

Run 13 RHIC Machine/Experiments Meeting

4 Jun 2013

Agenda:

- Status Reports
- Hydrogen Jet issue (Eyser)

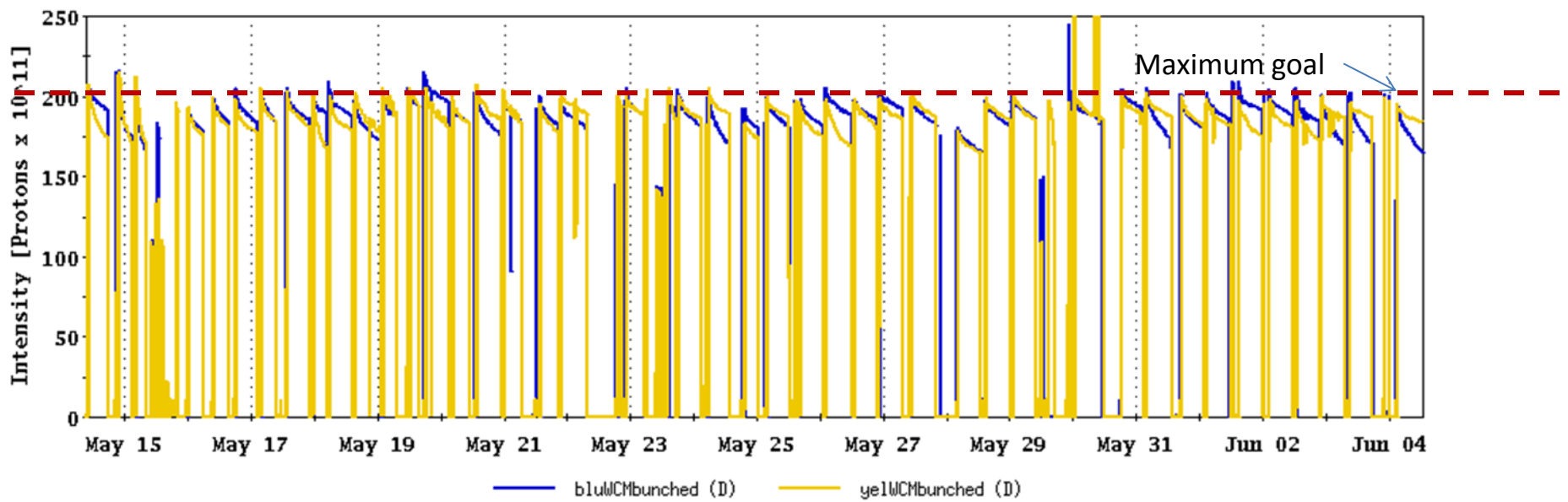
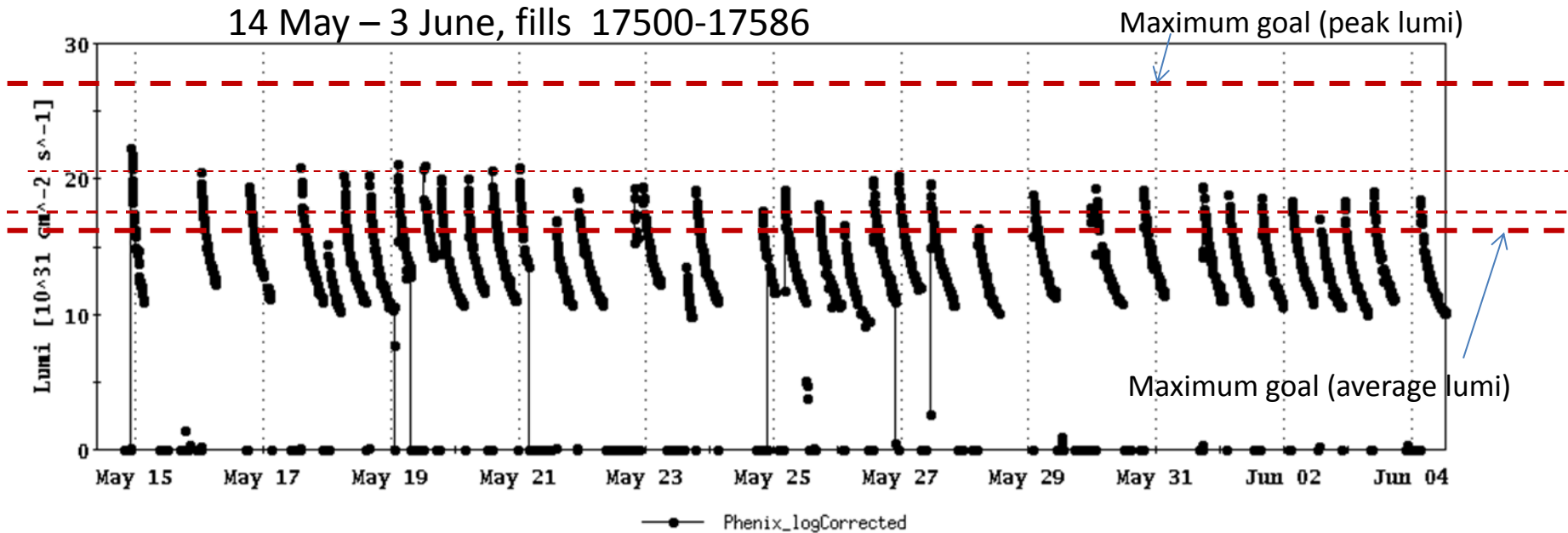
Run 13 plan based on 17 weeks cryo operation

- ✓ 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

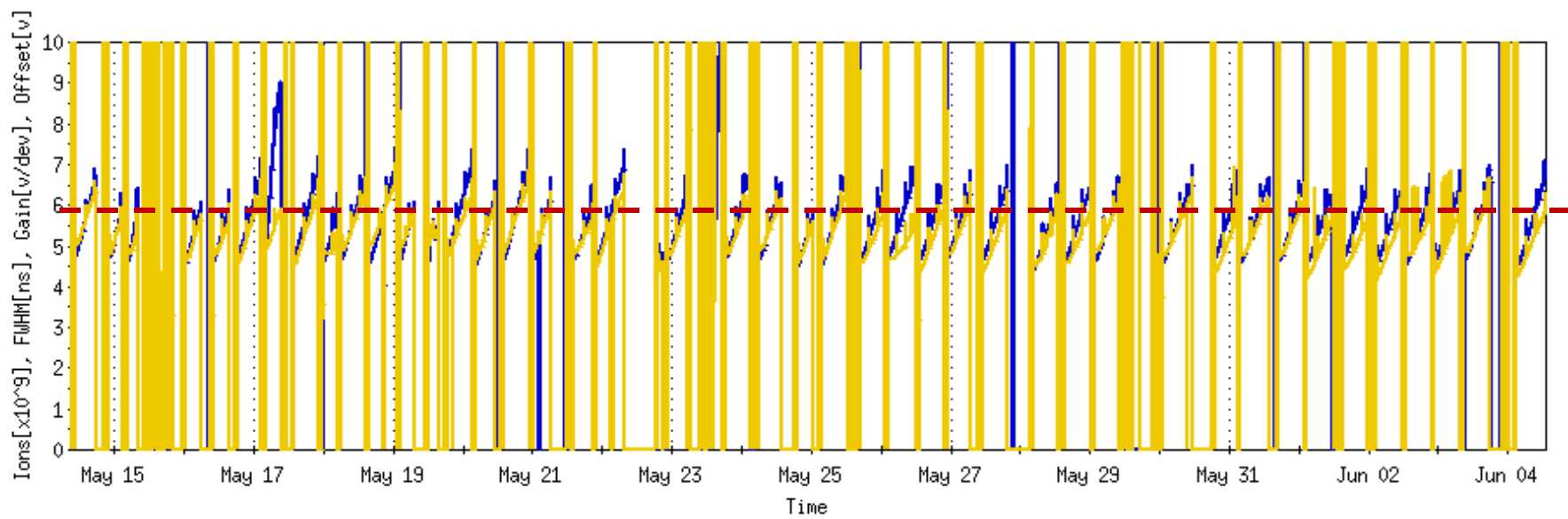
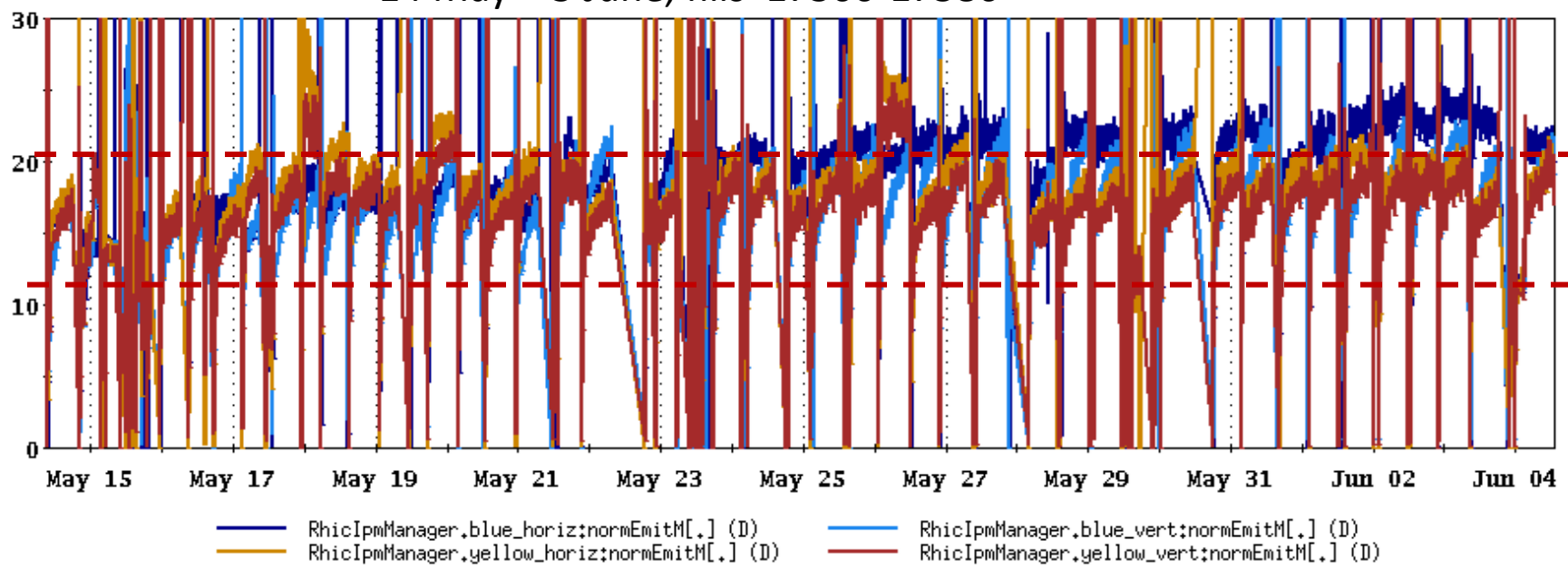
today, 4 Jun

- 5 Jun , 16 hours, APEX low energy Au study using 5.86 GeV protons.
- 6,7 or 8 Jun, 4 hours, APEX, spin tune meter development (blue beam only)
- 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)

