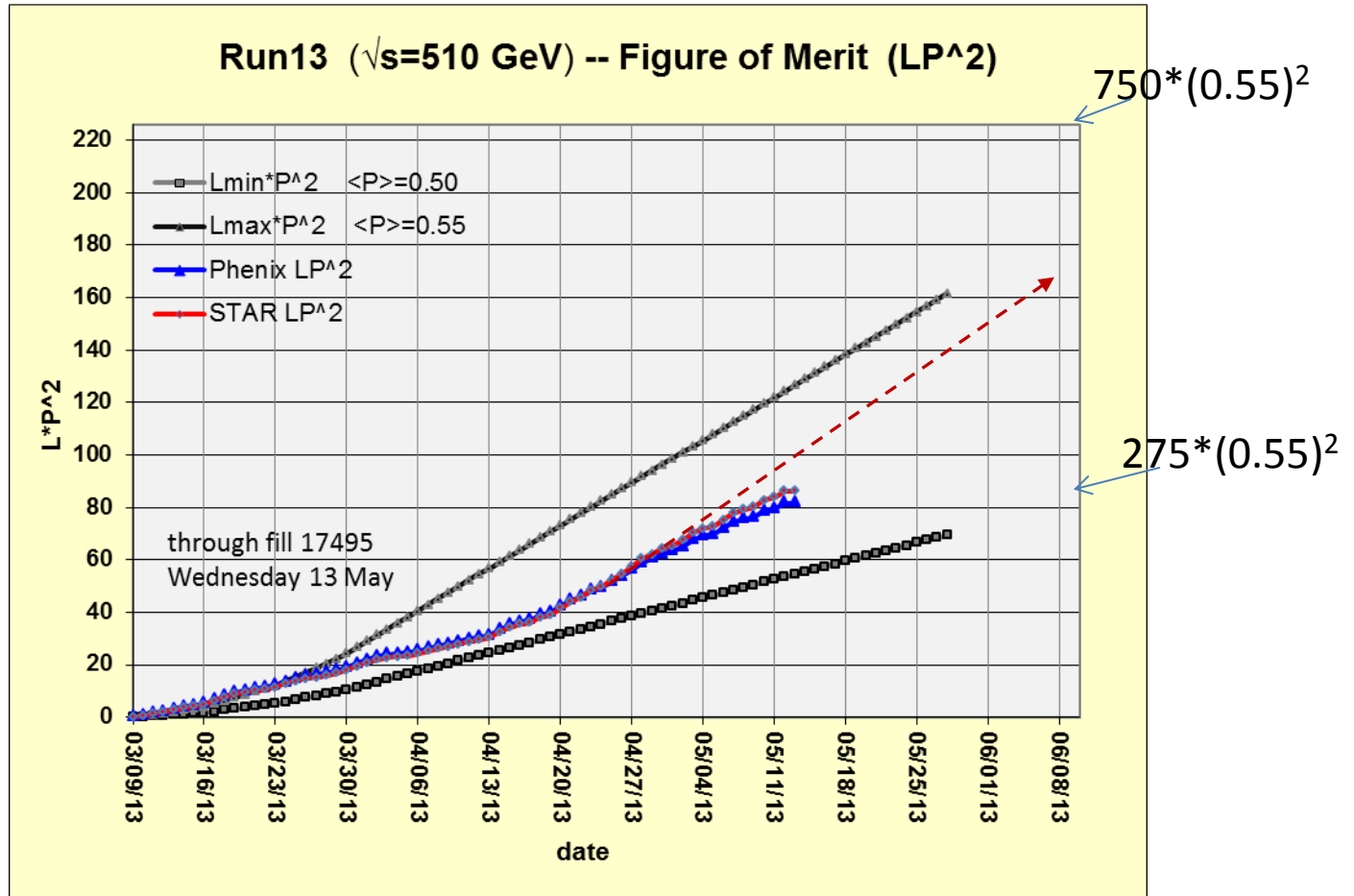
5/13/13

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)

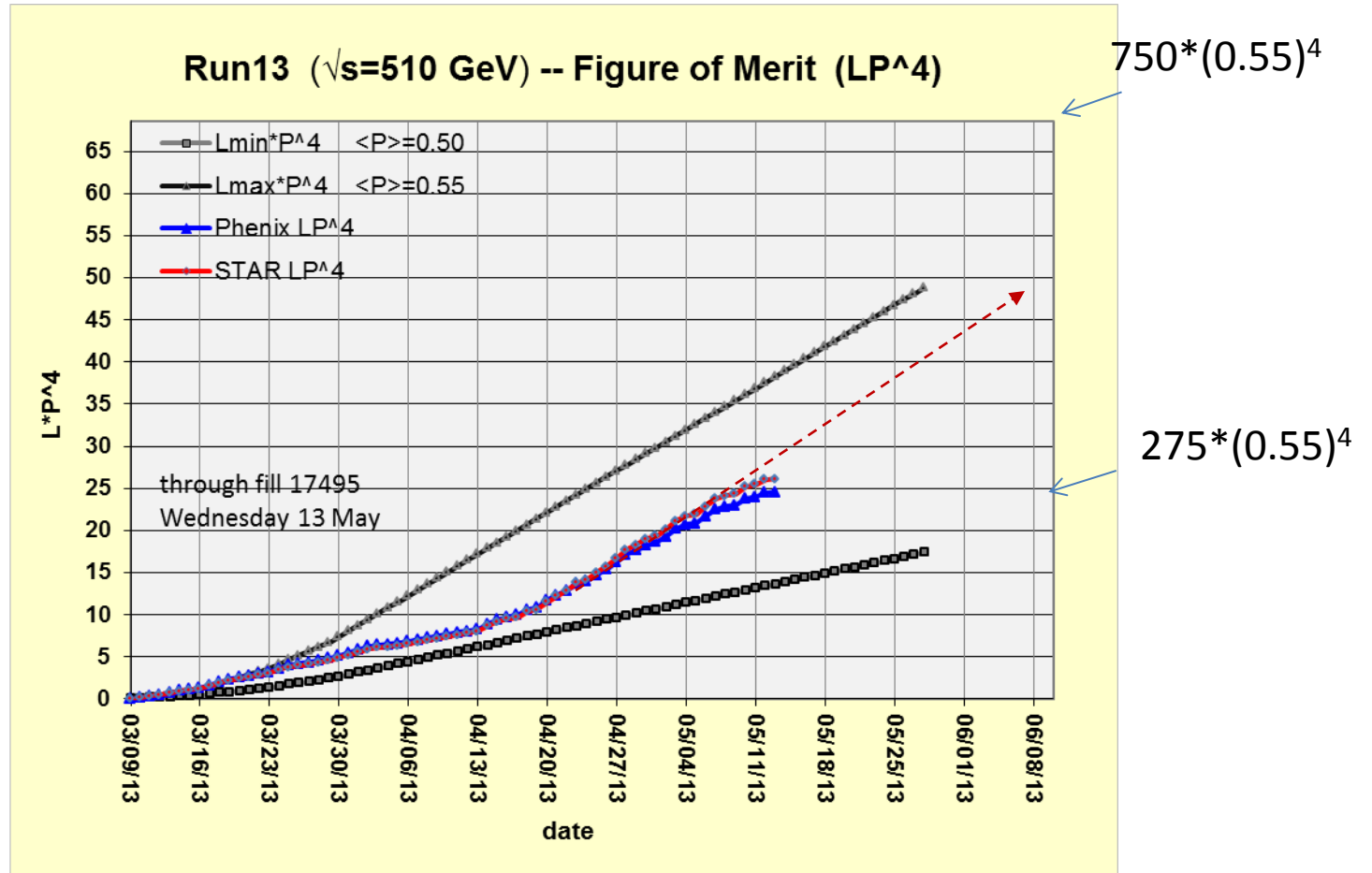


Preliminary, with Run 13 cross sections, PHENIX and STAR log based singles correction



Using average polarizations from CNI polarization from <http://www.phy.bnl.gov/cnipol/fills/>

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

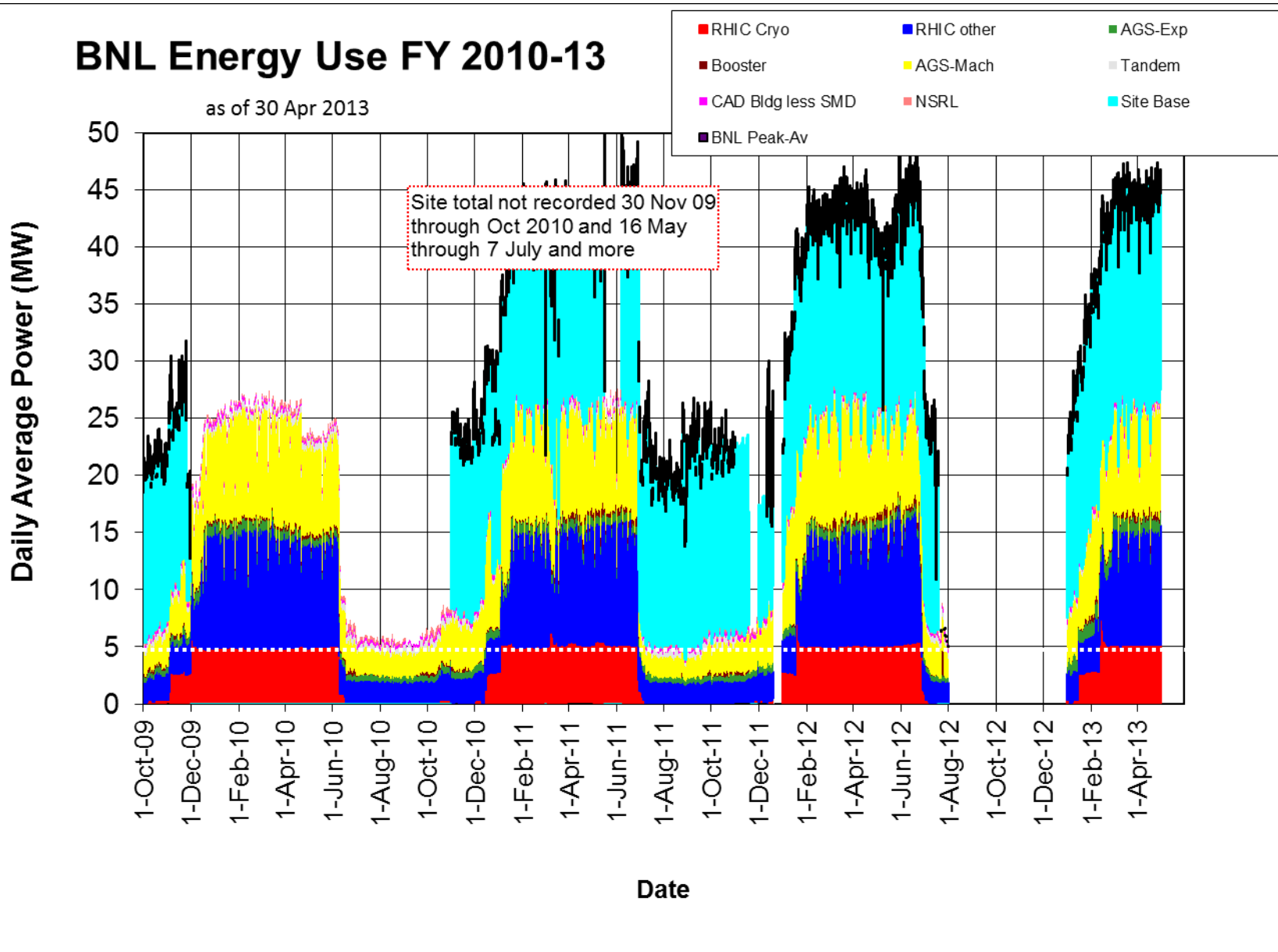


Using average polarizations from CNI polarization from <http://www.phy.bnl.gov/cnipol/fills/>