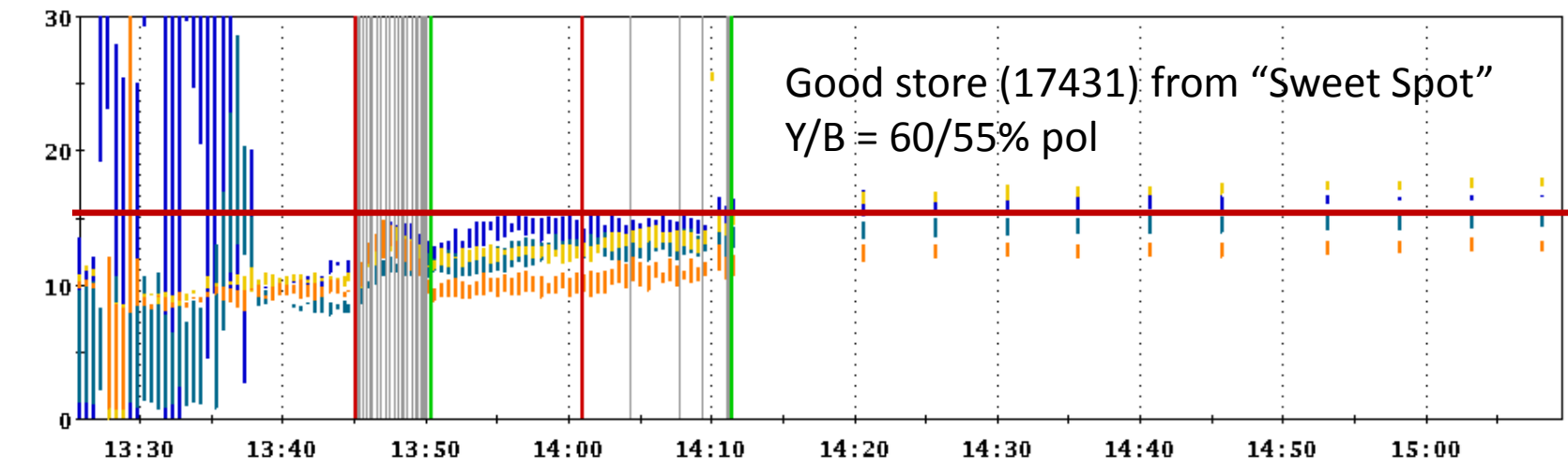
14 May – 3 June, fills 17500-17586



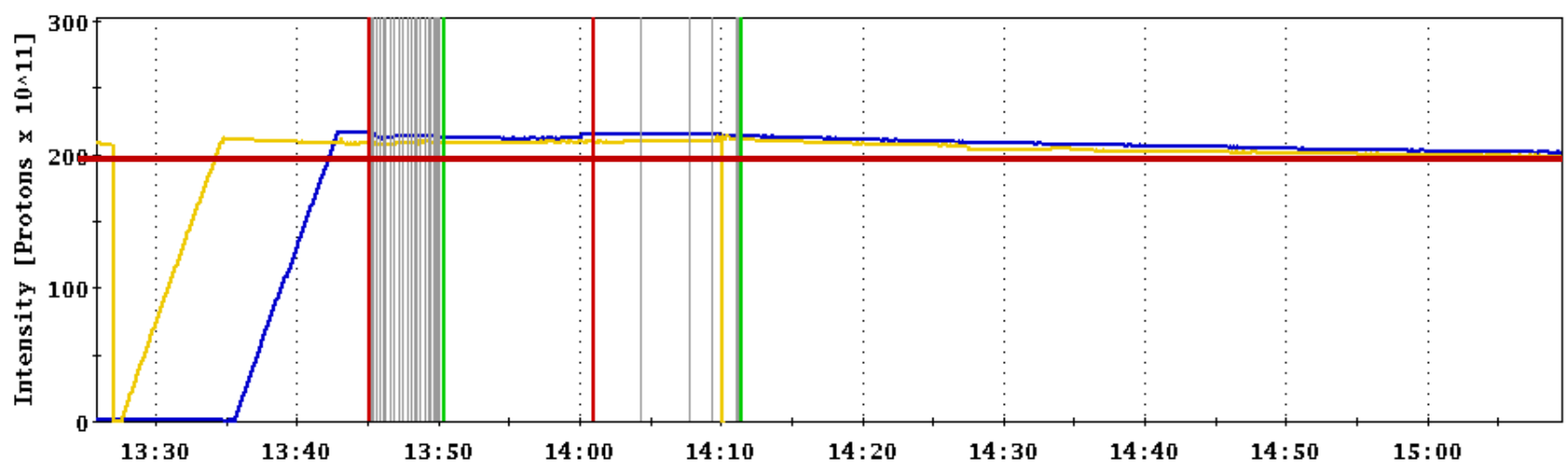
14 May – 3 June, fills 17500-17586



Good store (17431) from "Sweet Spot"
 Y/B = 60/55% pol



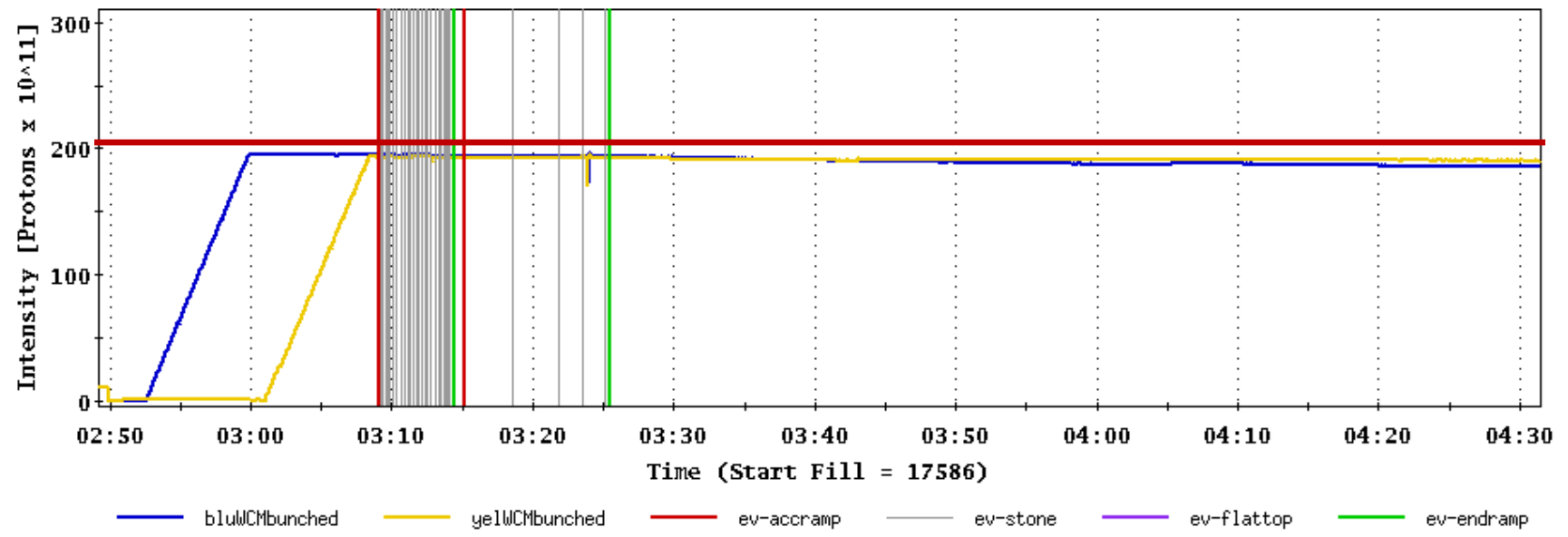
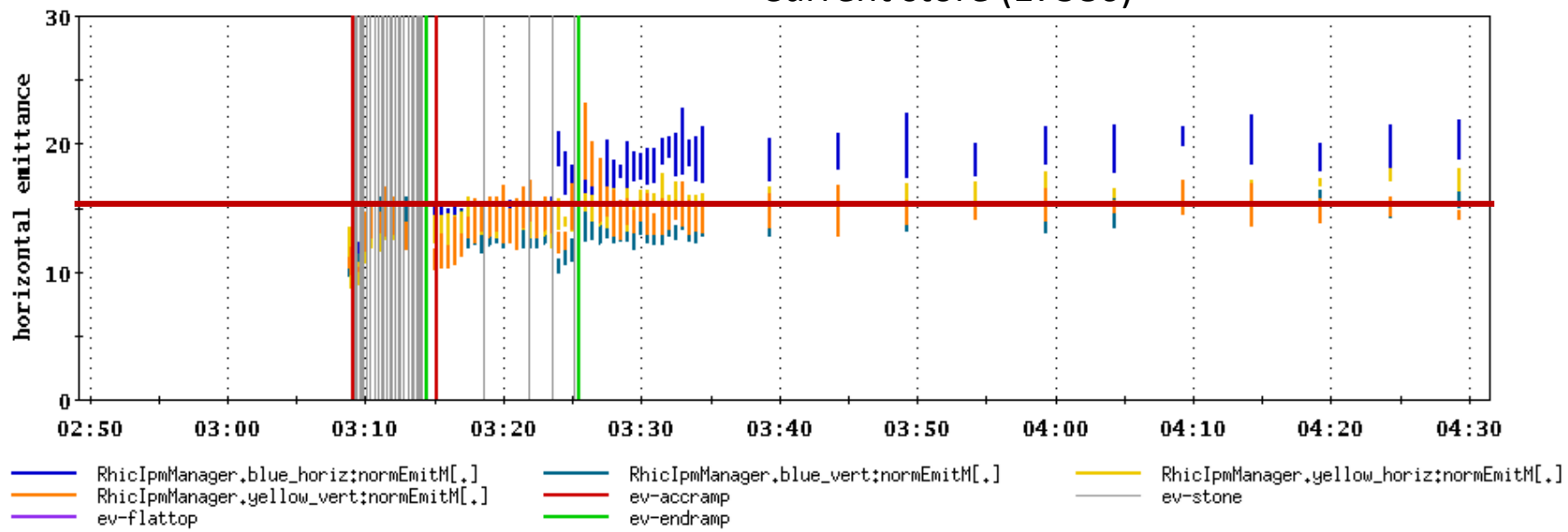
- RhicIpmManager.blue_horiz;normEmitM[.]
- RhicIpmManager.blue_vert;normEmitM[.]
- RhicIpmManager.yellow_horiz;normEmitM[.]
- RhicIpmManager.yellow_vert;normEmitM[.]
- ev-accramp
- ev-endramp
- ev-flattop
- ev-stone



Time (Start Fill = 17431)

- bluWCmbunched
- yellWCmbunched
- ev-accramp
- ev-stone
- ev-flattop
- ev-endramp

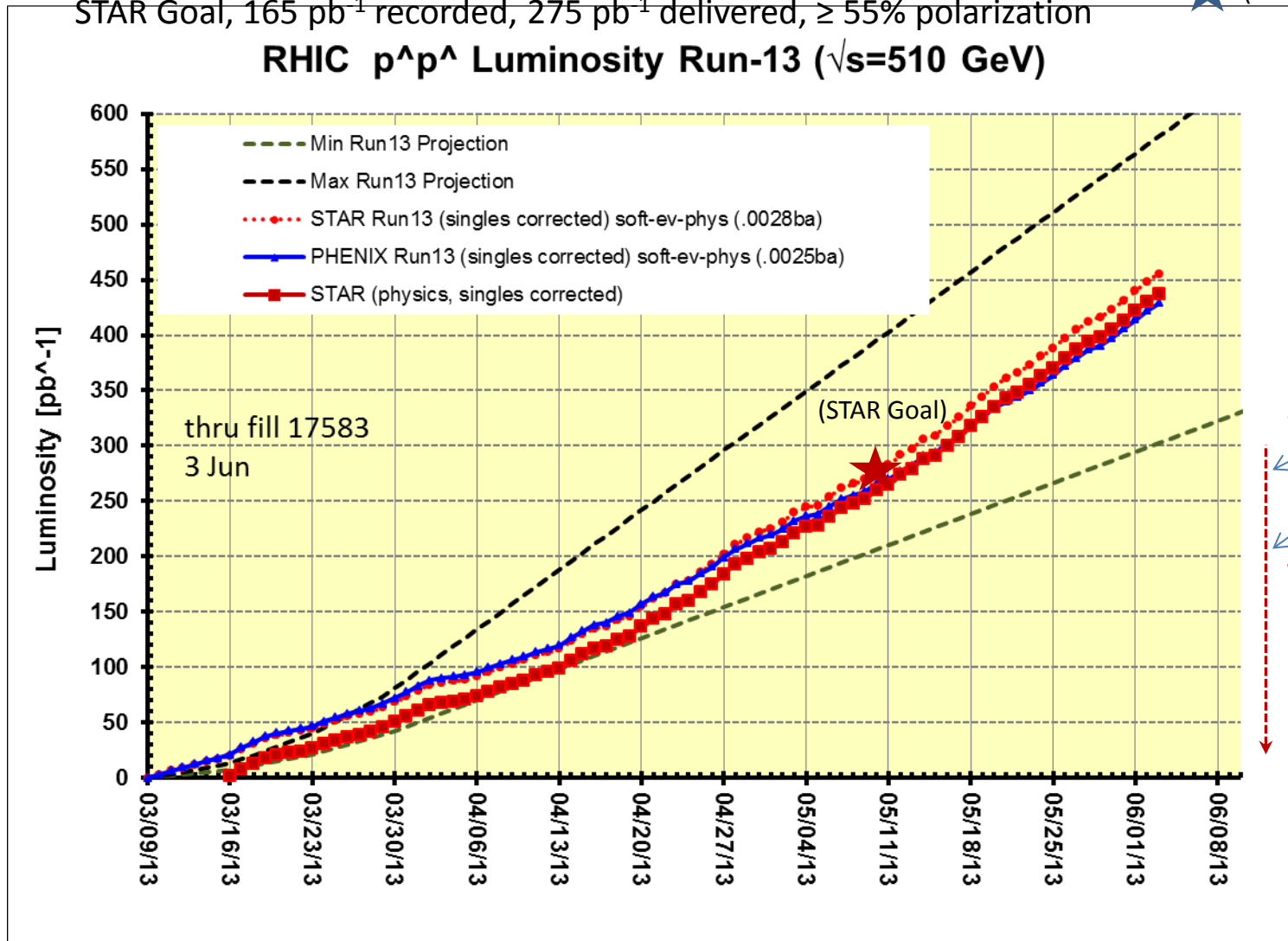
Current store (17586)



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)

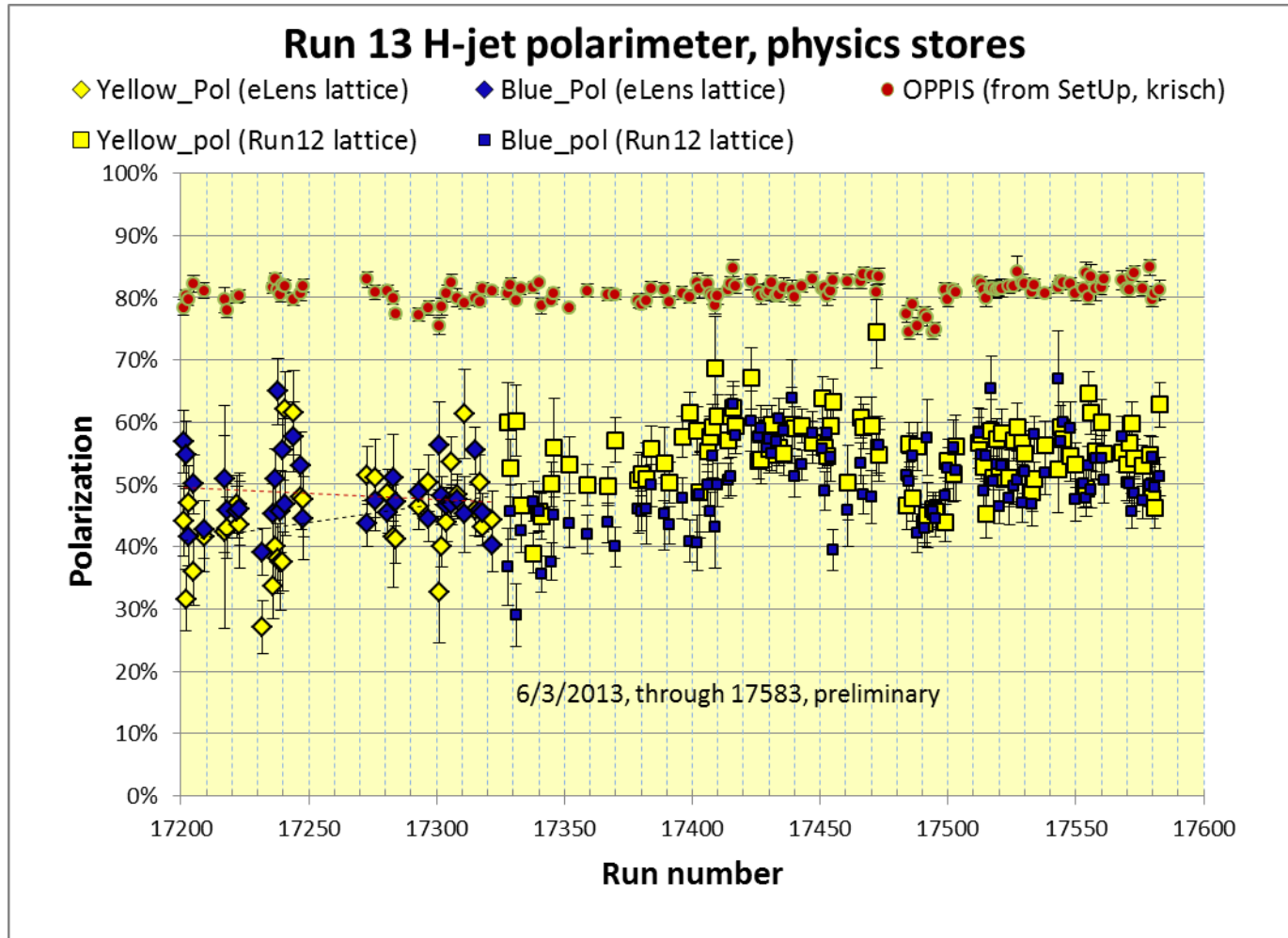
Yellow average = $54.5 \pm 0.4\%$

Blue average = $50.2 \pm 0.3\%$

Average = 52.4%

stores 17328 – 17583 (Run 12 lattice)

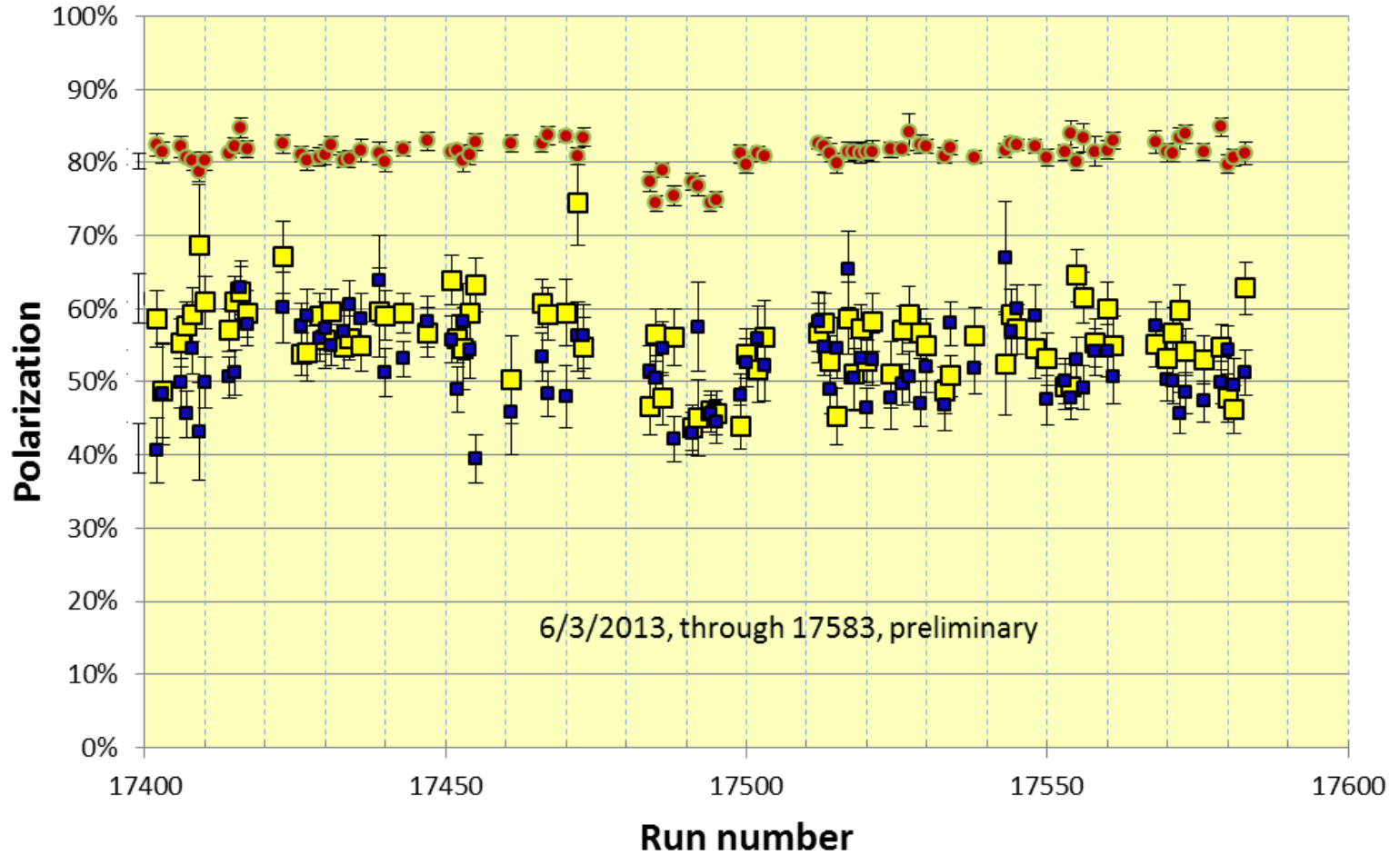
Average for all fills: Blue = $49.7\% \pm 0.3\%$, Yellow = $52.9\% \pm 0.3\%$