Additional Information

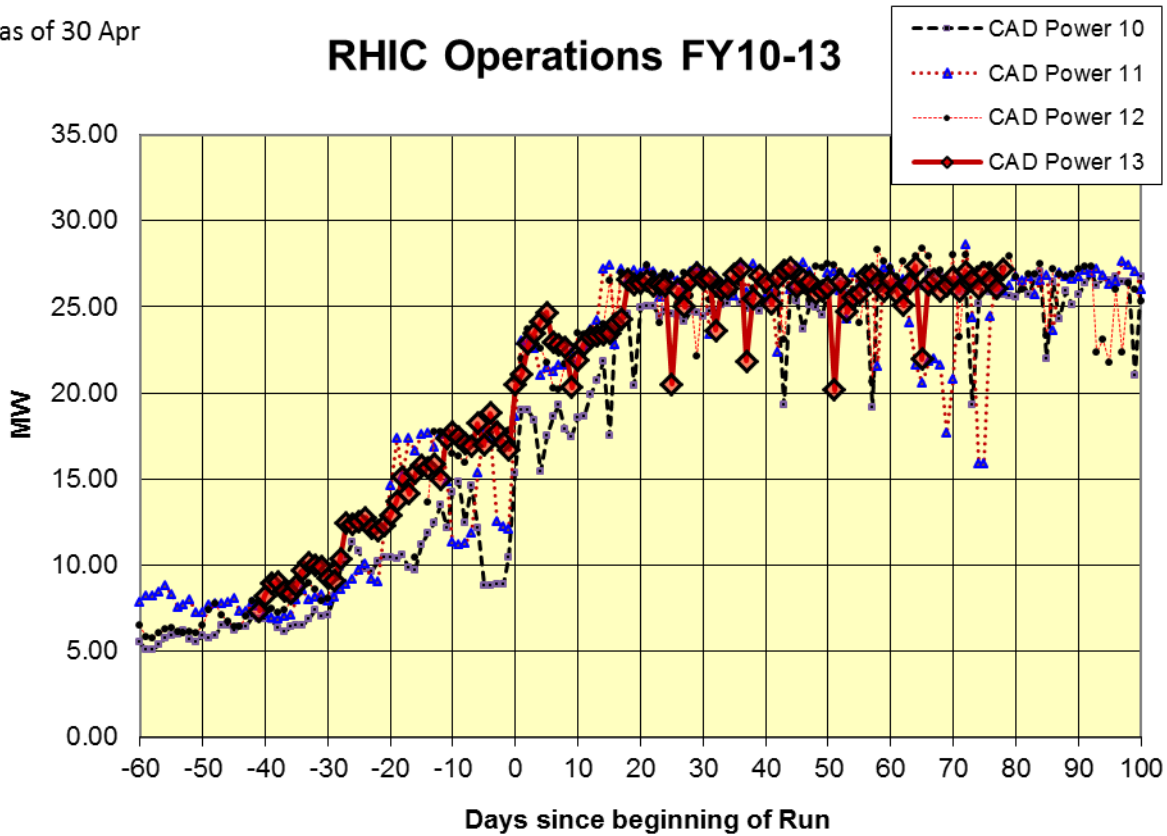
BNL Energy Use FY 2010-13

as of 30 Apr 2013



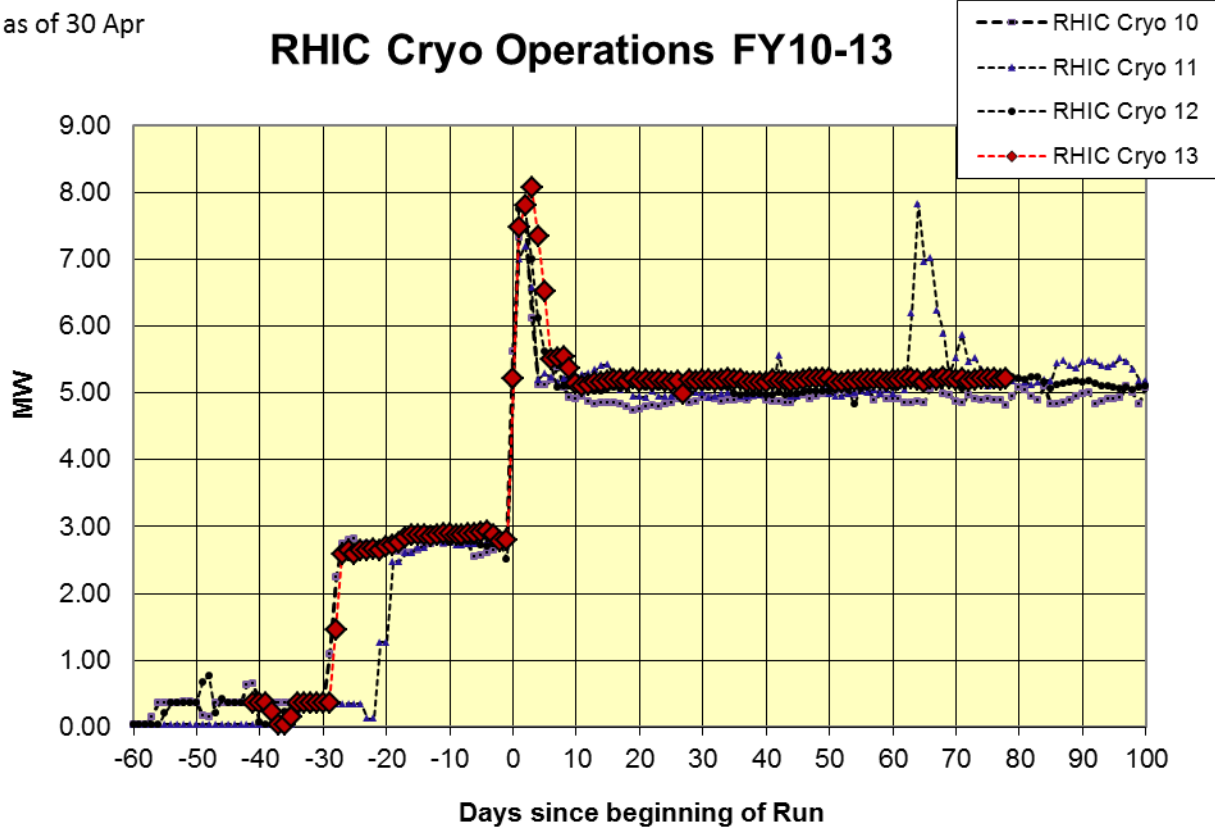
as of 30 Apr

RHIC Operations FY10-13



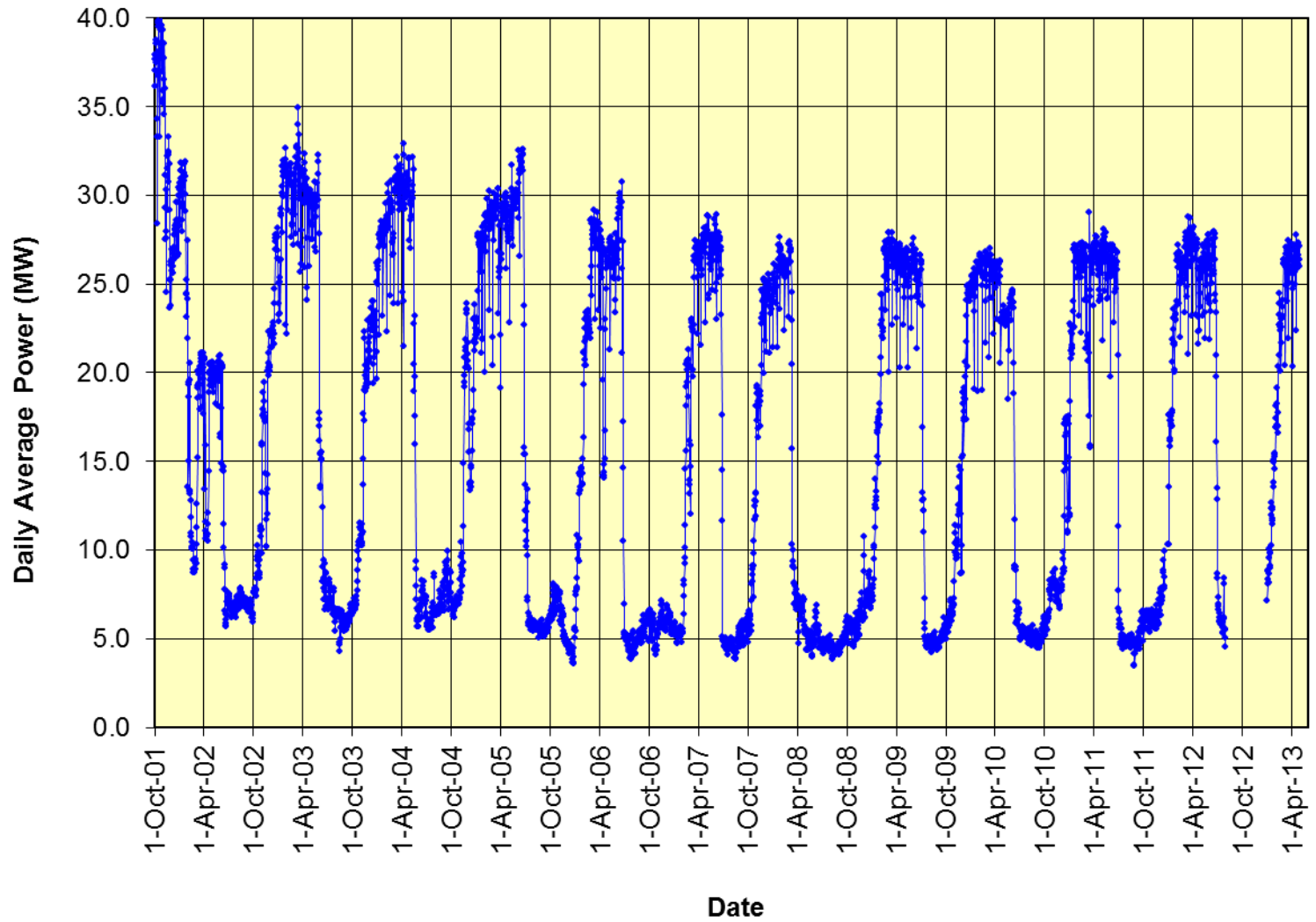