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

Run 13 H-jet polarimeter, physics stores

- ◆ Yellow_Pol (eLens lattice)
- ◆ Blue_Pol (eLens lattice)
- OPPIS (from SetUp, krisch)
- Yellow_pol (Run12 lattice)
- Blue_pol (Run12 lattice)



Yellow average = $52.7 \pm 0.5\%$

Blue average = $53.3 \pm 0.5\%$

Average = 53.0%

stores 17201-17322 (eLens lattice)

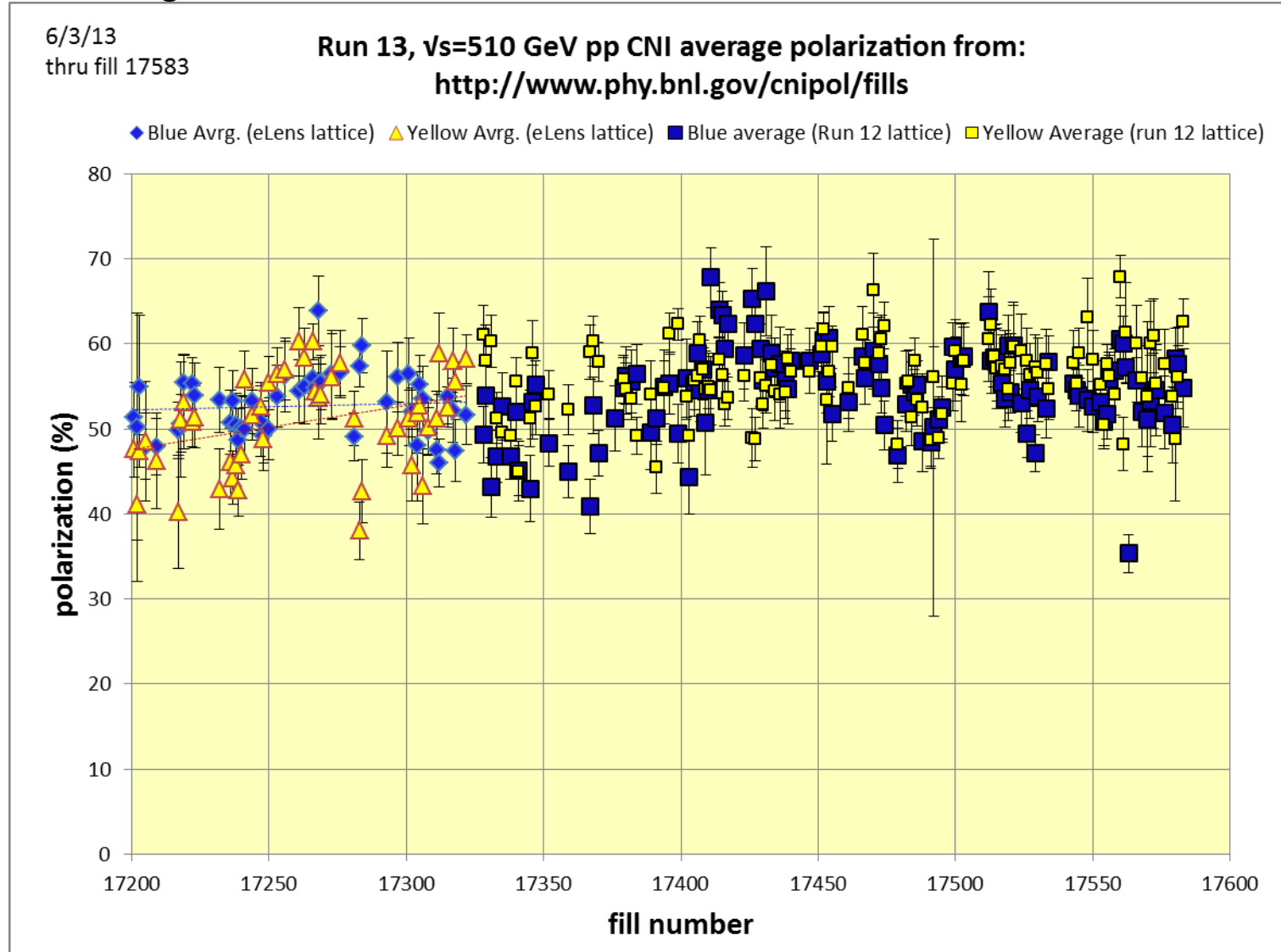
Yellow average = $56.0 \pm 0.3\%$

Blue average = $54.1 \pm 0.3\%$

Average = 55.0%

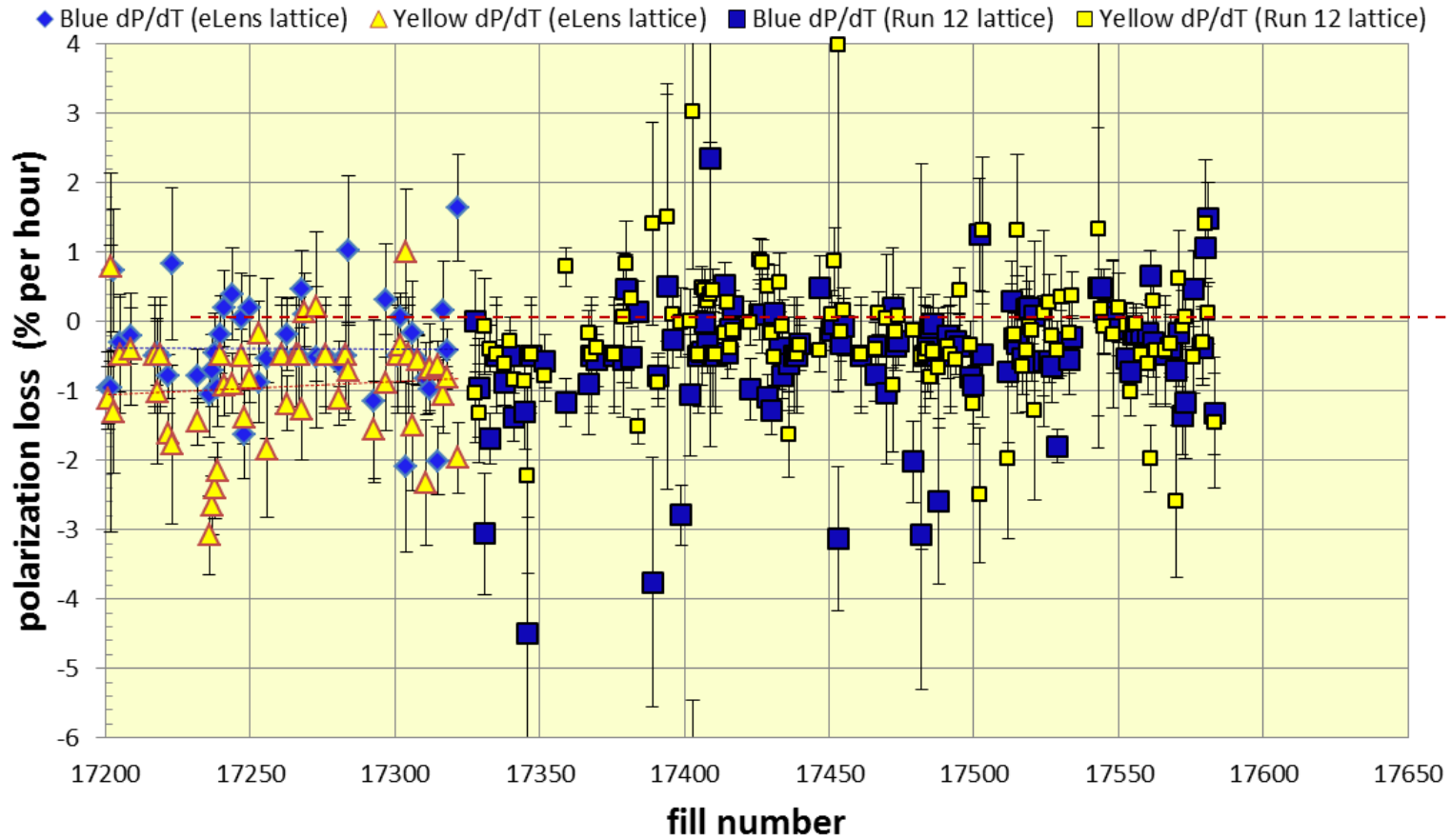
stores 17328-17583 (Run 12 lattice)

Average for all fills: Blue = $53.9\% \pm 0.3\%$, Yellow = $55.1\% \pm 0.3\%$

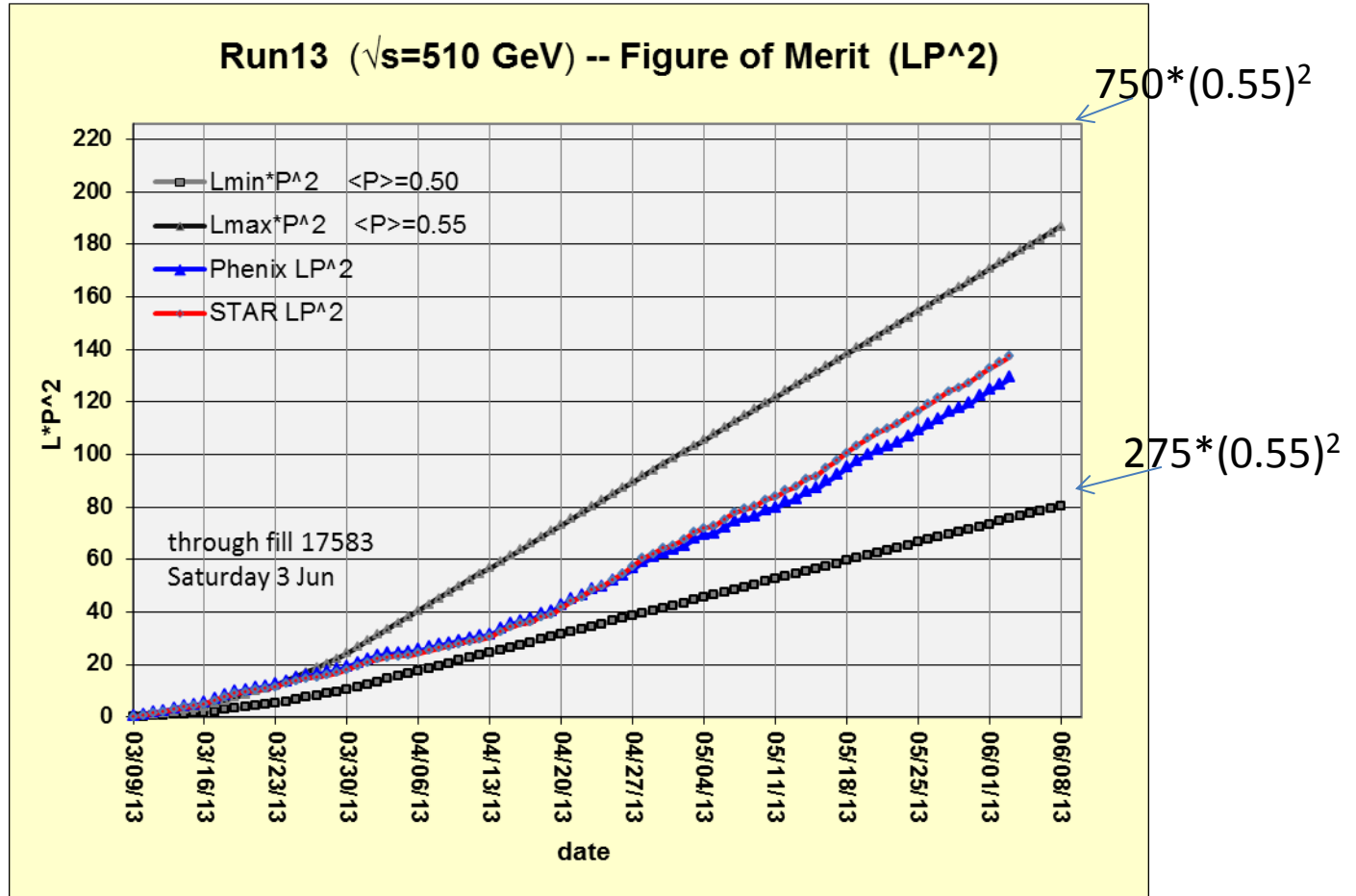


6/3/13
thru fill 17583

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

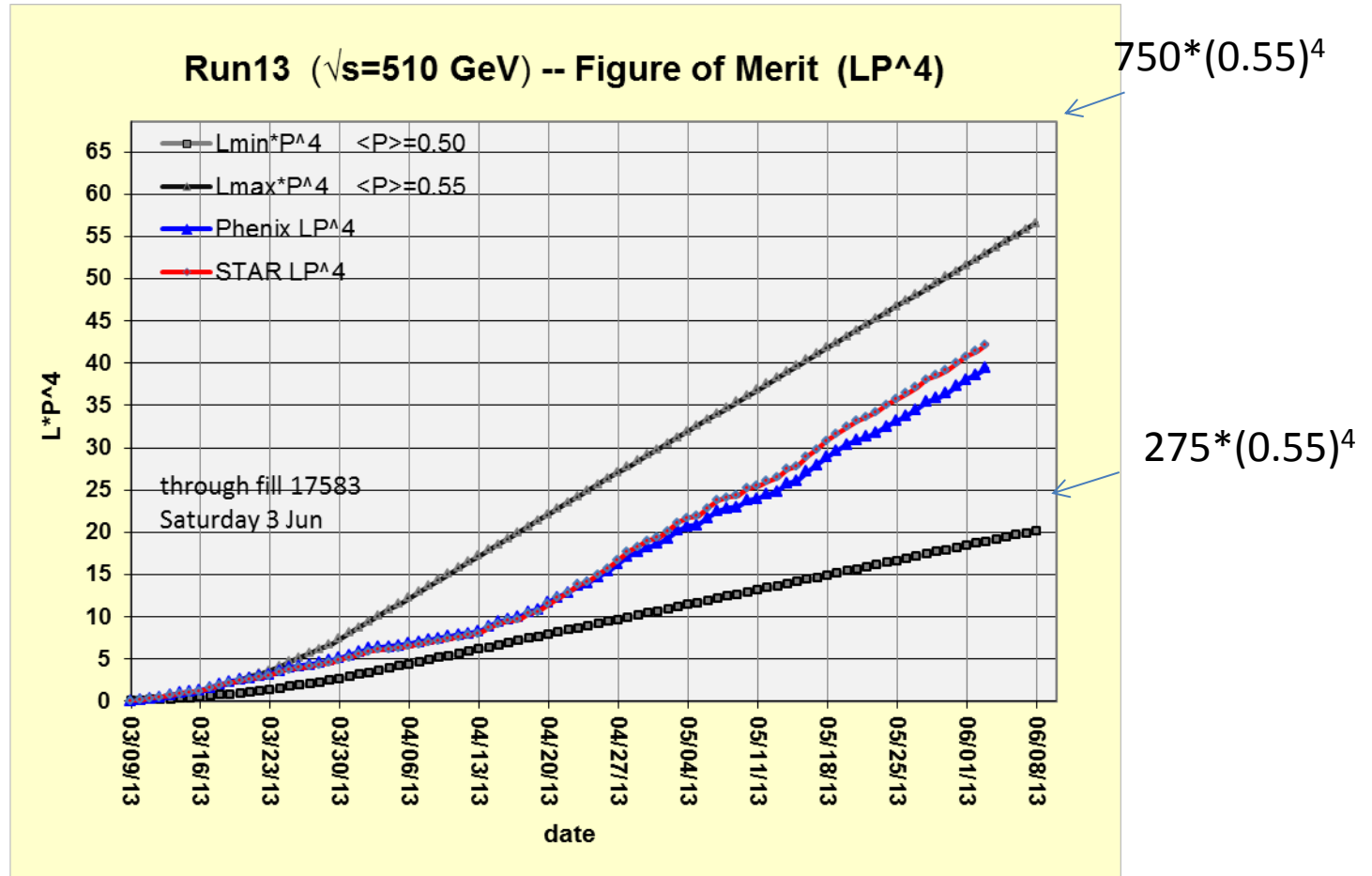


Preliminary, with Run 13 cross sections, PHENIX and STAR log based singles correction