as of 30 Apr

RHIC Cryo Operations FY10-13

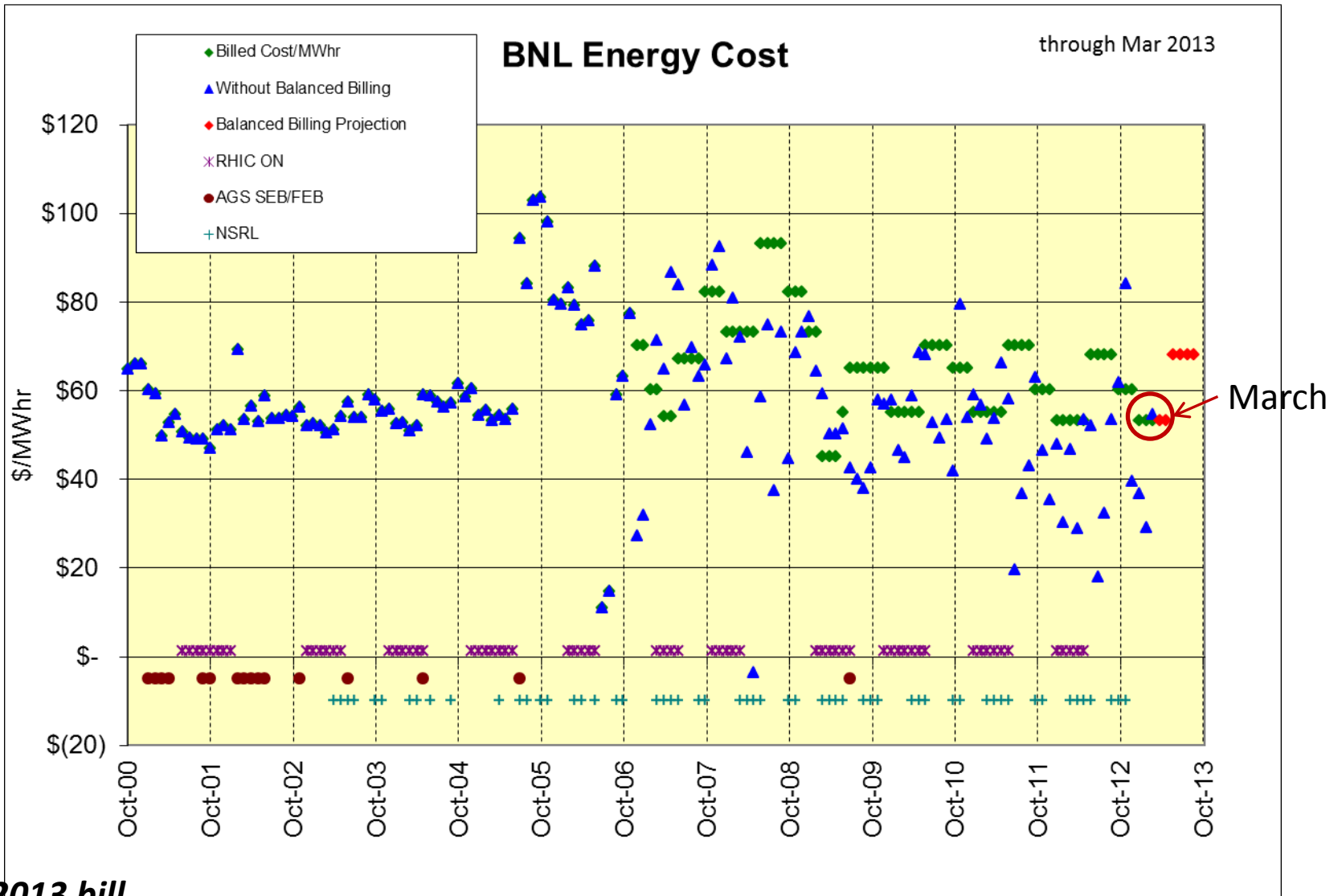


as of 31 Apr 2013

C-AD Energy Use FY 2002-13



+\$1,086K in BNL bank through Mar 2013 (~\$450K should come back to CAD)

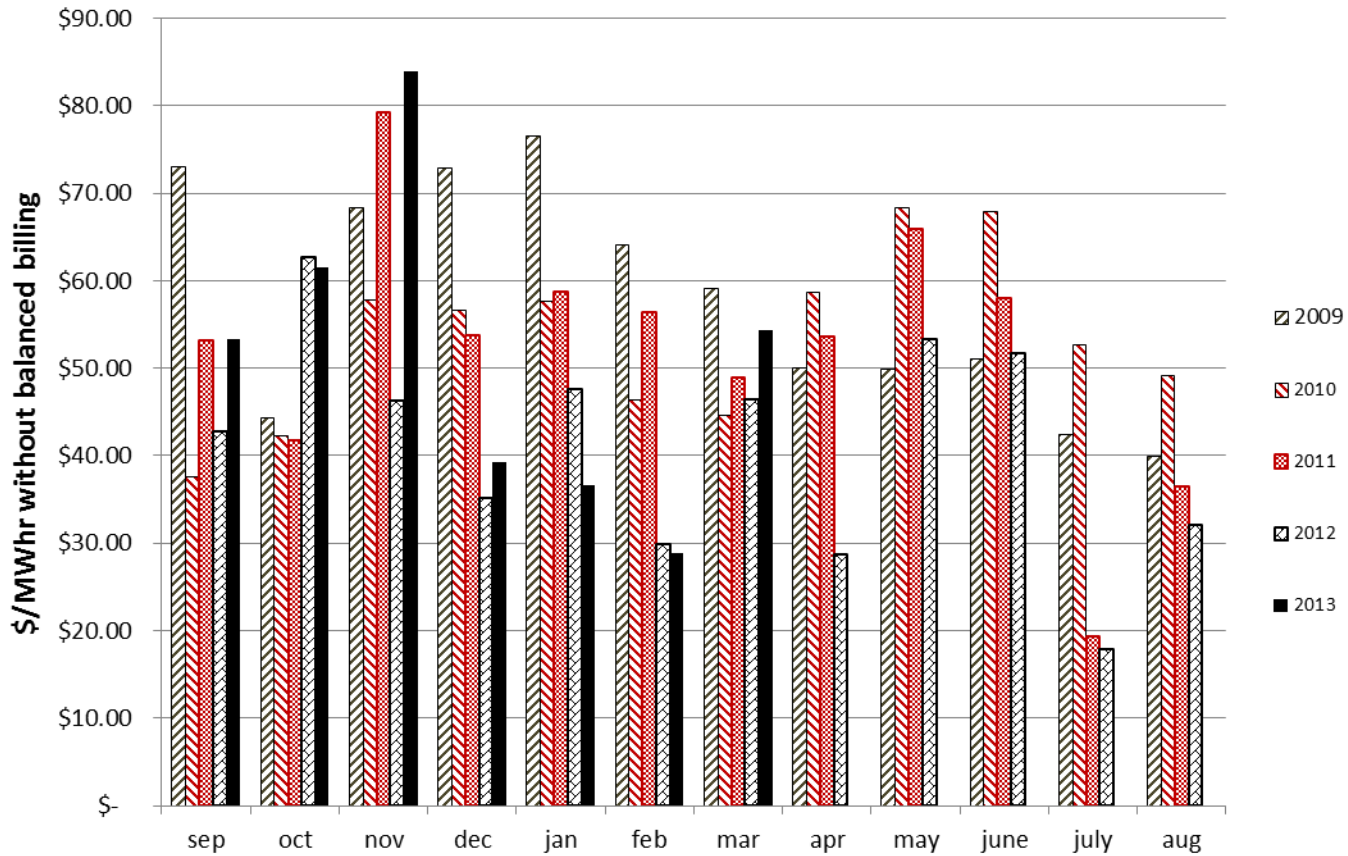


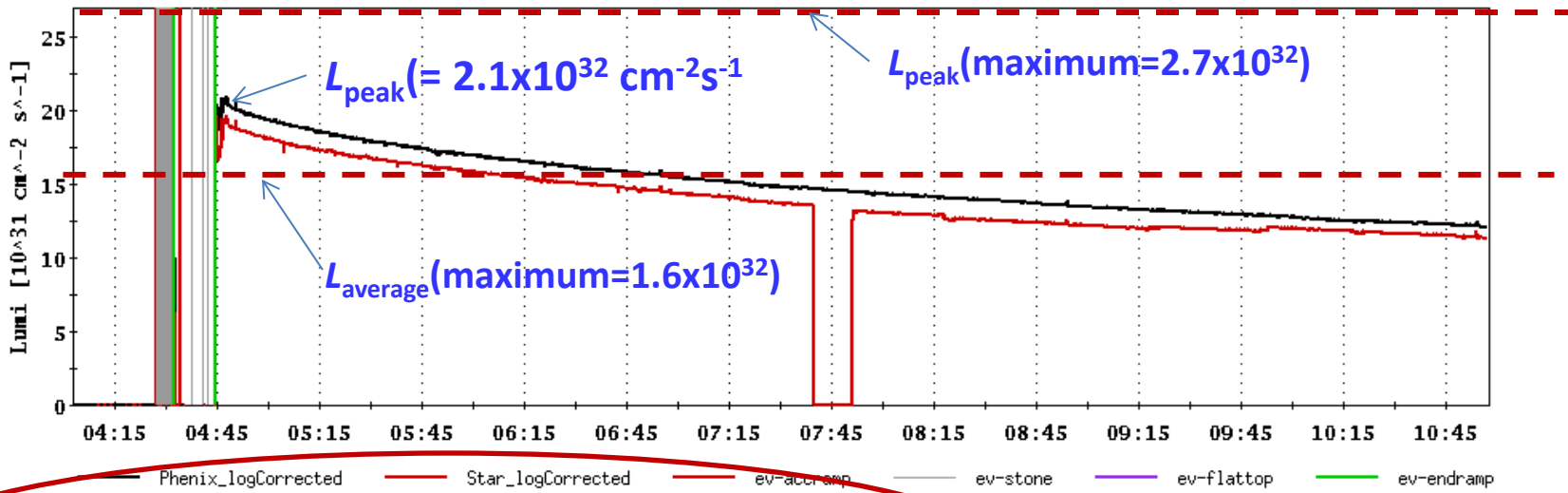
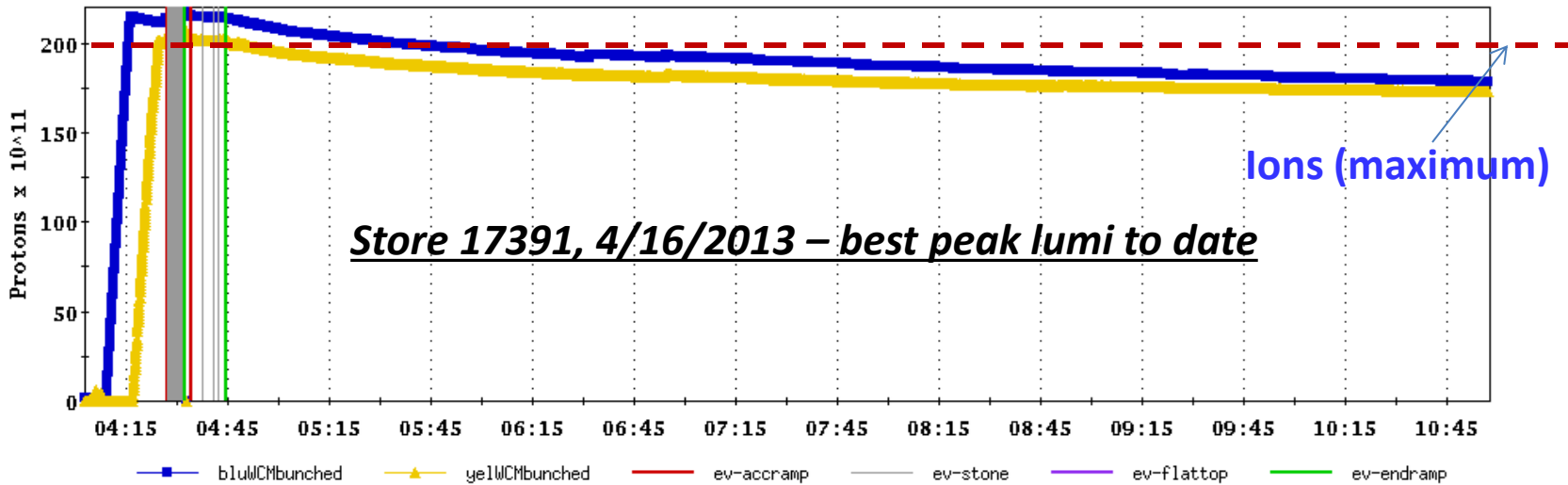
Mar 2013 bill

\$54.39 actual

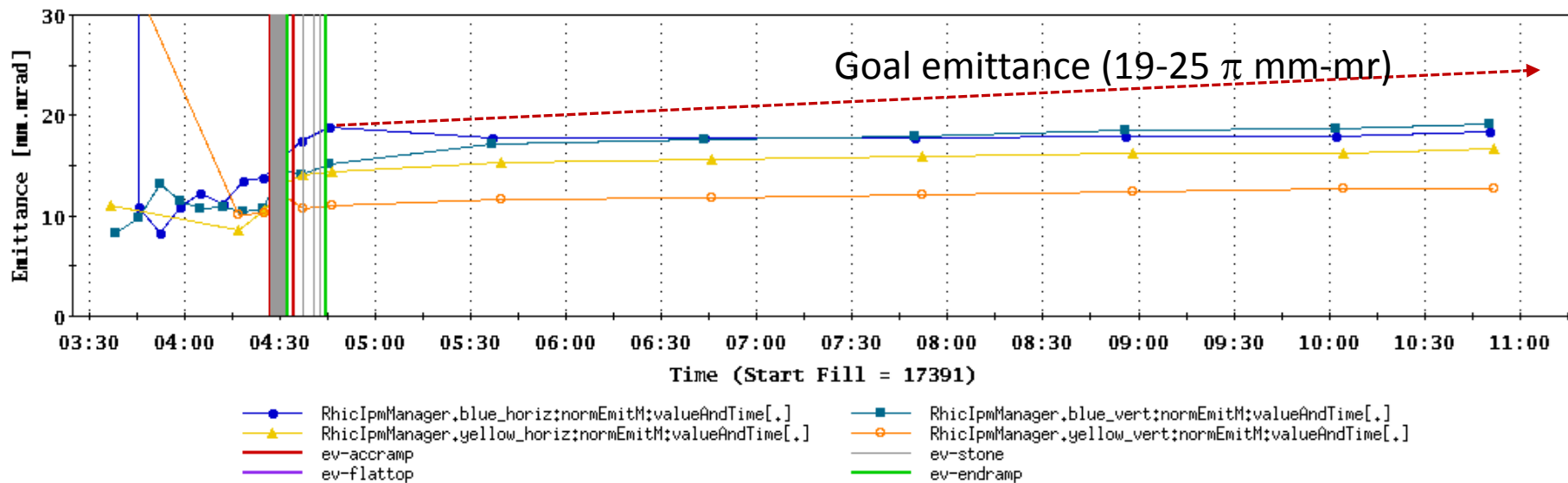
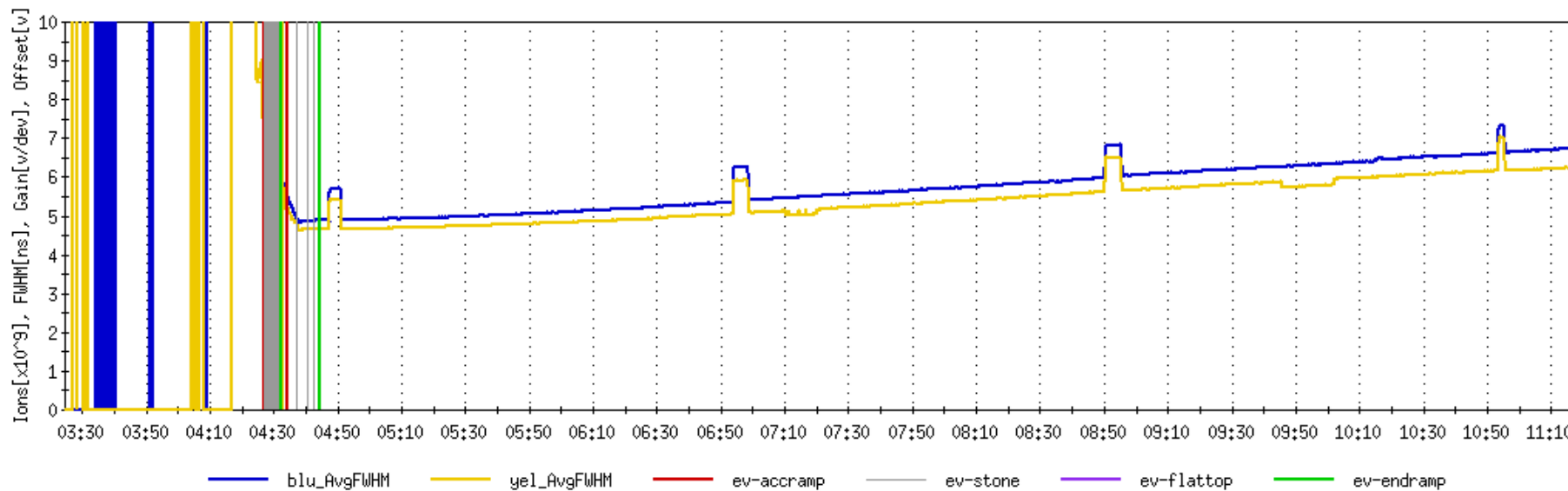
billed at \$53/Mwhr

BNL Electricity Cost





Time = Tue Apr 16 04:47:24 2013+0ms, bluWCMbunched = 212.643
 Time = Tue Apr 16 04:47:32 2013+0ms, yelWCMbunched = 200.528
 Time = Tue Apr 16 04:46:59 2013+5ms, Phenix_logCorrected = 20.7117