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

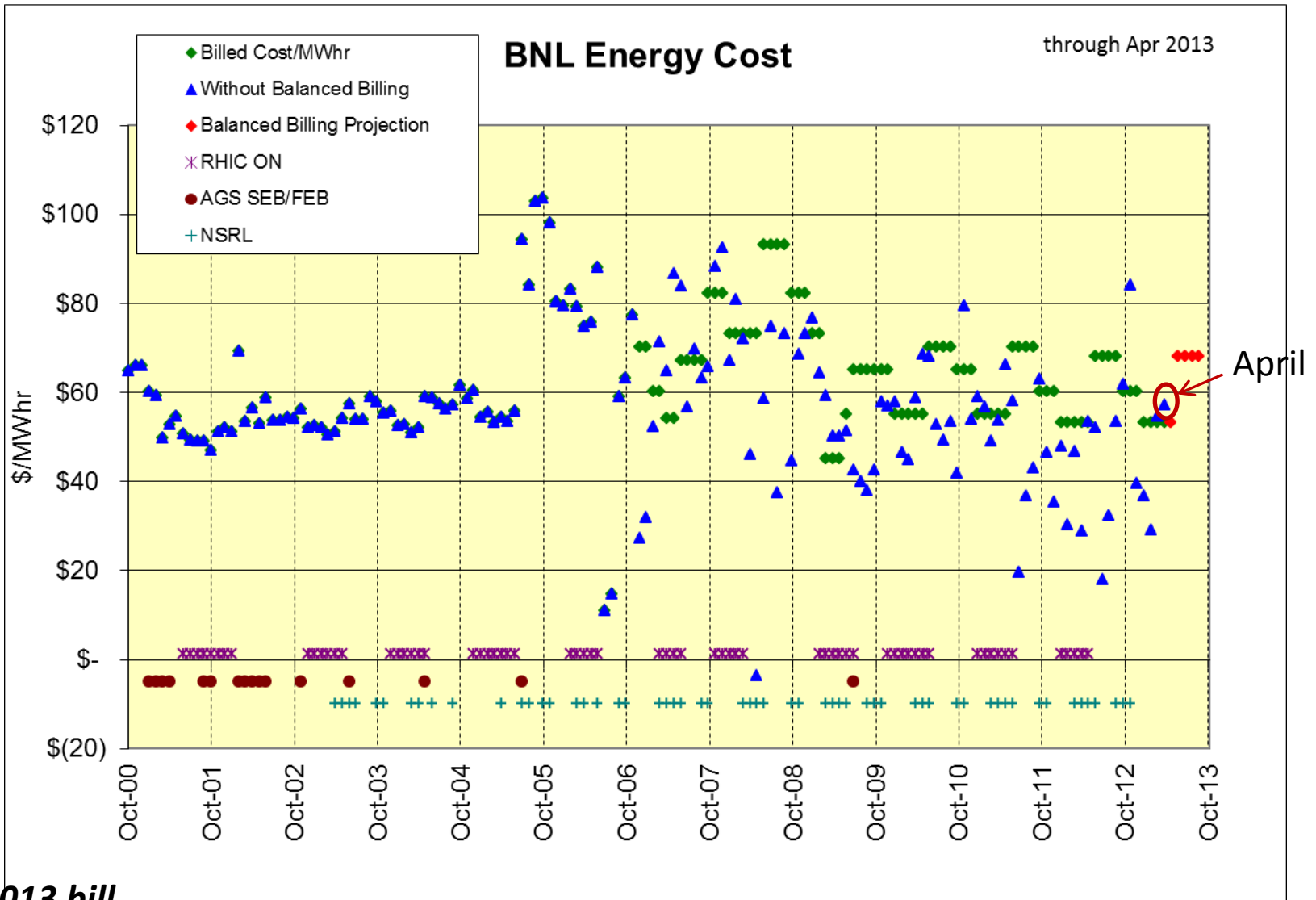
Preliminary, with Run 13 cross sections, PHENIX and STAR log based singles correction



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

Additional Information

+\$962,930K in BNL bank through Mar 2013 (~half should come back to CAD)

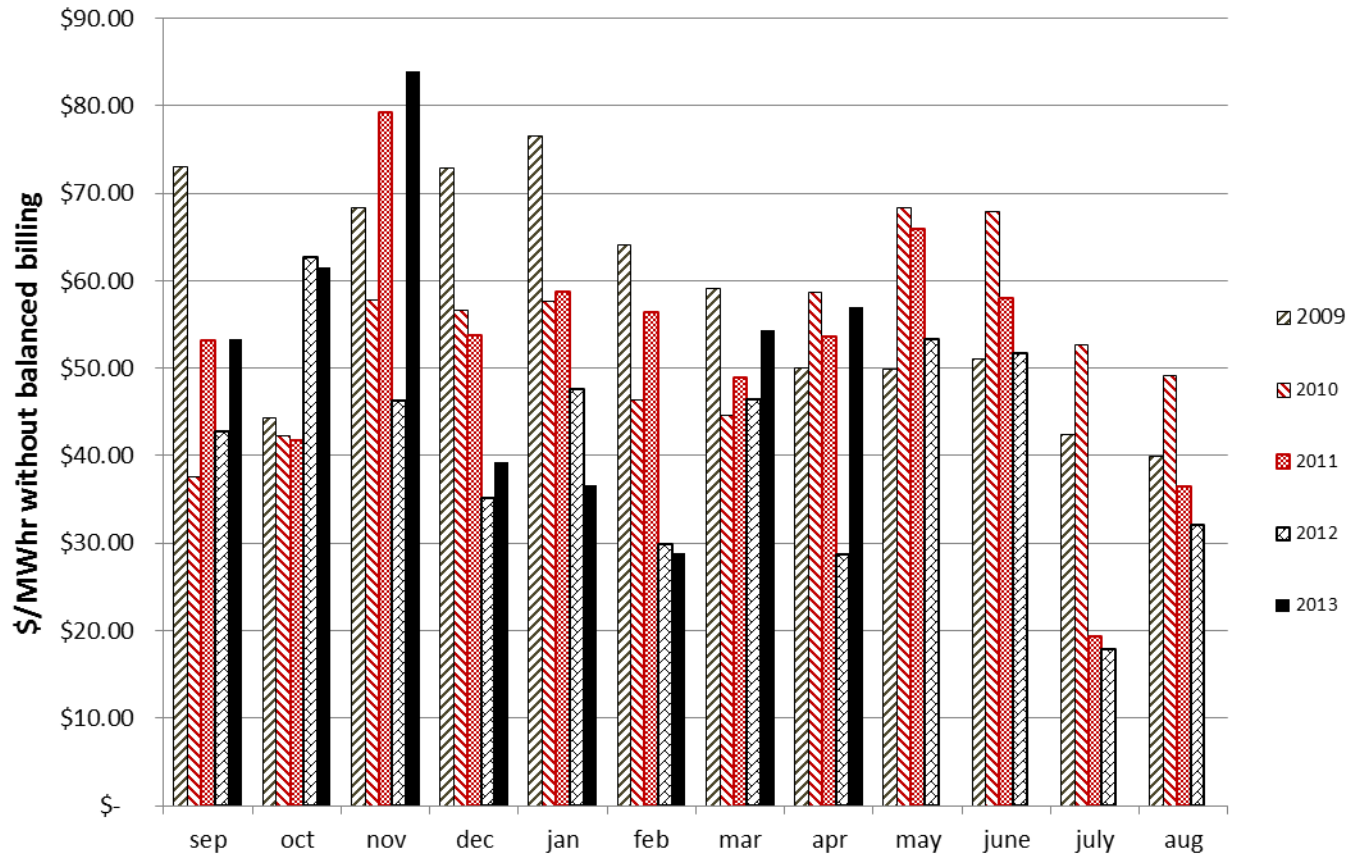


Apr 2013 bill

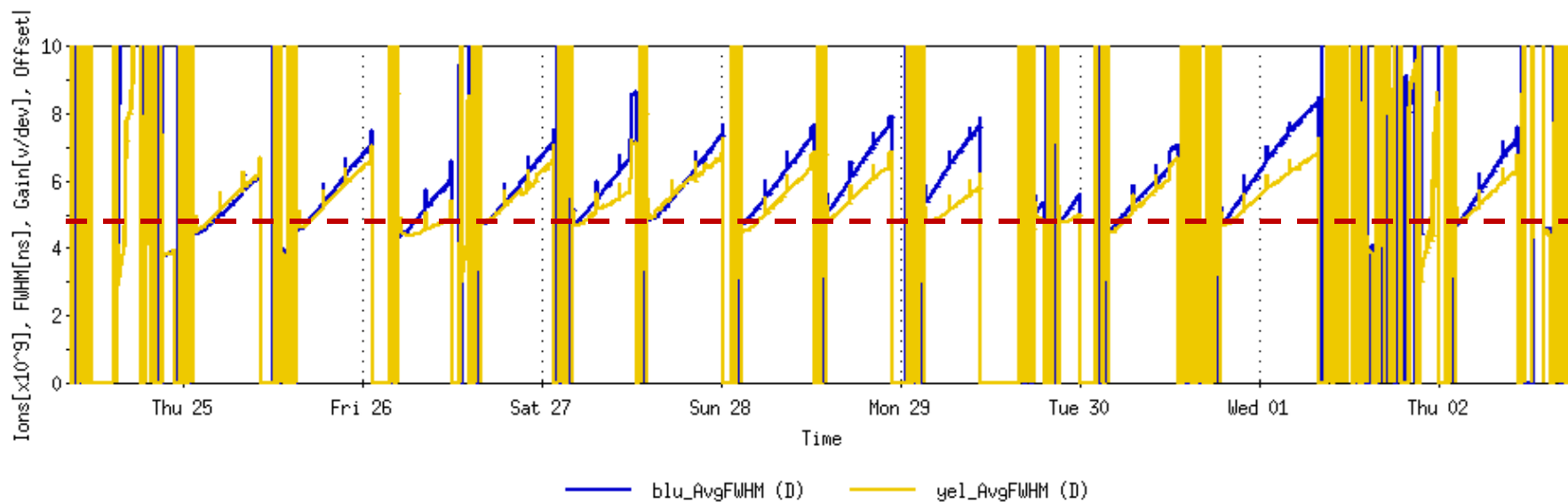
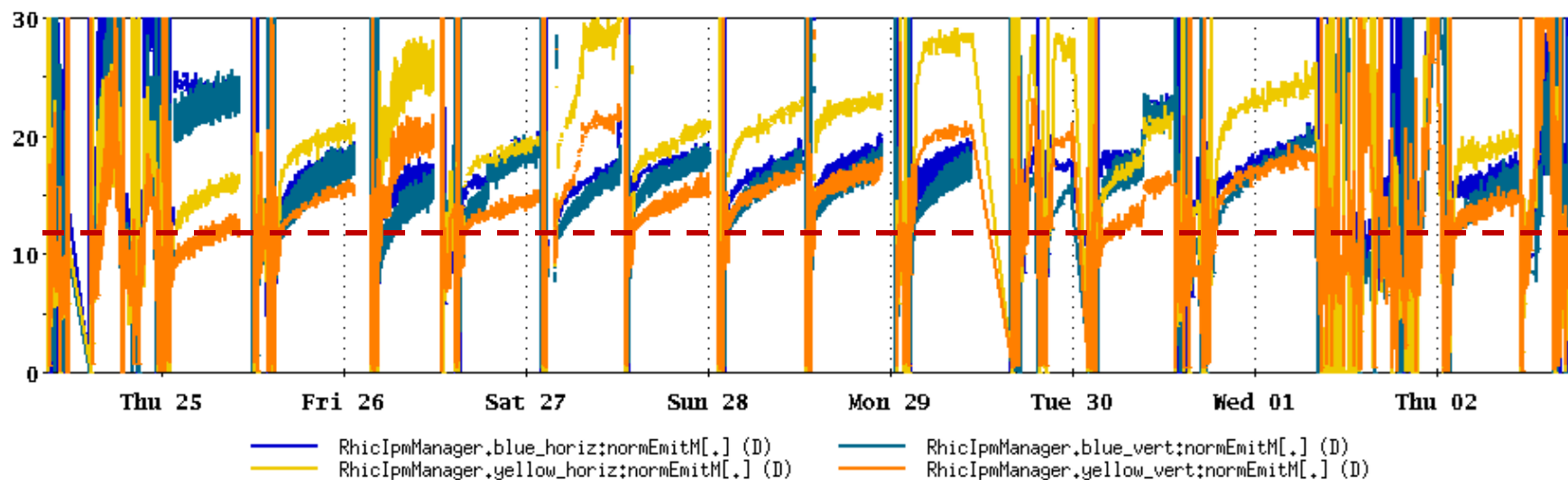
\$56.92 actual