Run 13 plan based on 20 weeks cryo operation

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

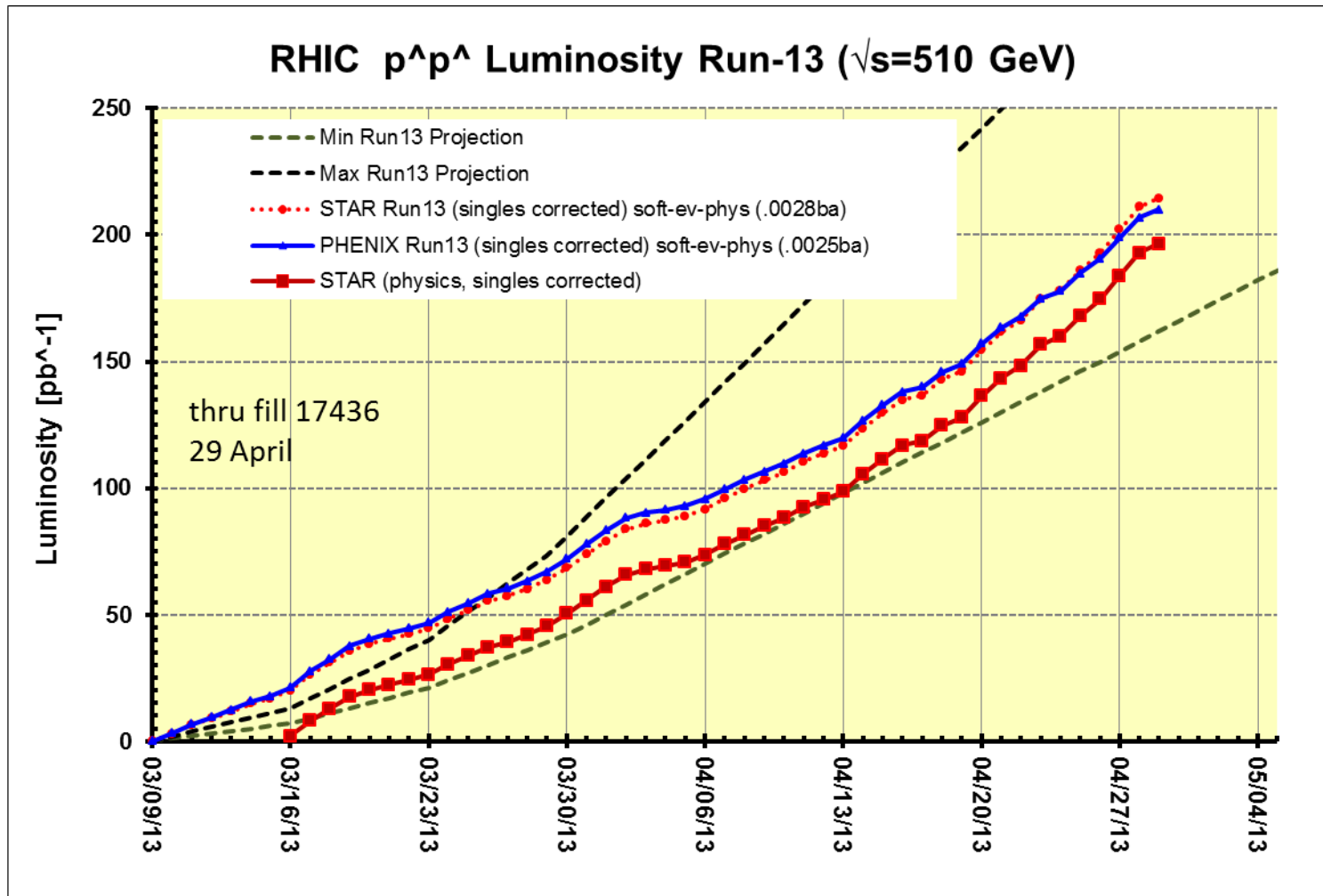
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- ✓ 15 Feb, Cool-down to 4.5K in Blue and Yellow Ring complete, begin magnet setup
- ✓ 26 Feb, first collisions
- ✓ 15 Feb -1 Mar, RHIC $\sqrt{s} = 510$ GeV pp machine setup
- ✓ 1-8 Mar, machine ramp-up with 8 hr/night for experiment setup
- ✓ 9 Mar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

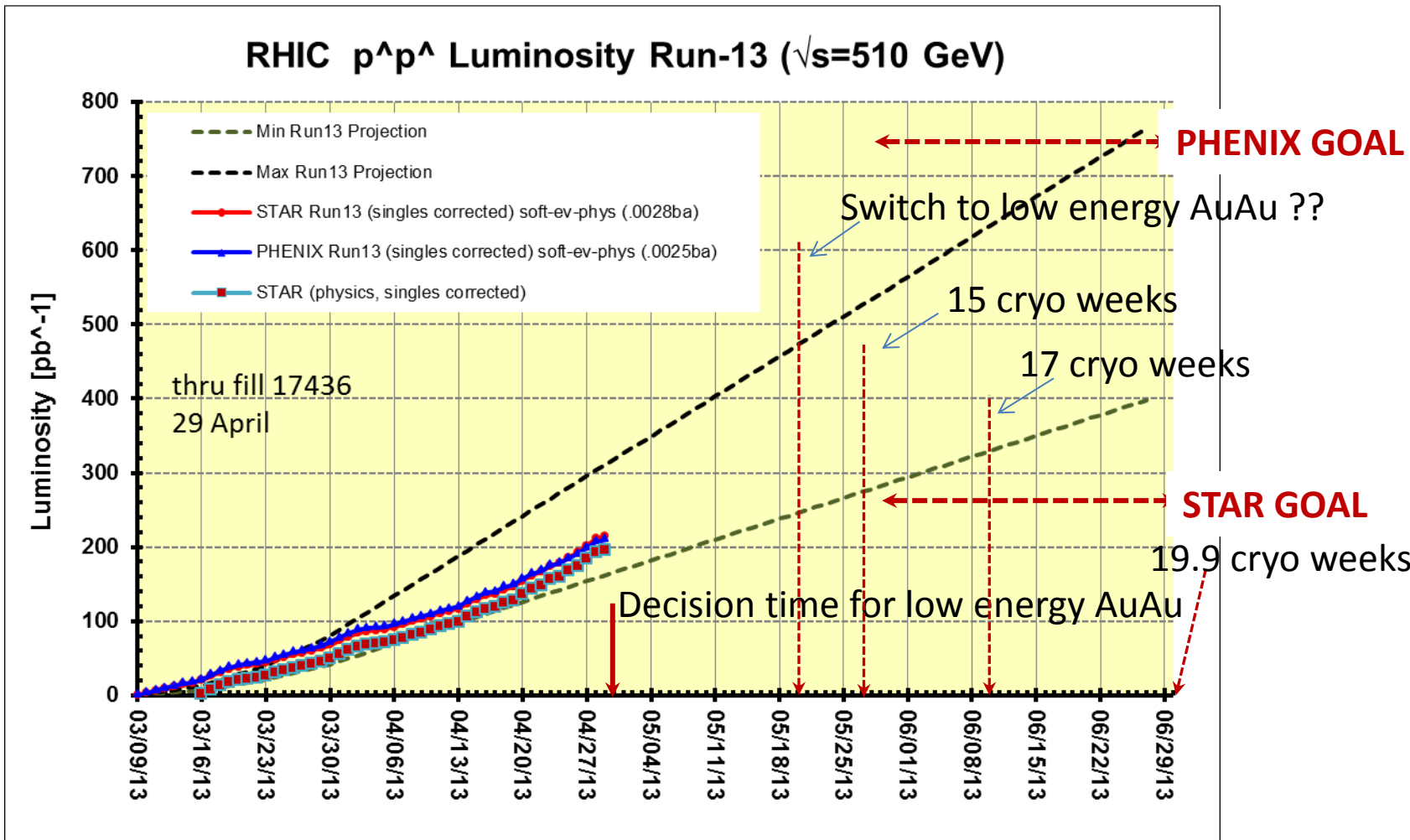
Preliminary, with Run 13 cross sections, PHENIX and STAR **log based singles correction**



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

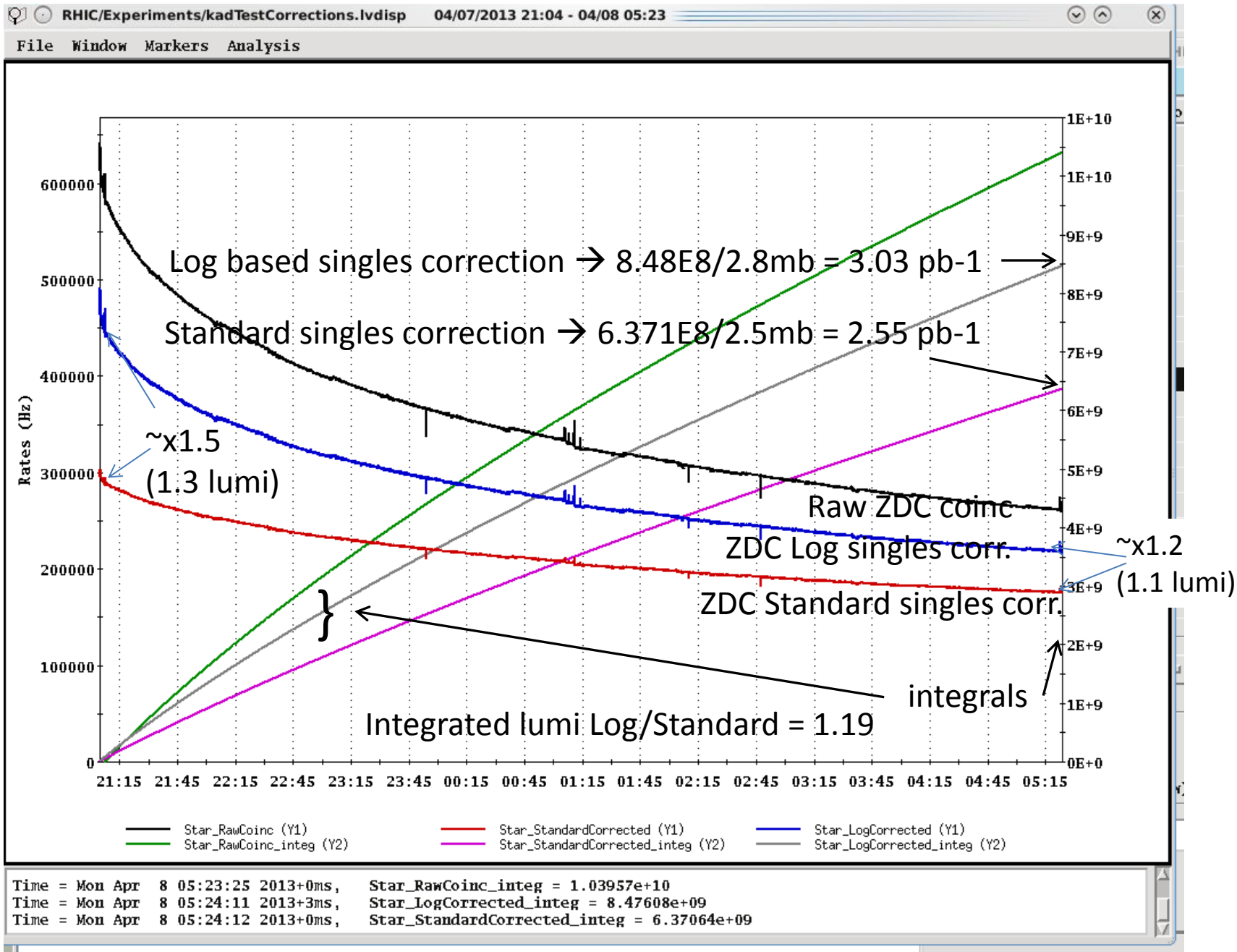
PHENIX Goal, 250 pb⁻¹ recorded, 750 pb⁻¹ delivered, ≥ 55% polarization