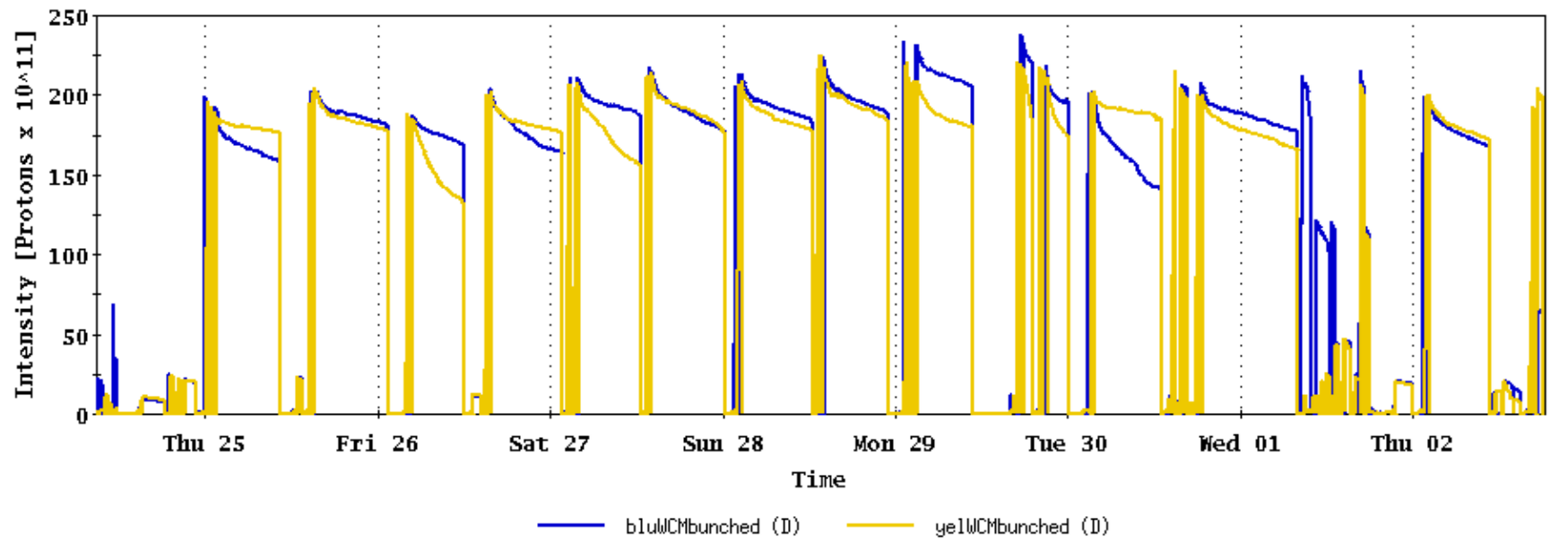
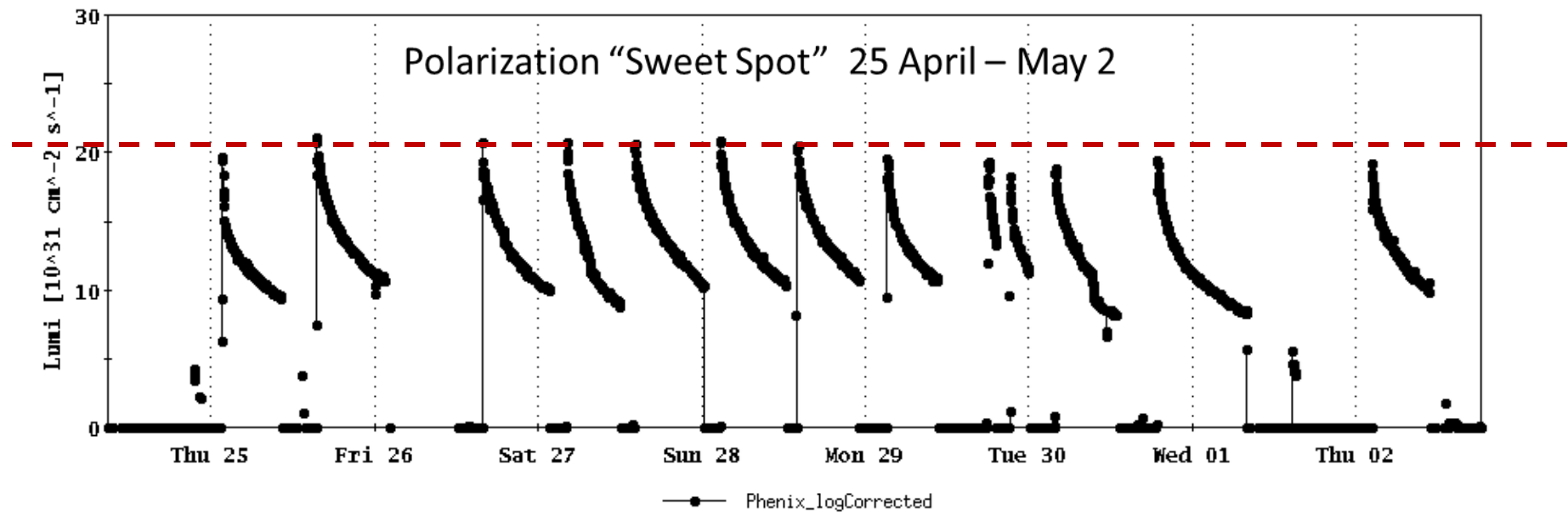
billed at \$53/Mwhr

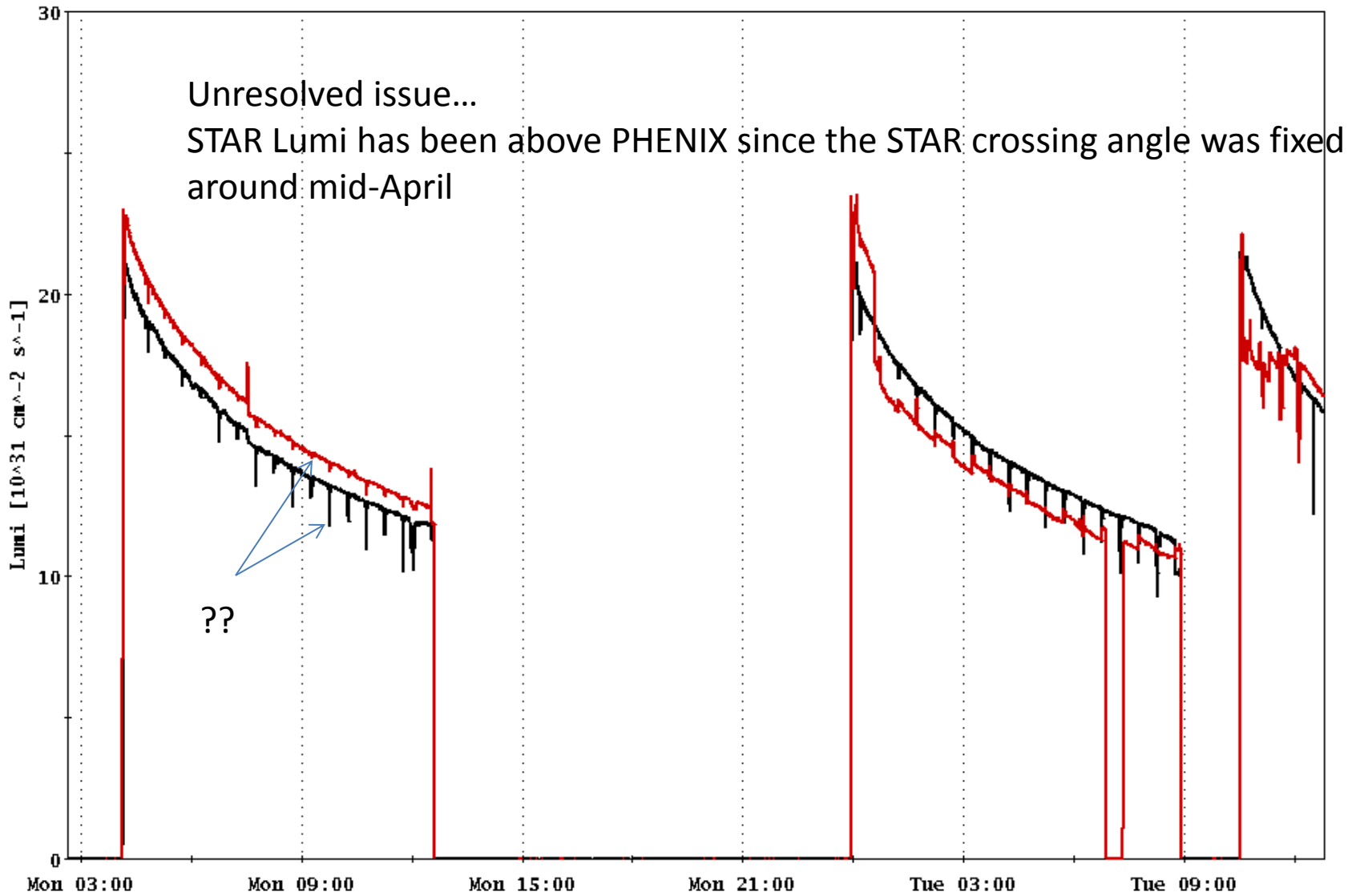
BNL Electricity Cost



Polarization "Sweet Spot" 25 April – May 2

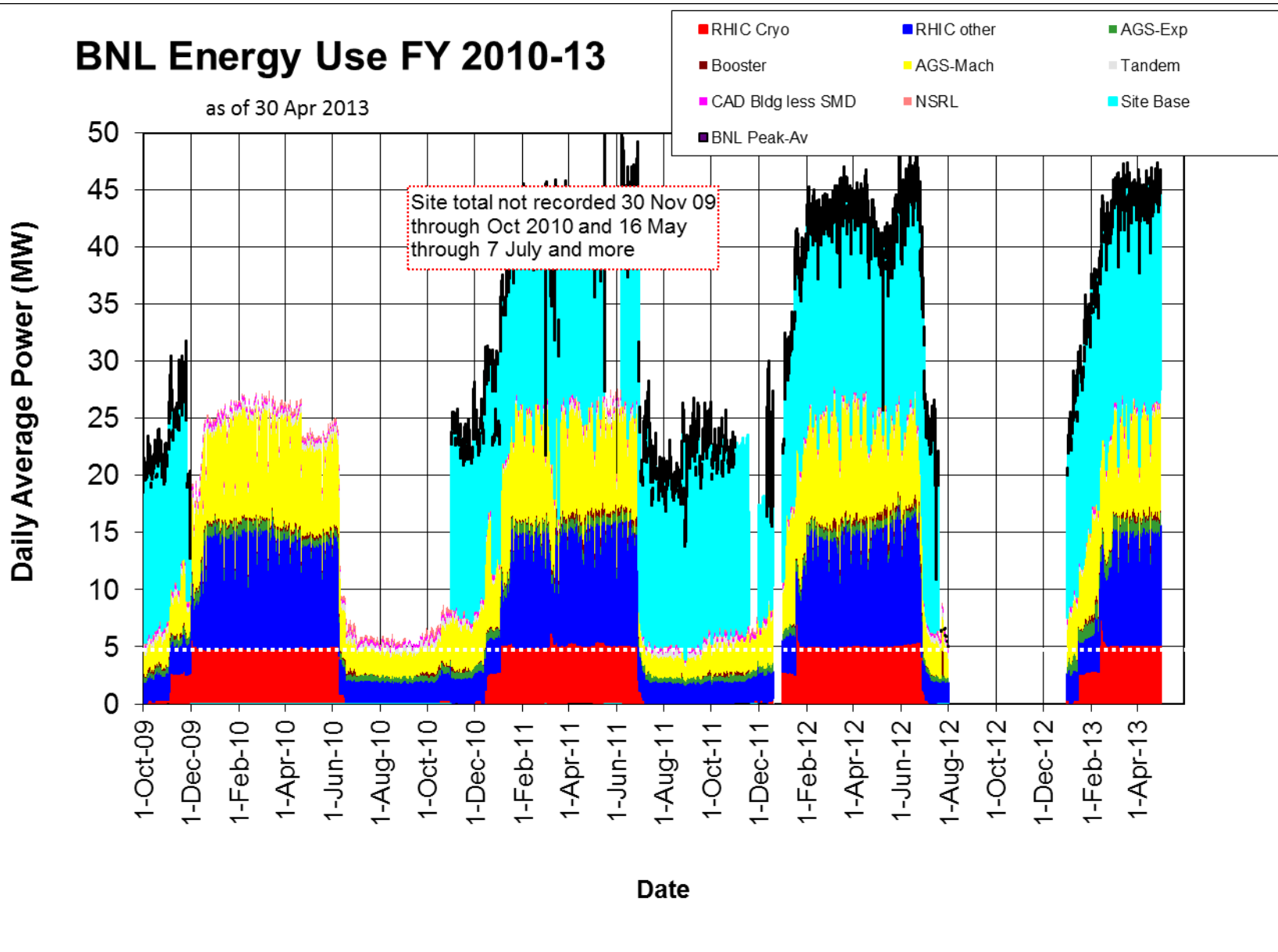






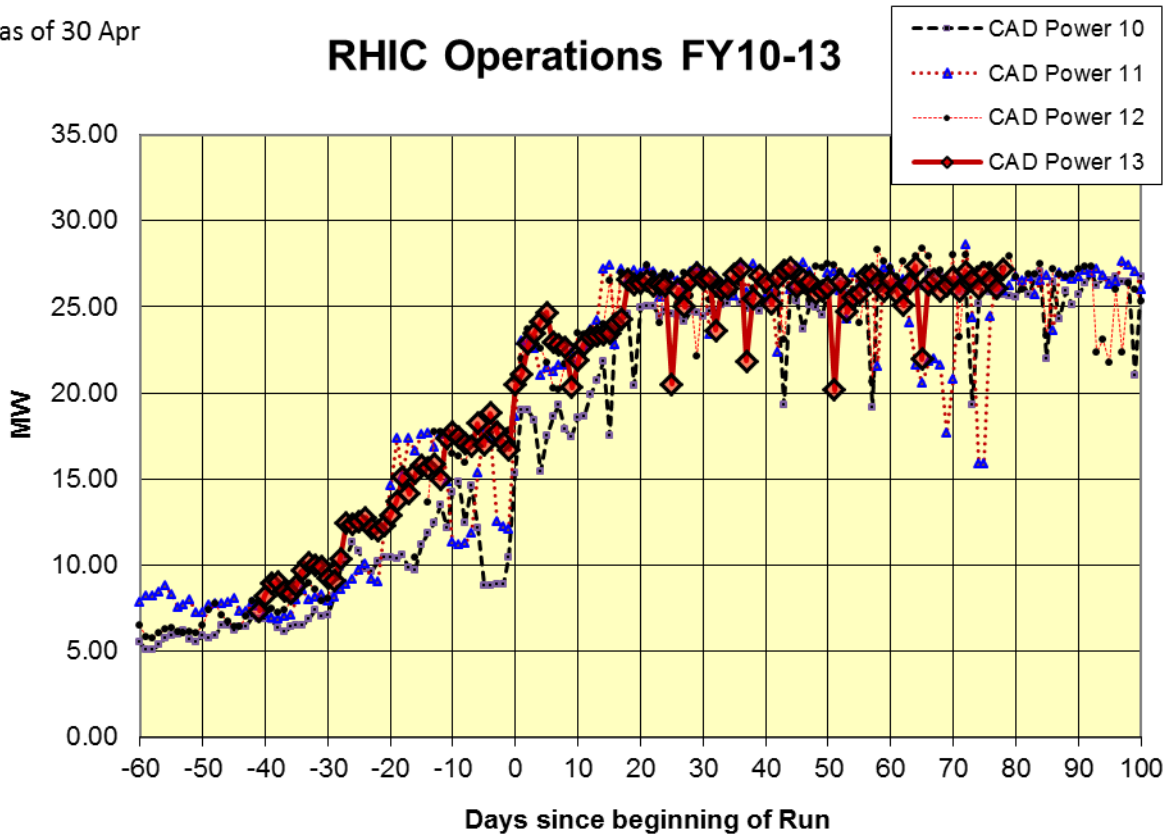
BNL Energy Use FY 2010-13

as of 30 Apr 2013



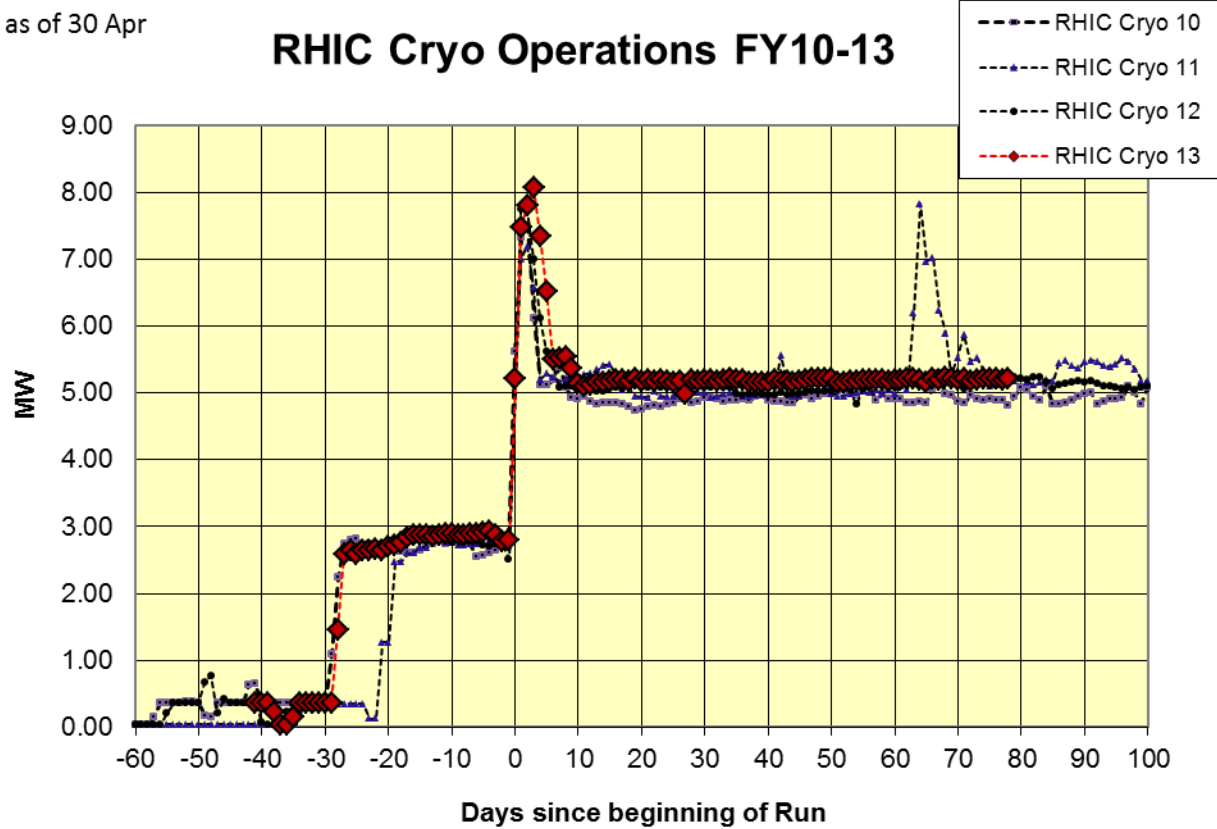
as of 30 Apr

RHIC Operations FY10-13



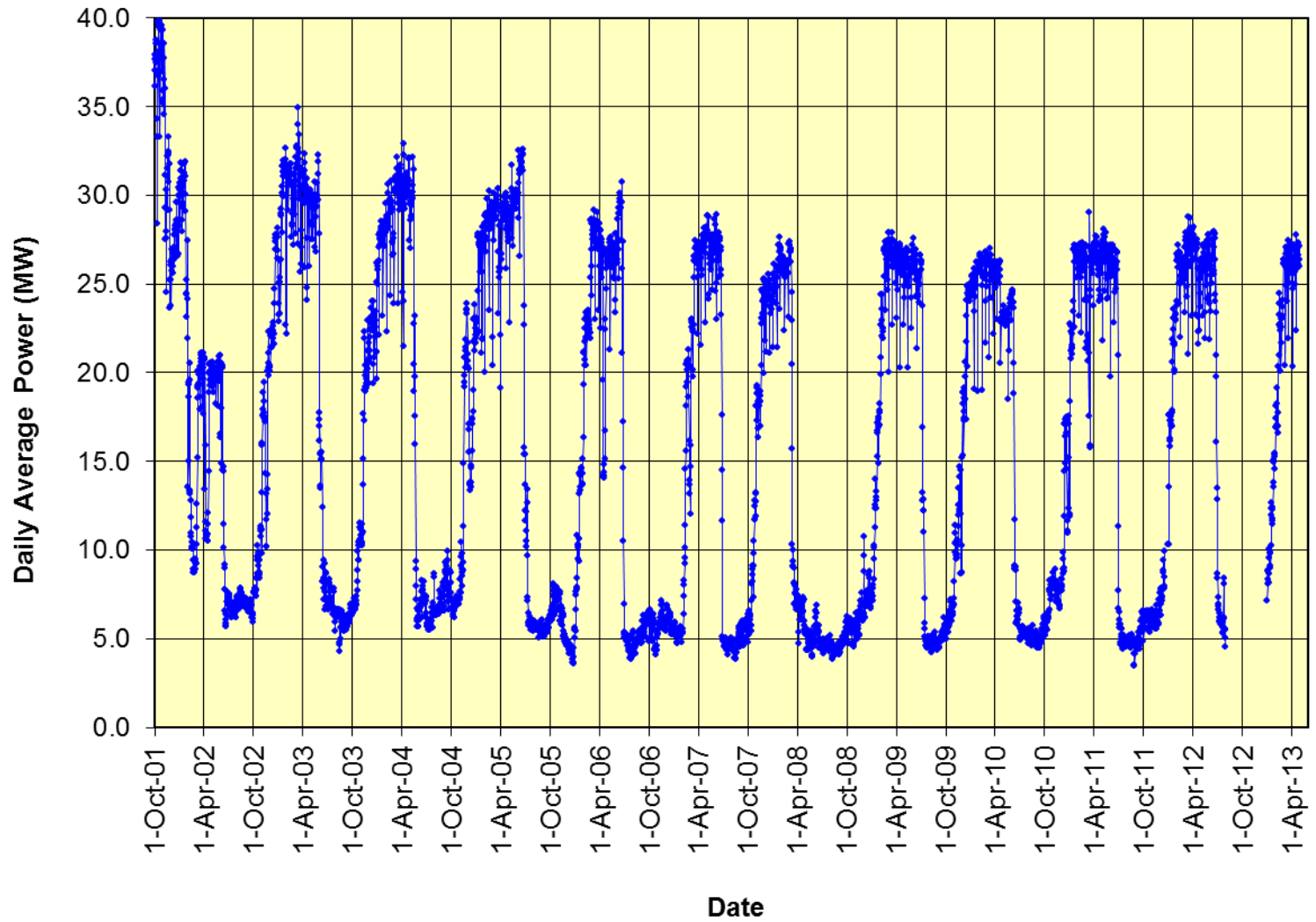
as of 30 Apr

RHIC Cryo Operations FY10-13






as of 31 Apr 2013

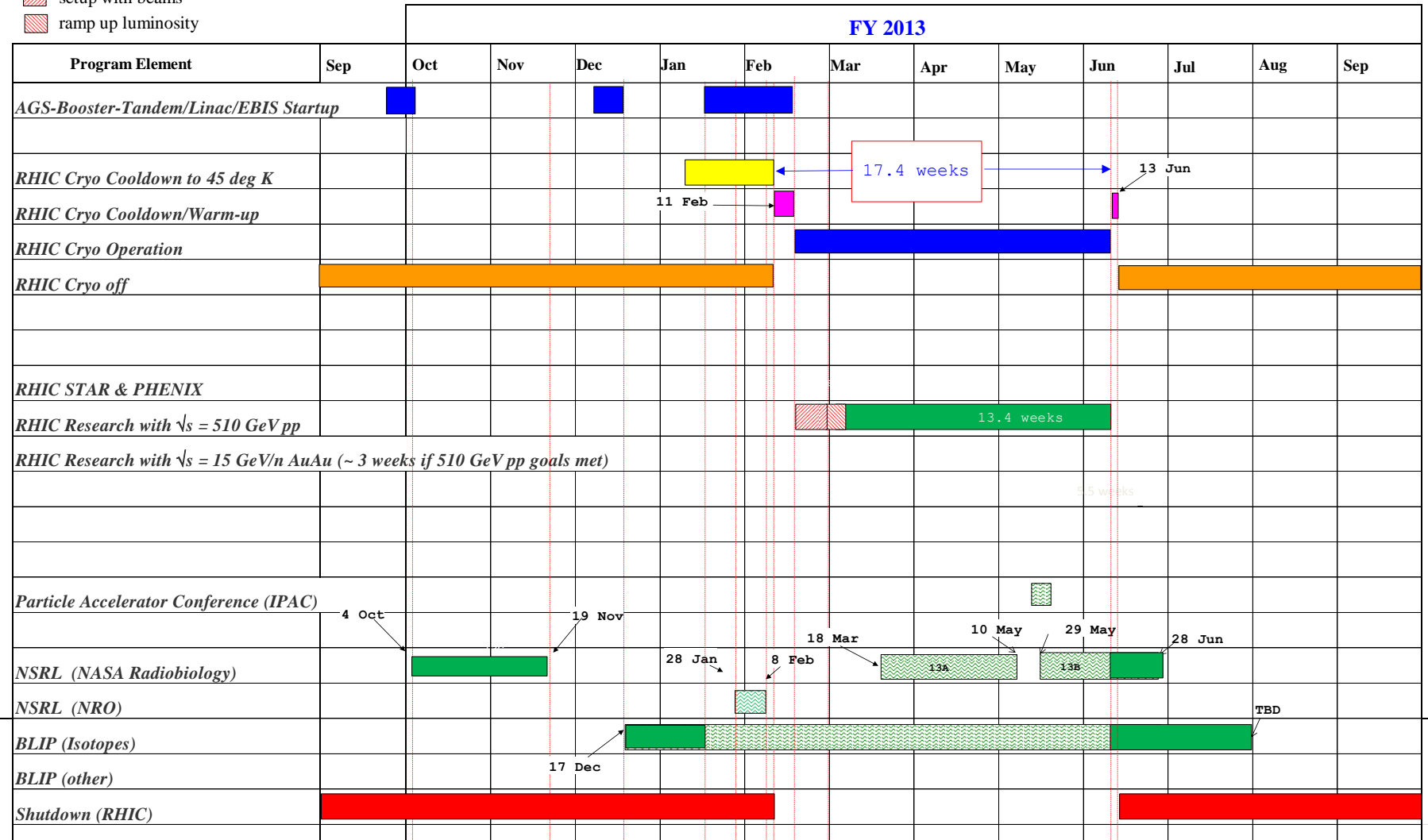
C-AD Energy Use FY 2002-13

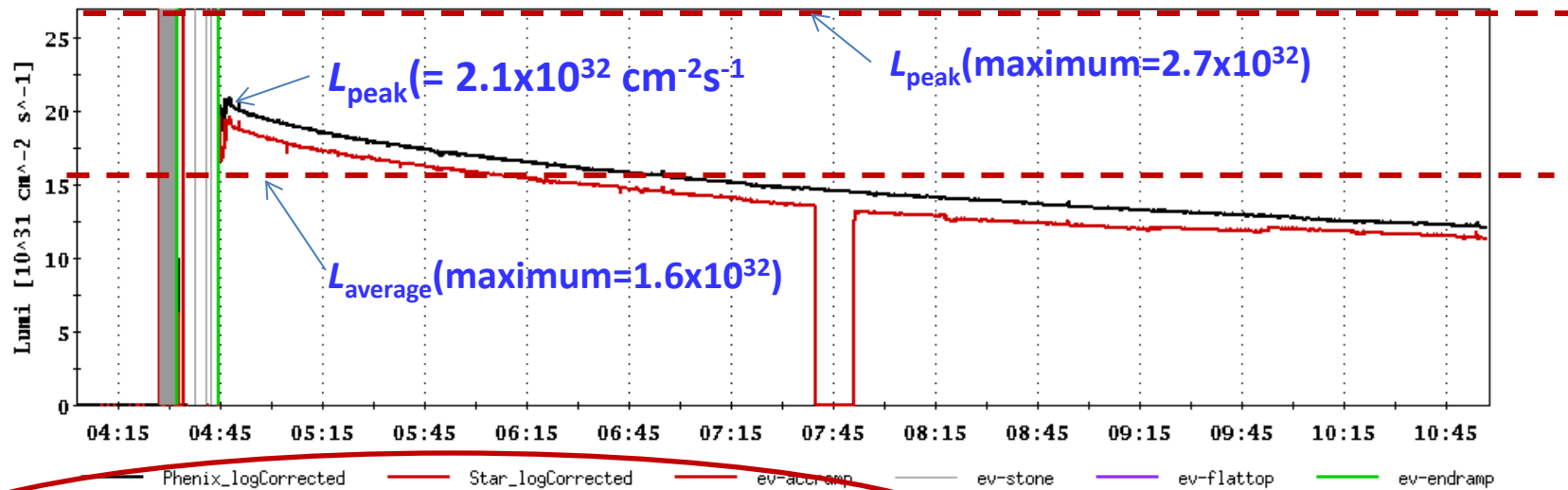
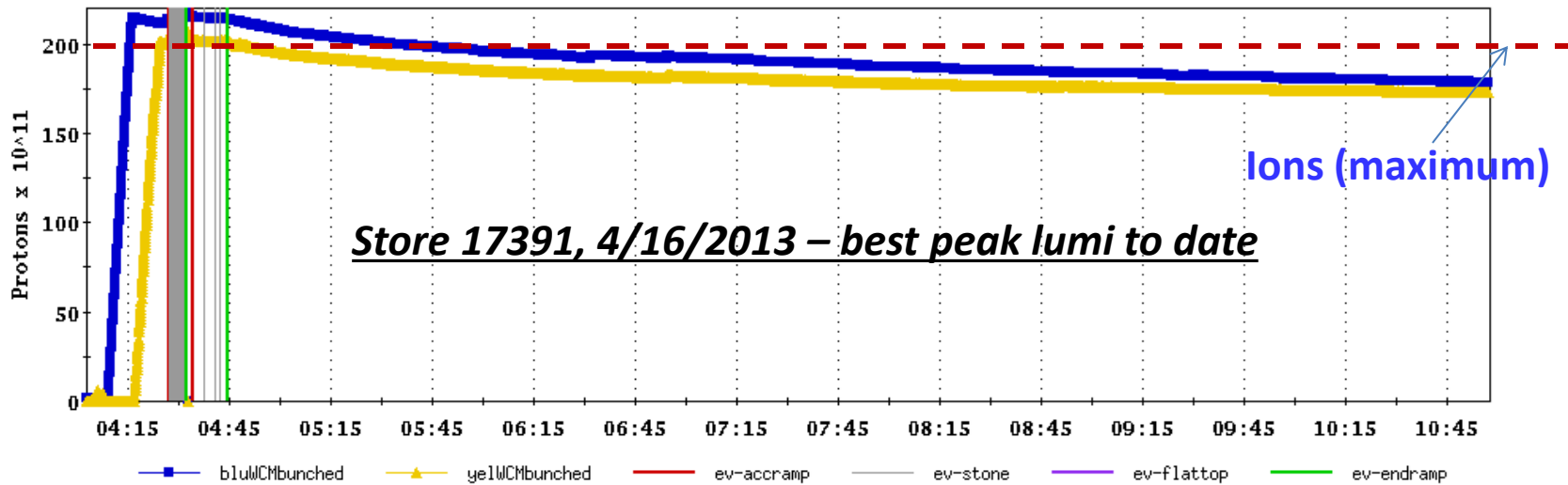