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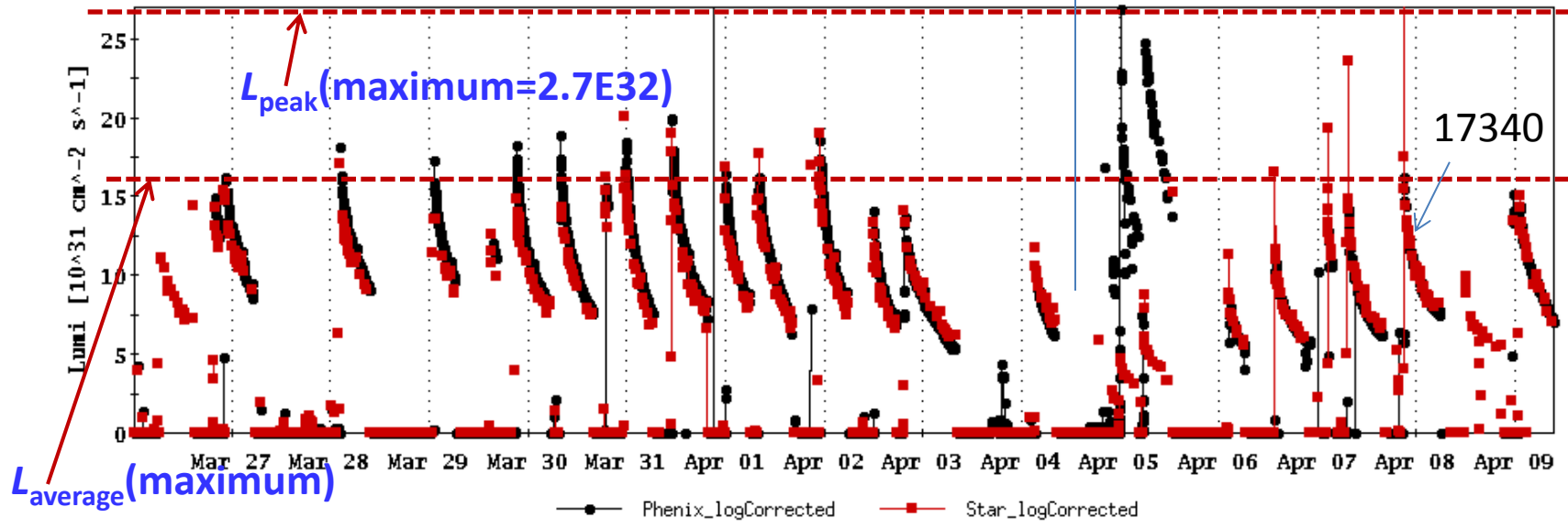


Preliminary, with Run 13 cross sections, singles corrected

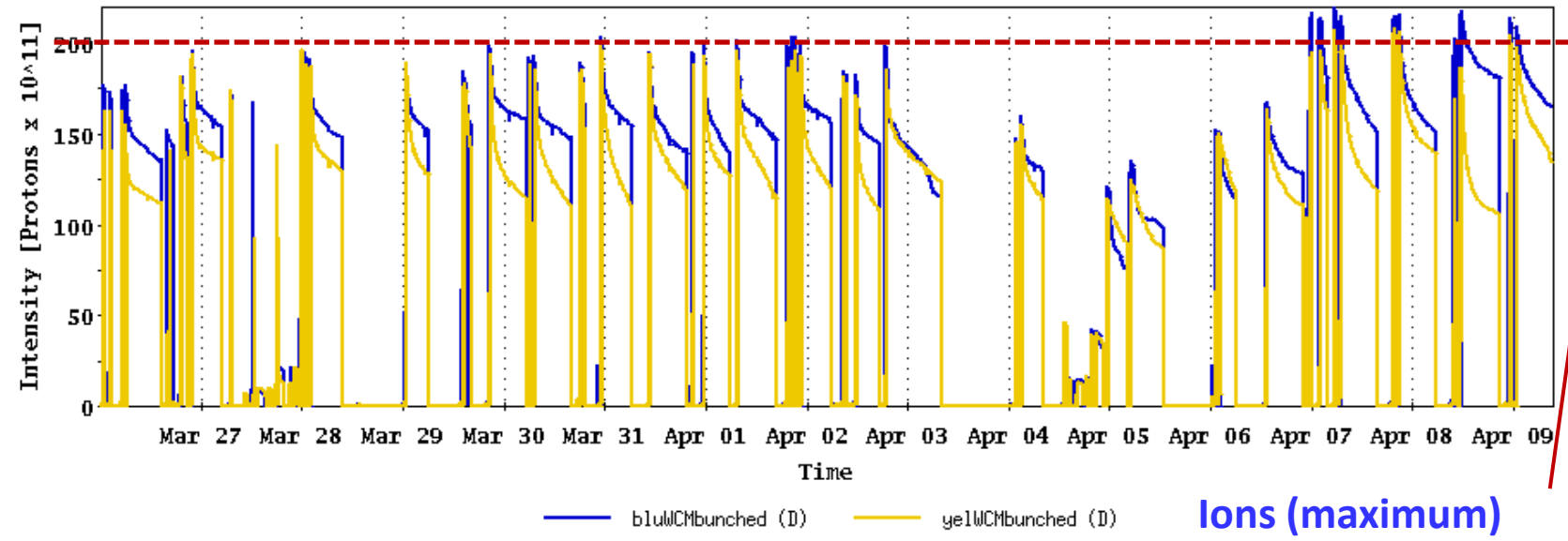
Example Store for STAR (17340) with "physics" time cuts



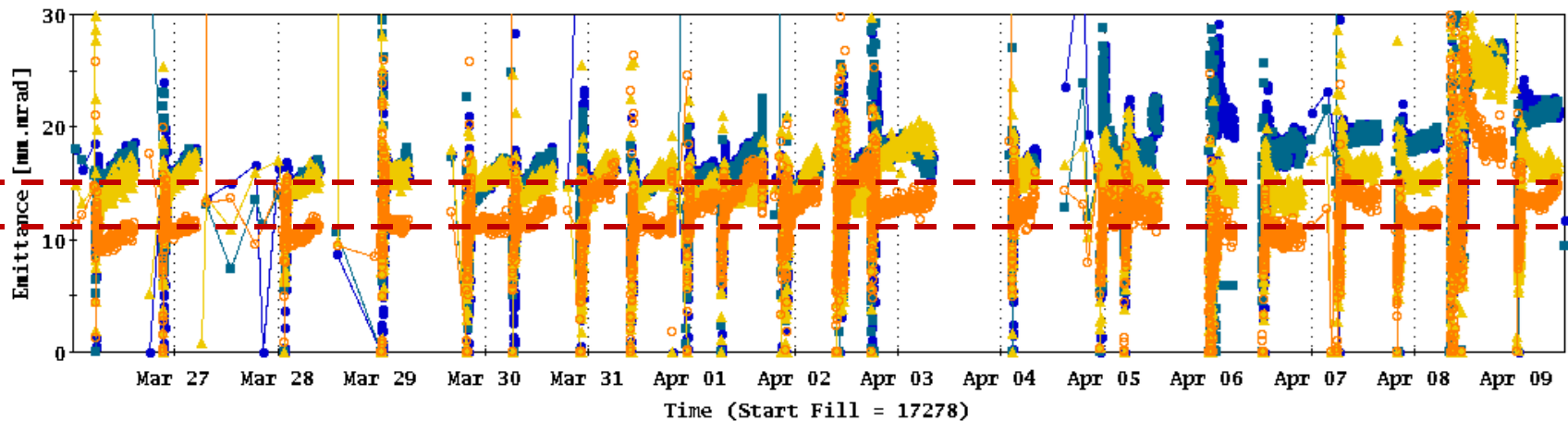
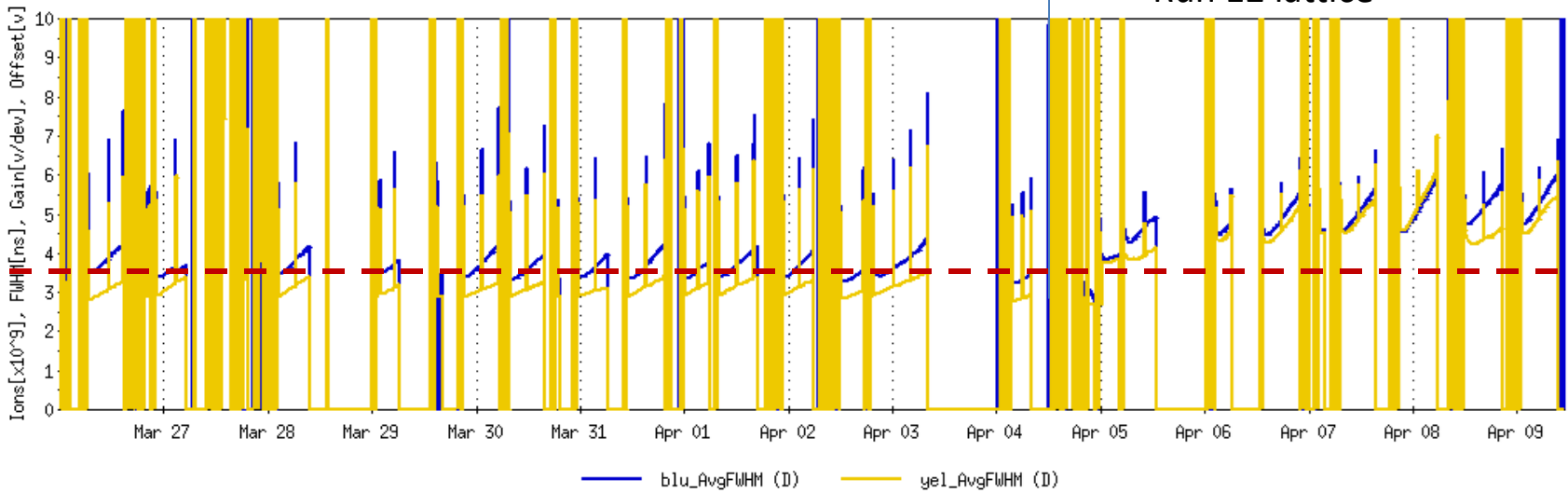
Physics stores



Using Run 13 cross sections with log based singles correction

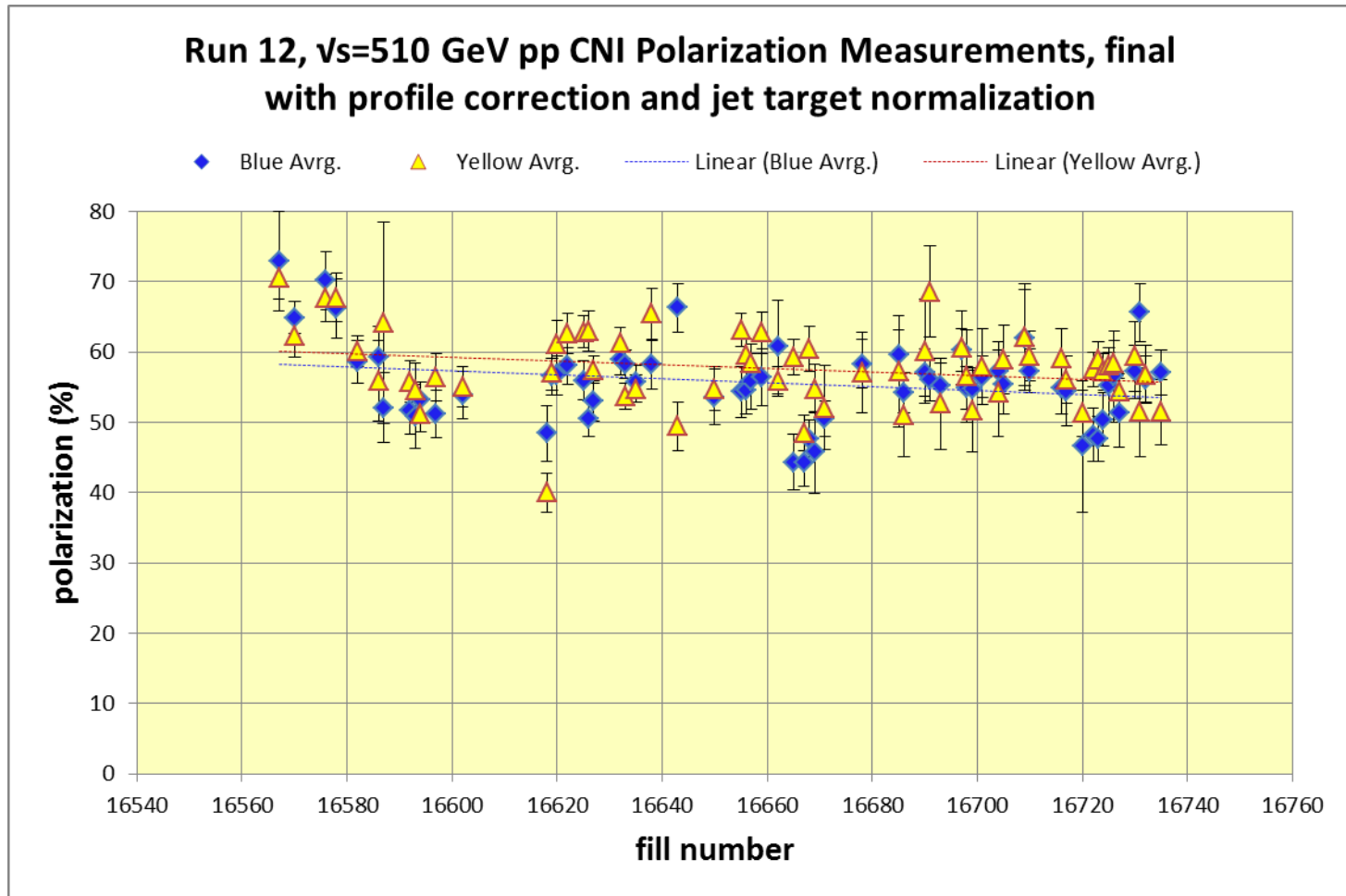


Past 2 Weeks



Yellow average = $48.12 \pm 0.4\%$

Blue average = $53.1 \pm 0.5\%$

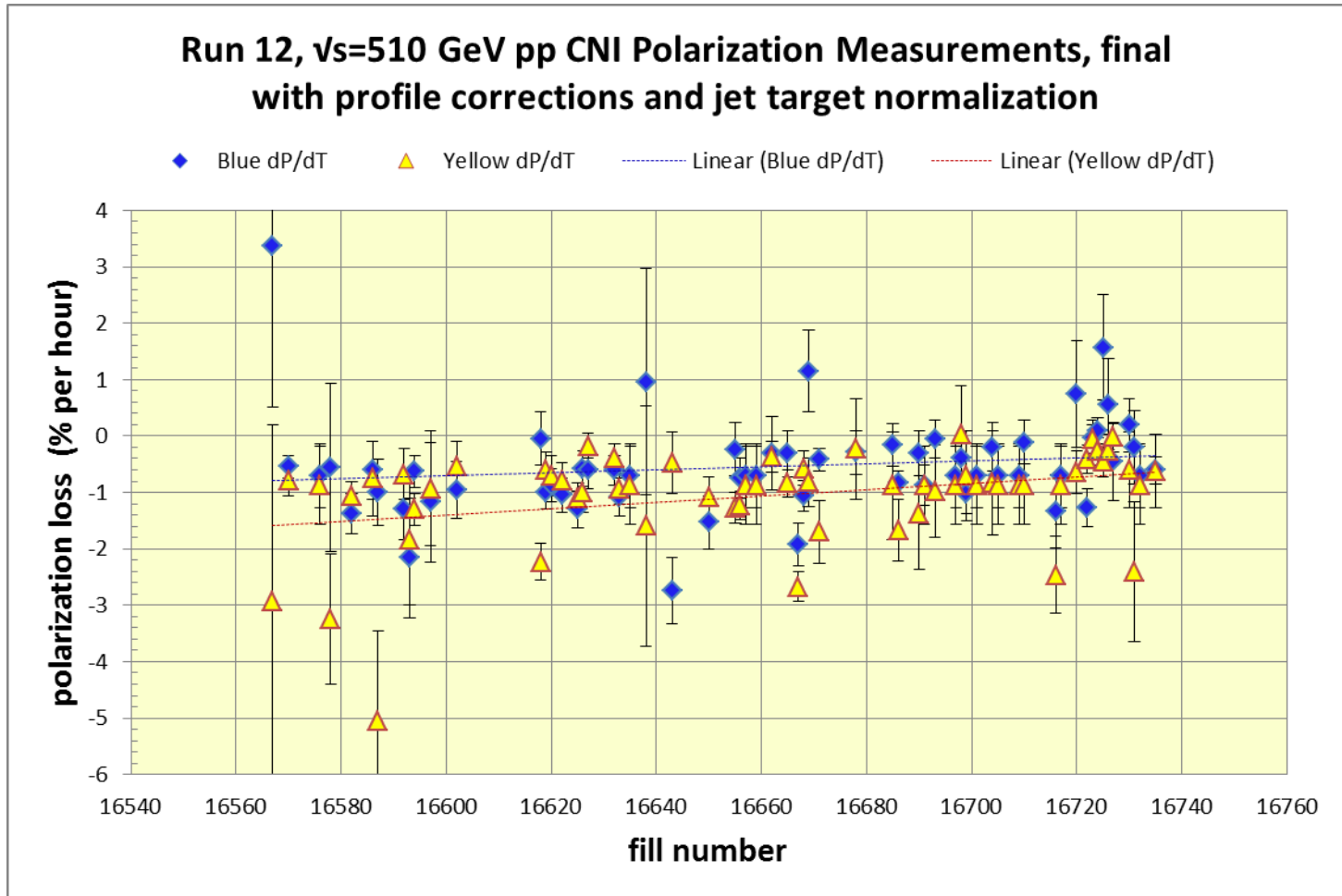


<http://www.phy.bnl.gov/cnipol/fills/>

Yellow average = $57.7 \pm 0.4\%$

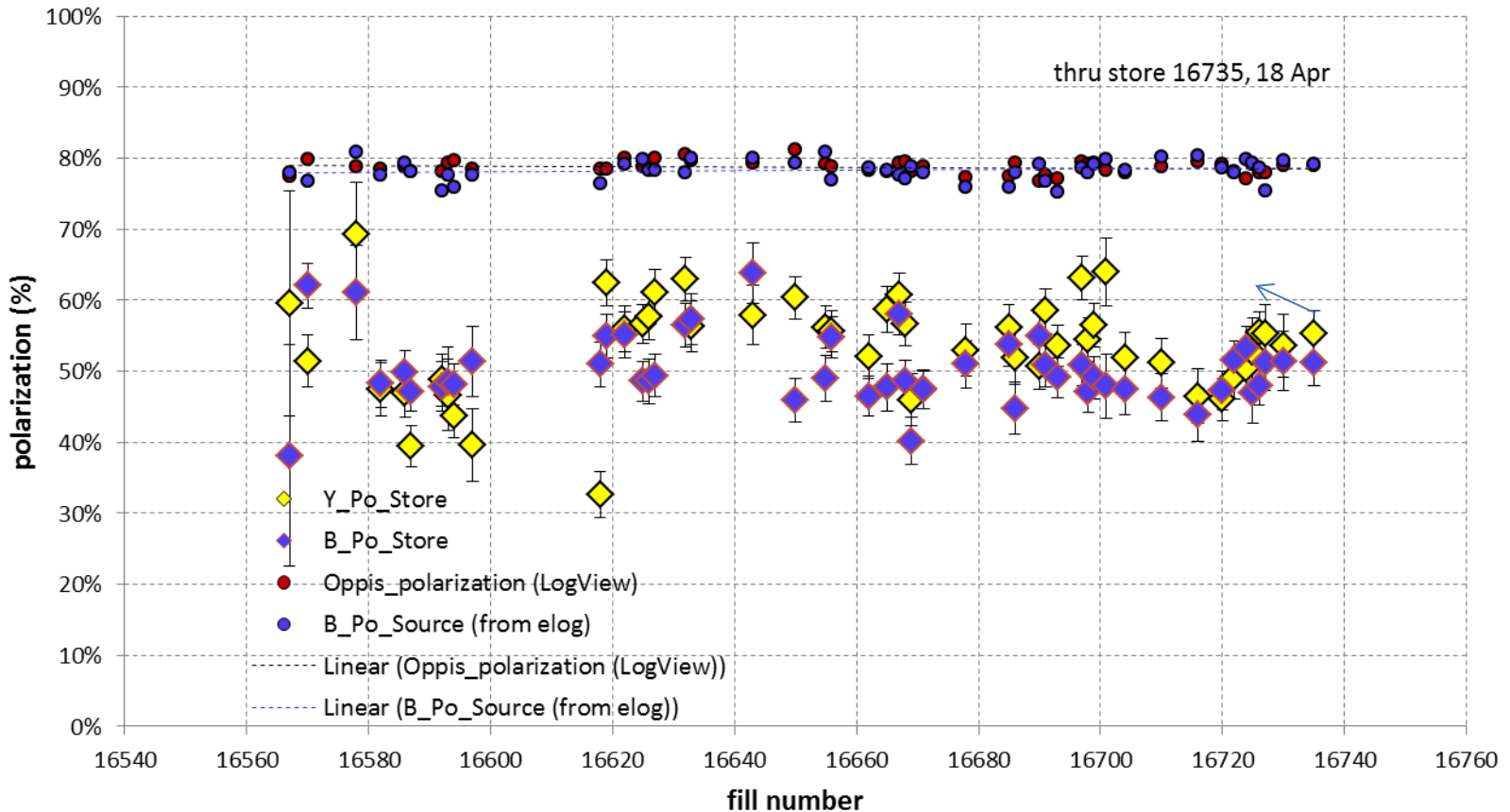
Blue average = $55.9 \pm 0.4\%$

Average = 56.8%



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

Run12 255 x 255 Gev pp Jet target Polarization final results