C-A Operations-FY13

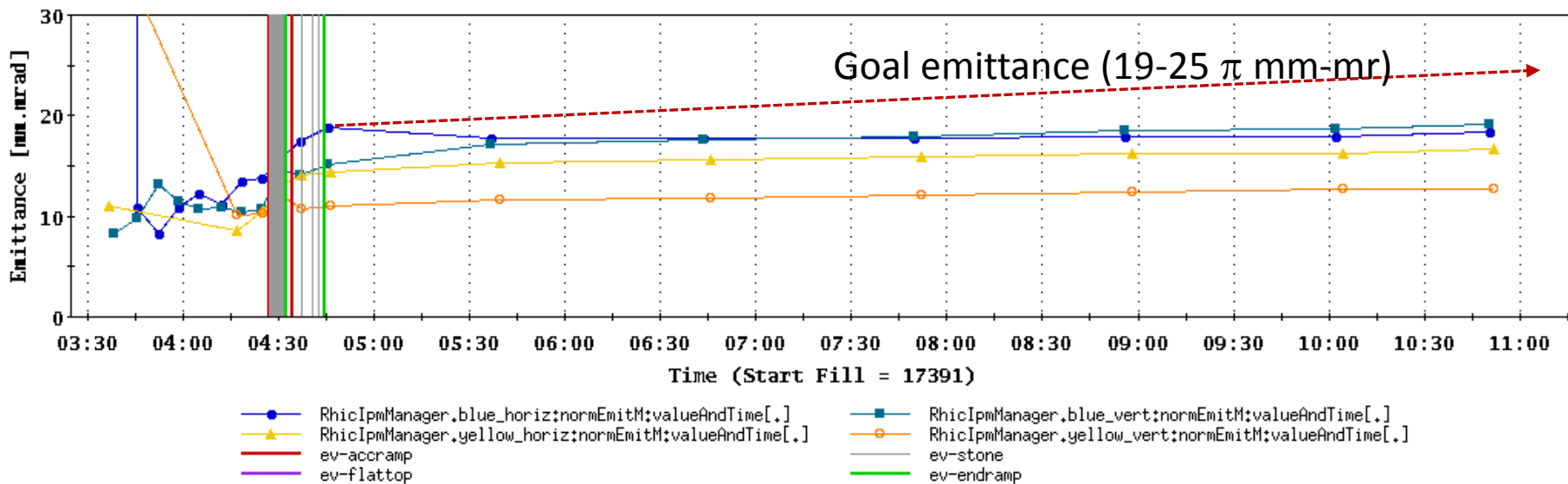
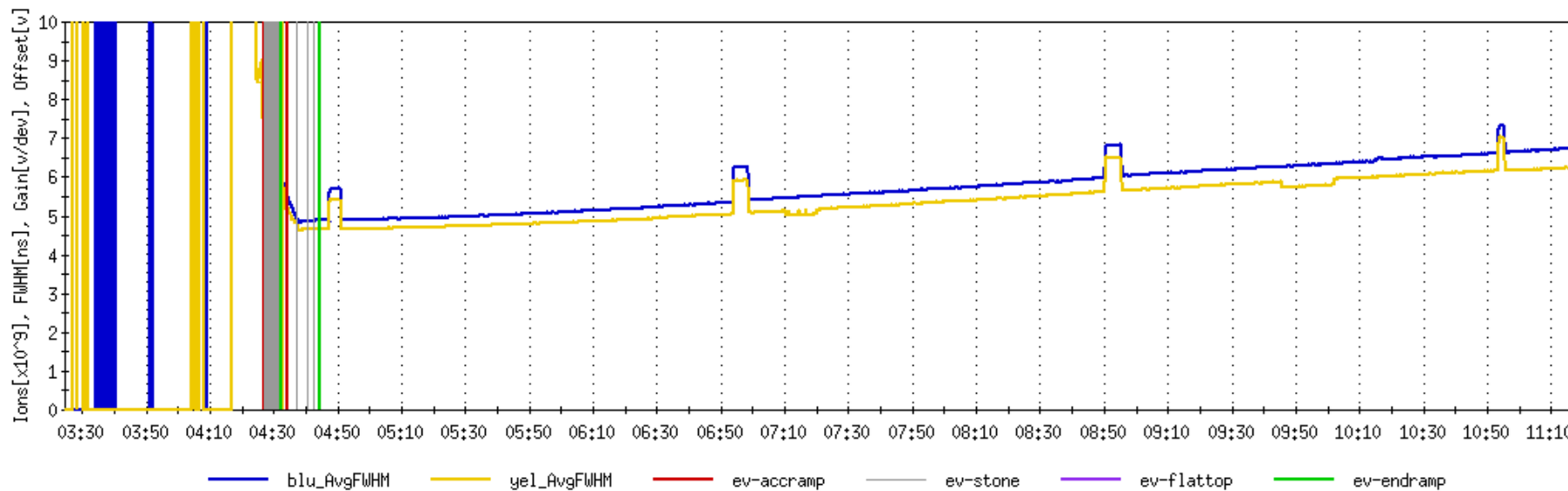
planned, budget permitting

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





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

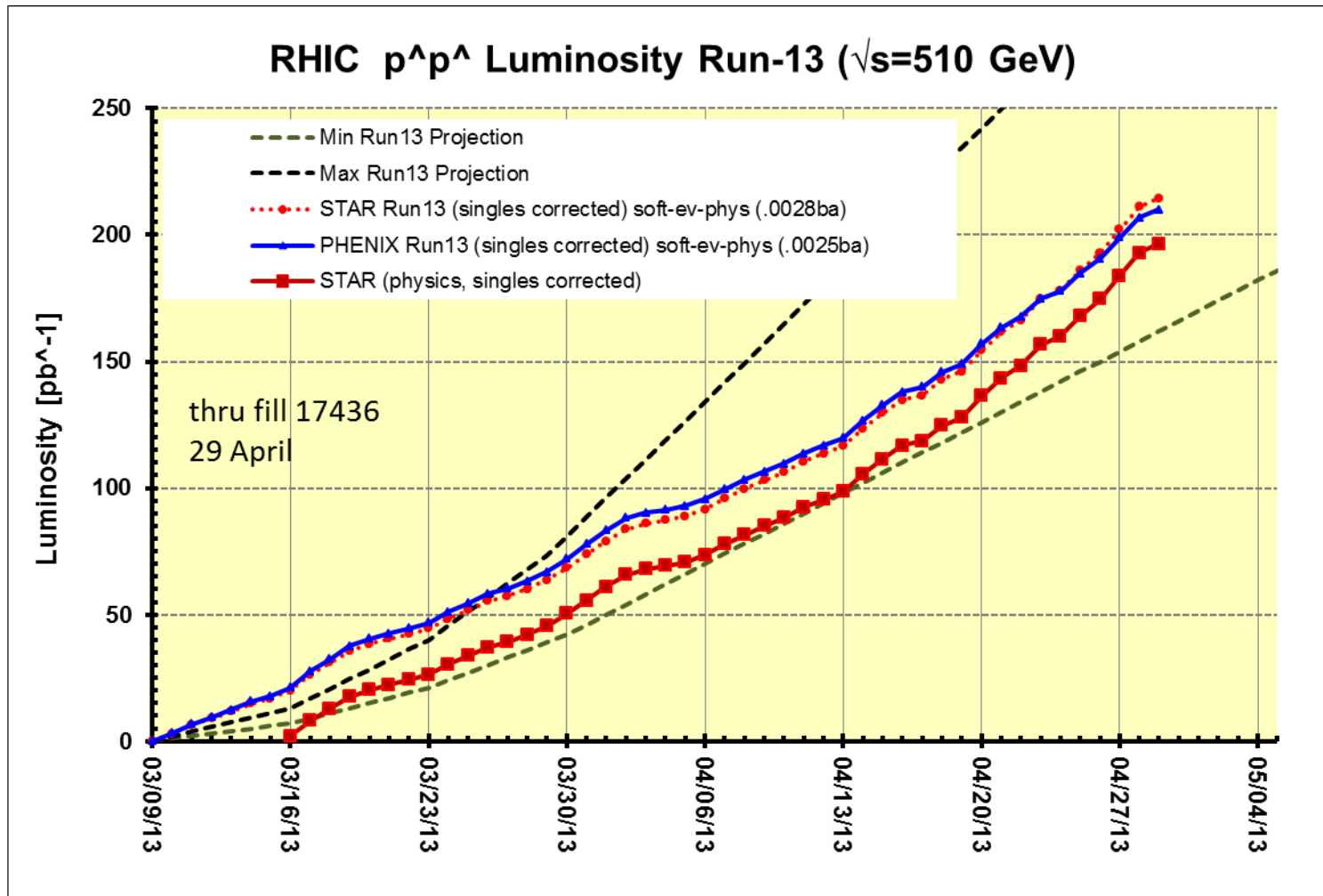
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- ✓ 26 Feb, first collisions
- ✓ 15 Feb -1 Mar, RHIC $\sqrt{s} = 510$ GeV pp machine setup
- ✓ 1-8 Mar, machine ramp-up with 8 hr/night for experiment setup
- ✓ 9 Mar (store 17201), begin $\sqrt{s} = 510$ GeV pp physics run

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

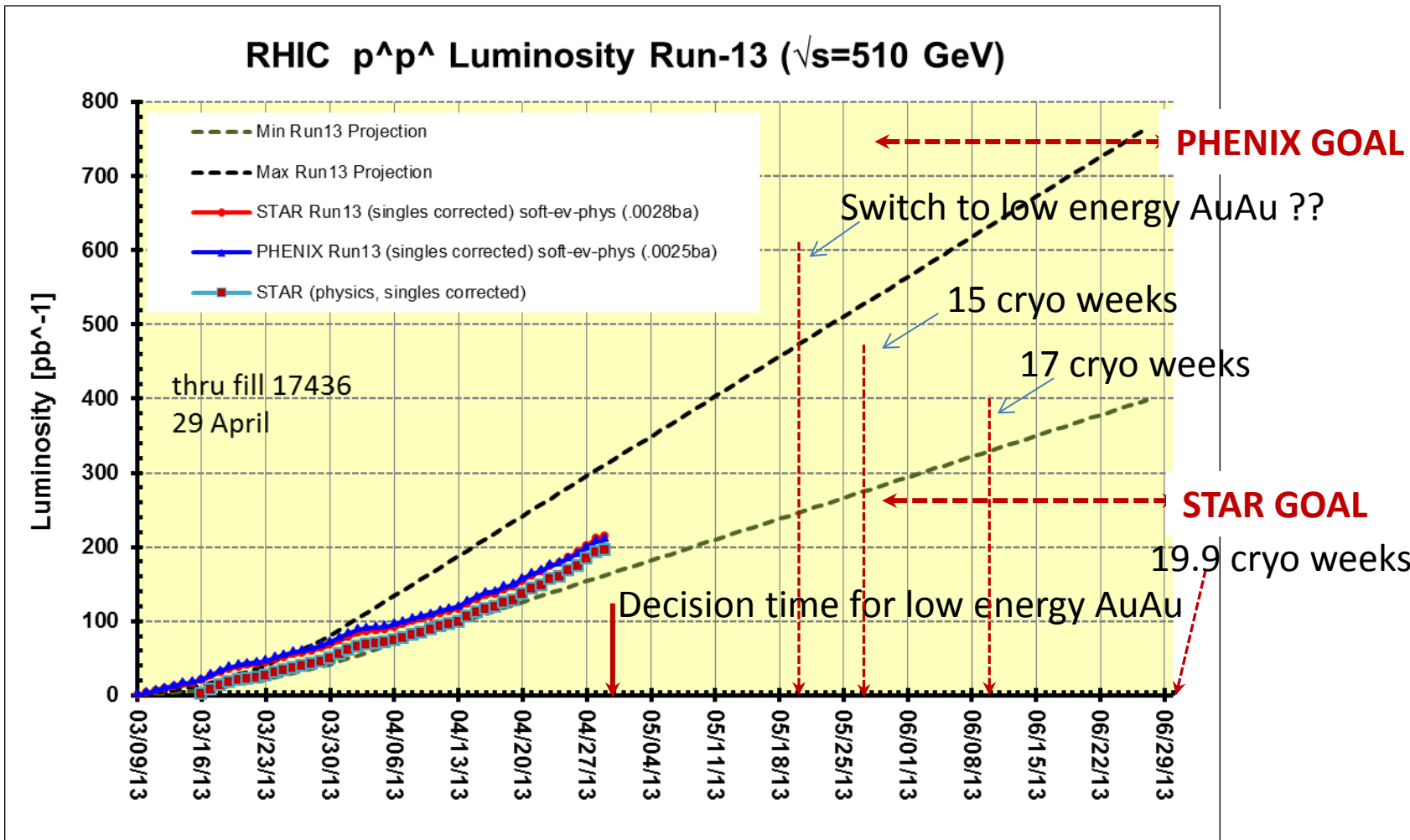
Preliminary, with Run 13 cross sections, PHENIX and STAR **log based singles correction**



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

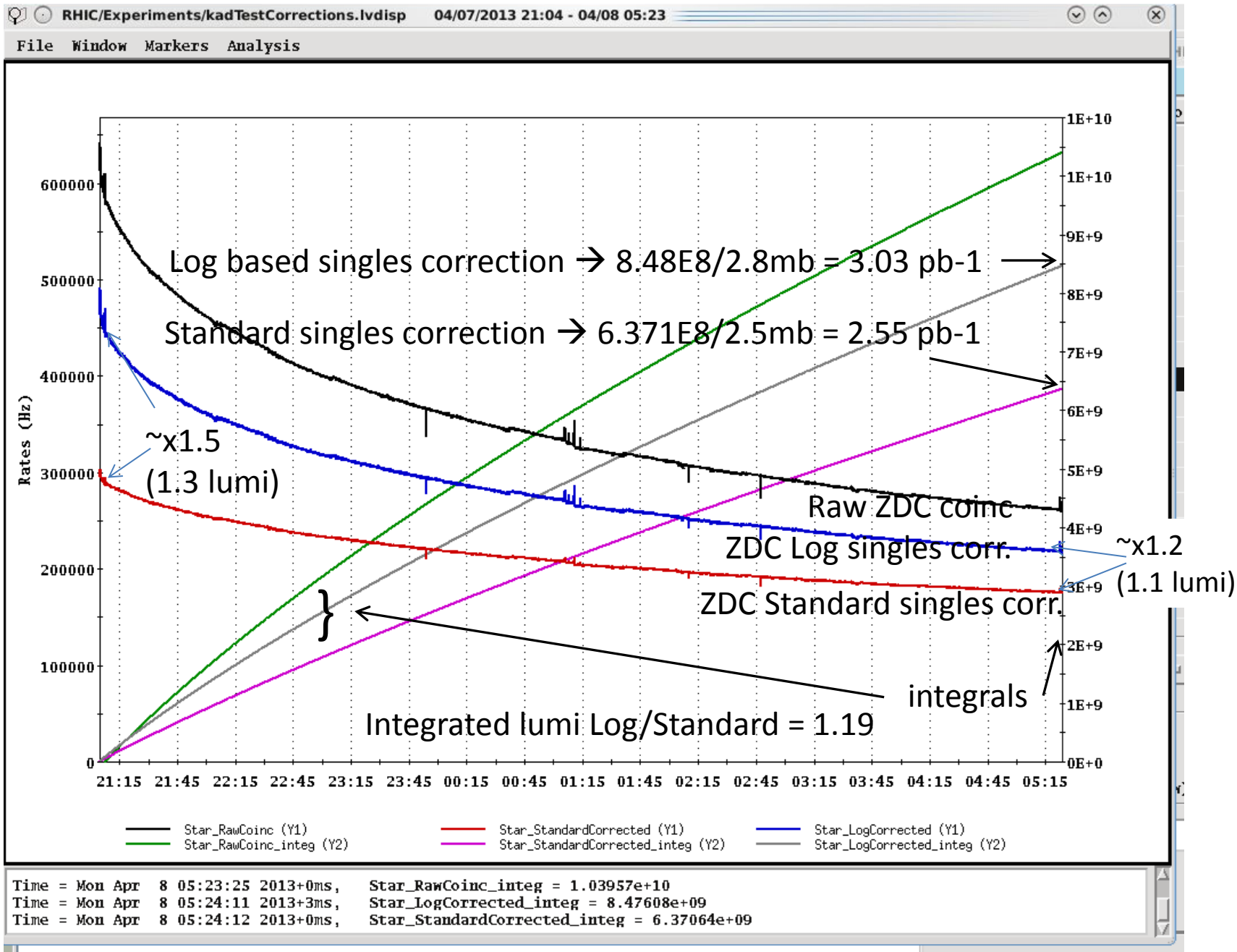
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STAR Goal, 165 pb⁻¹ recorded, 275 pb⁻¹ delivered, ≥ 55% polarization