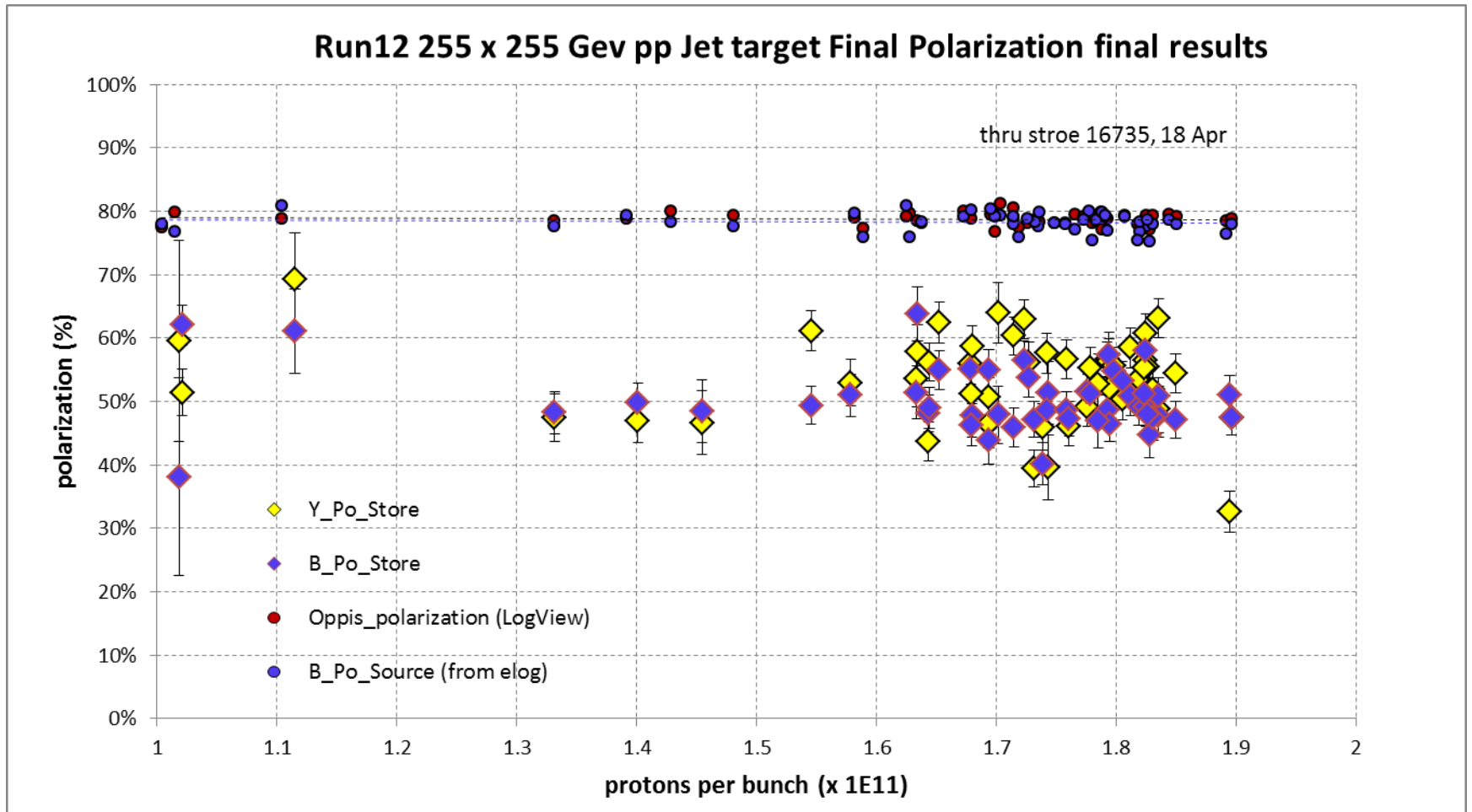
And Yellow beam at injection jet target Run 12 result = $63.0 \pm 4.4\%$

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 = $50.3 \pm 0.5\%$

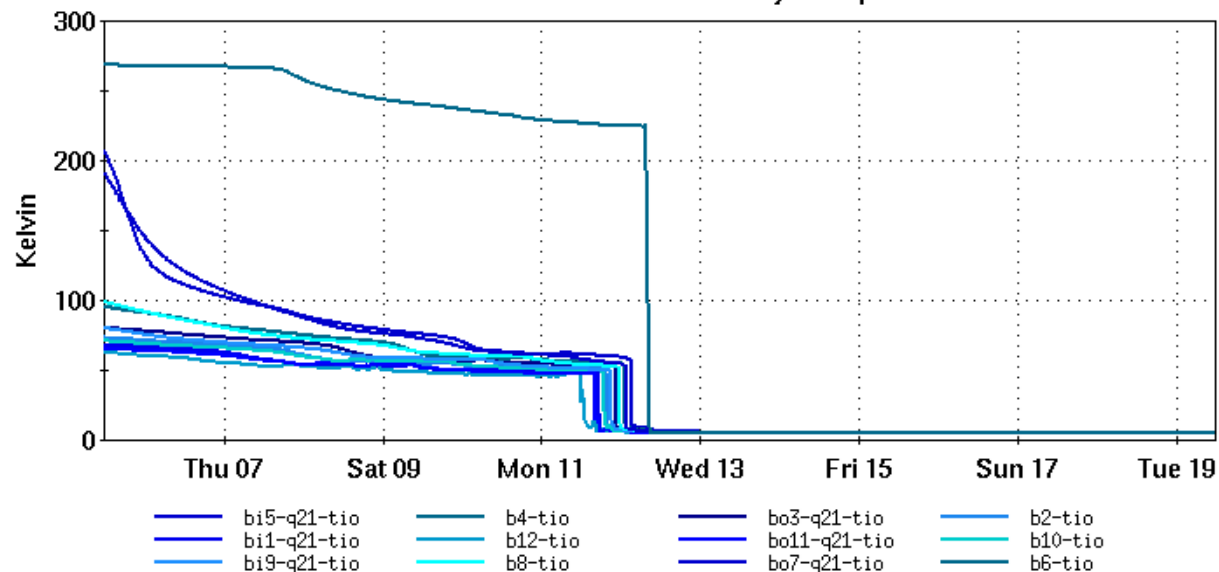


Cryogenic Blue & Yellow Rings (14 days)

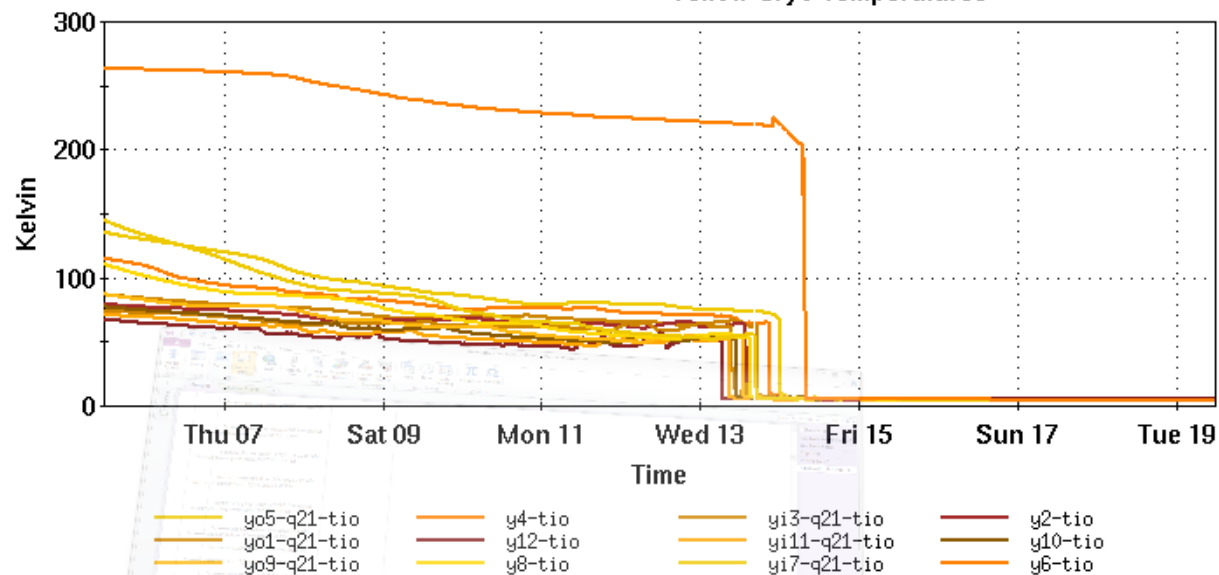
[Ring Summary \(1 day\)](#) [Sector Plots \(1 day\)](#) [Sector Plots \(14 days\)](#)

File Window Markers Analysis

Blue Cryo Temperatures



Yellow Cryo Temperatures



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.