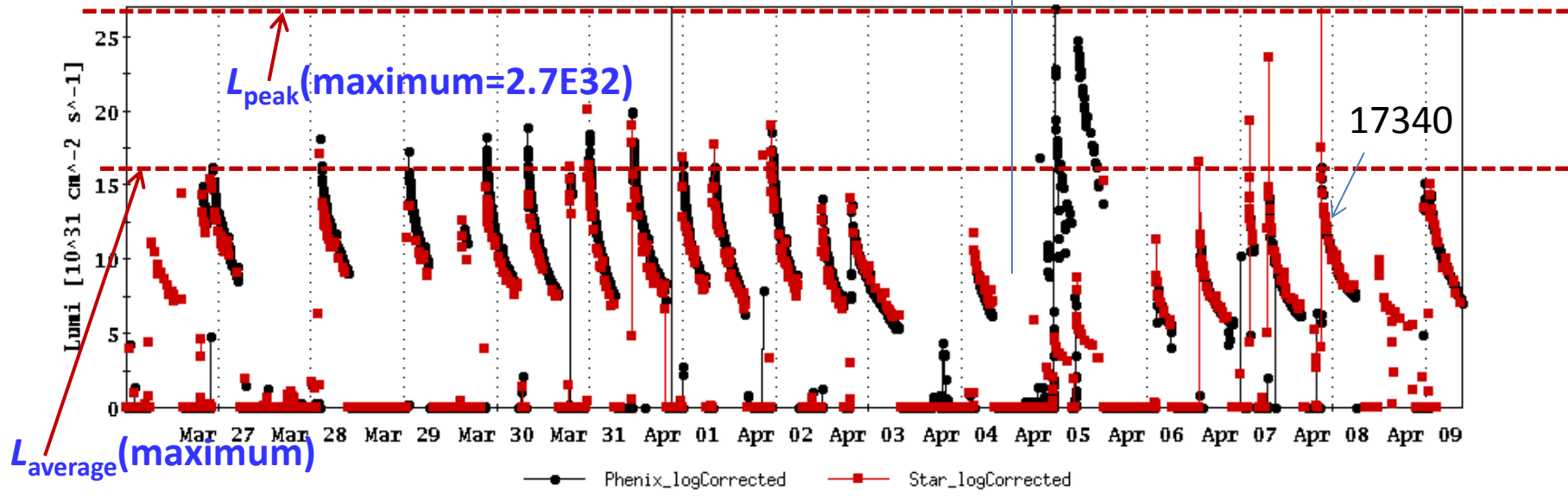


Preliminary, with Run 13 cross sections, singles corrected

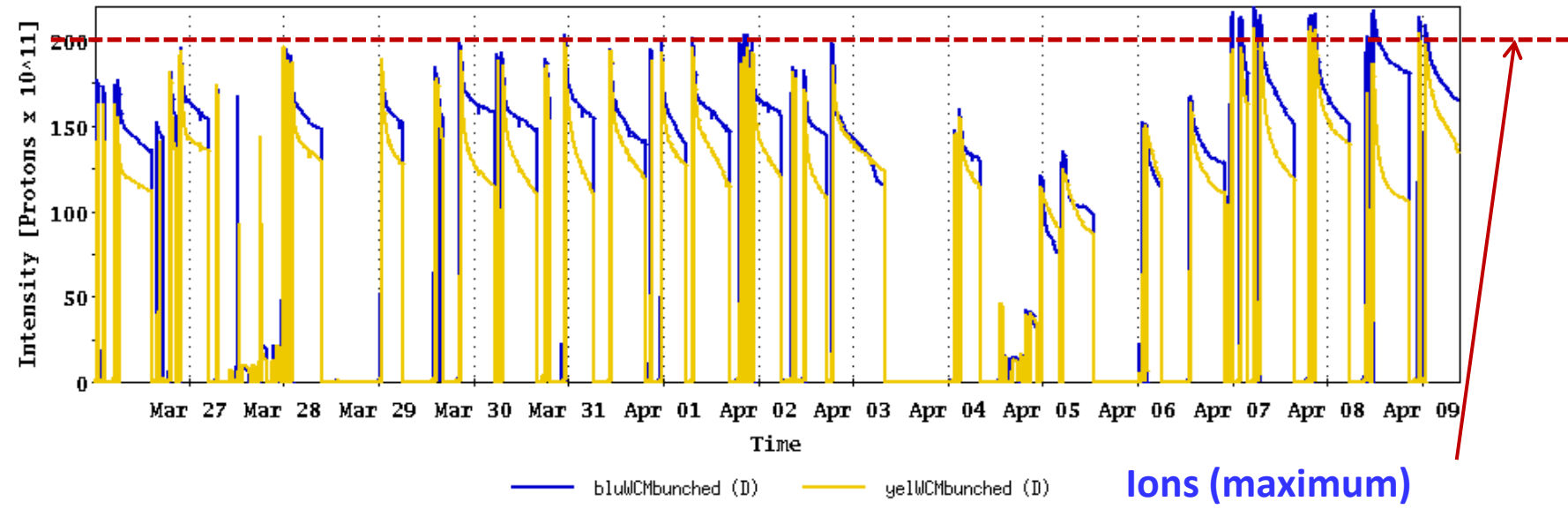
Example Store for STAR (17340) with "physics" time cuts



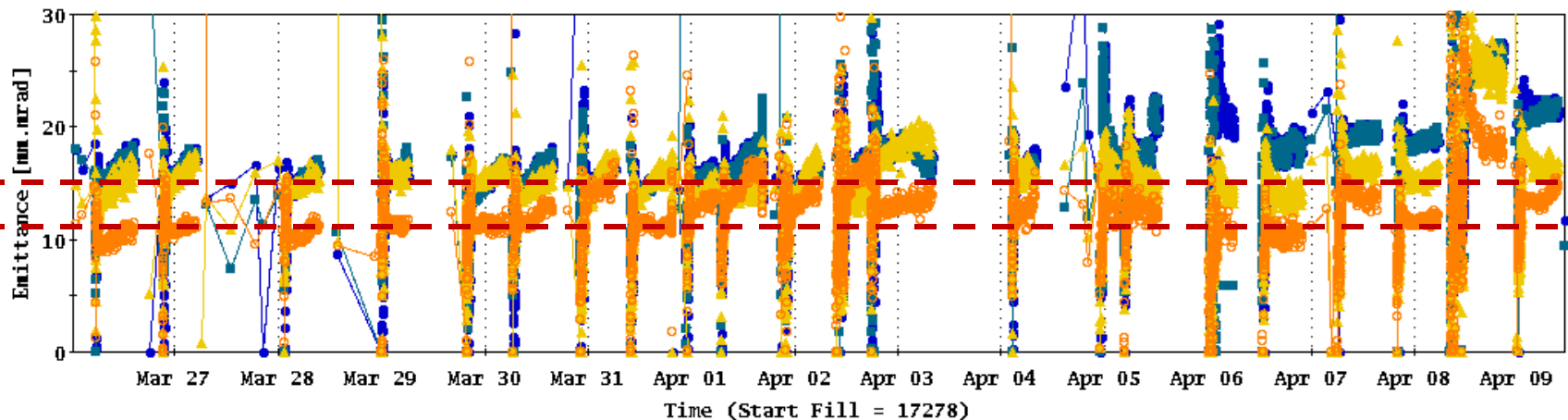
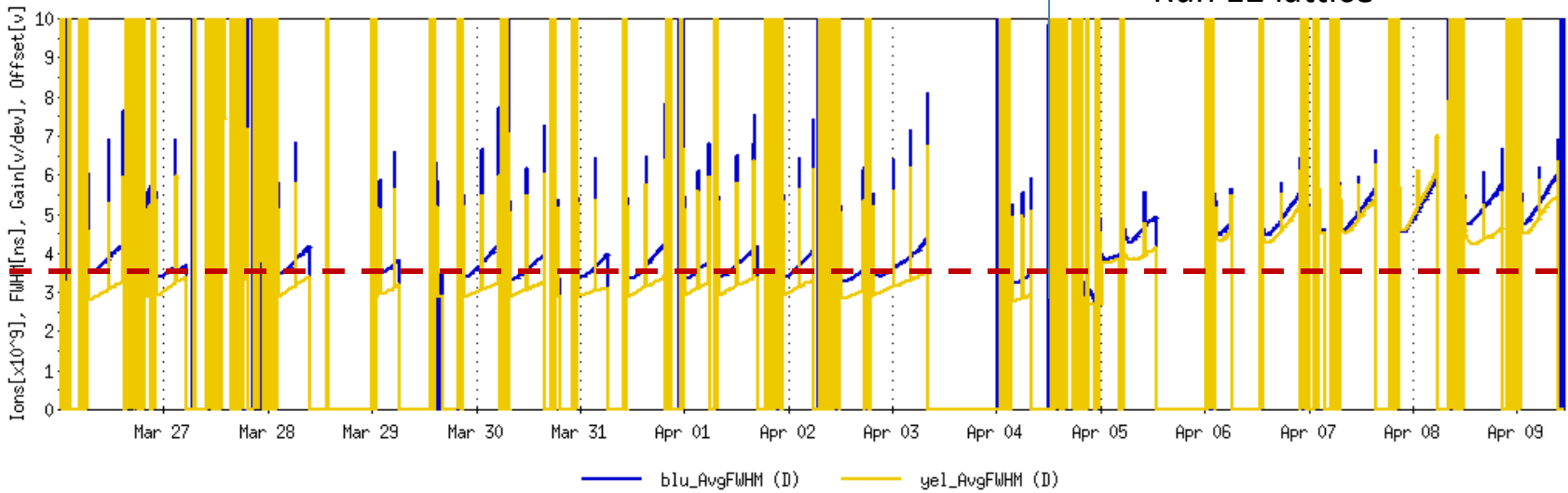
Physics stores



Using Run 13 cross sections with log based singles correction

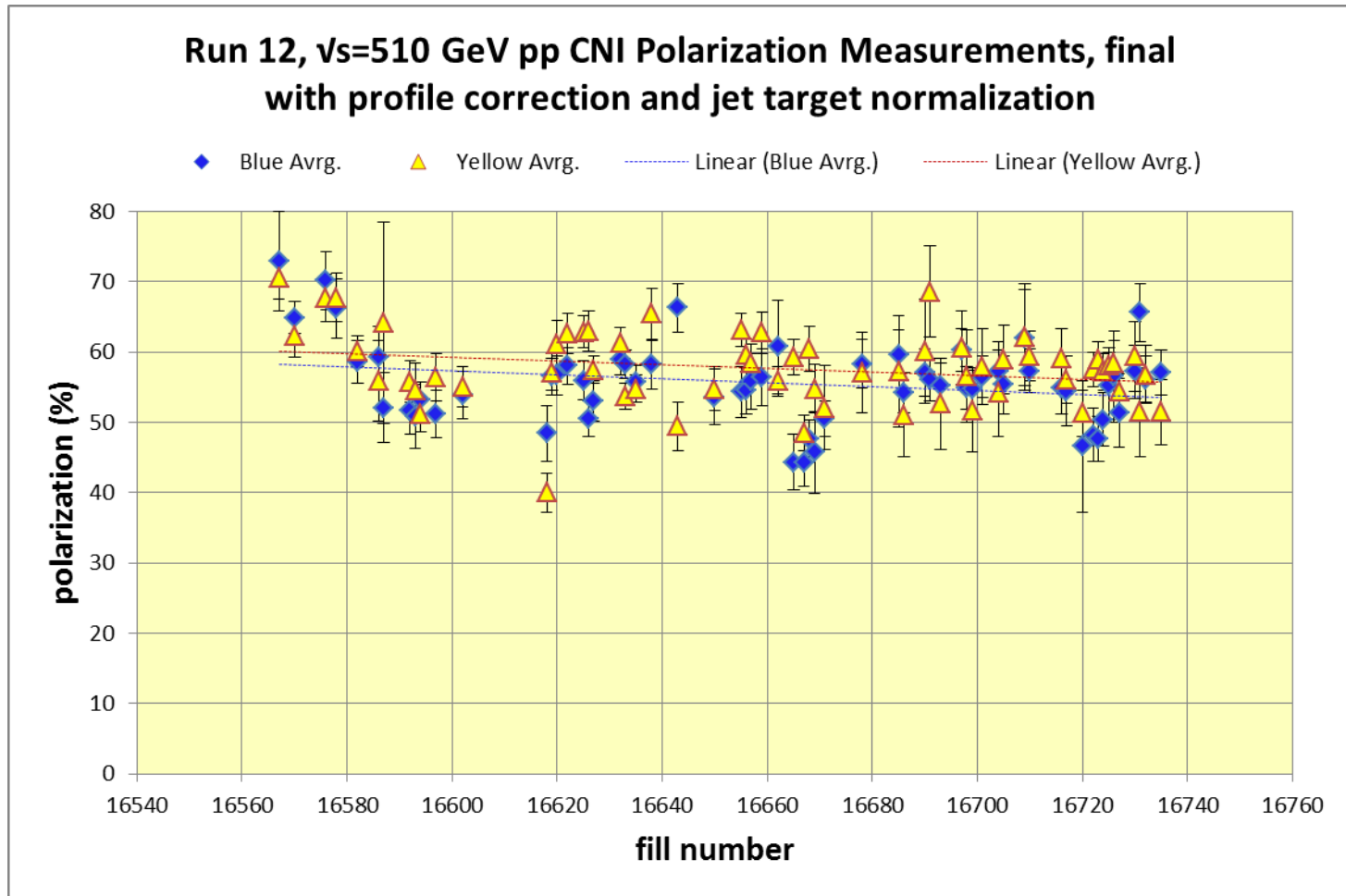


Past 2 Weeks



Yellow average = $48.12 \pm 0.4\%$

Blue average = $53.1 \pm 0.5\%$

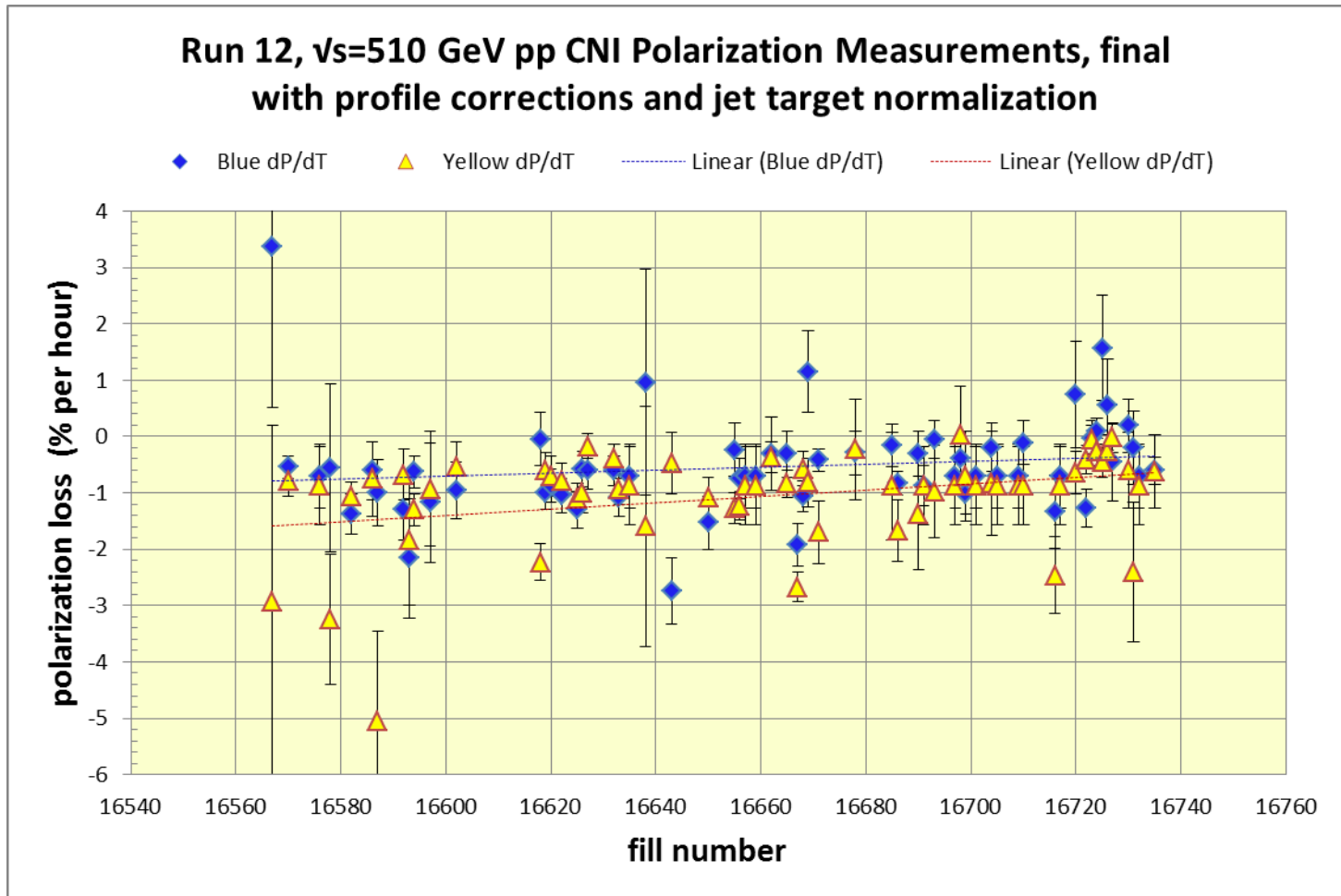


<http://www.phy.bnl.gov/cnipol/fills/>

Yellow average = $57.7 \pm 0.4\%$

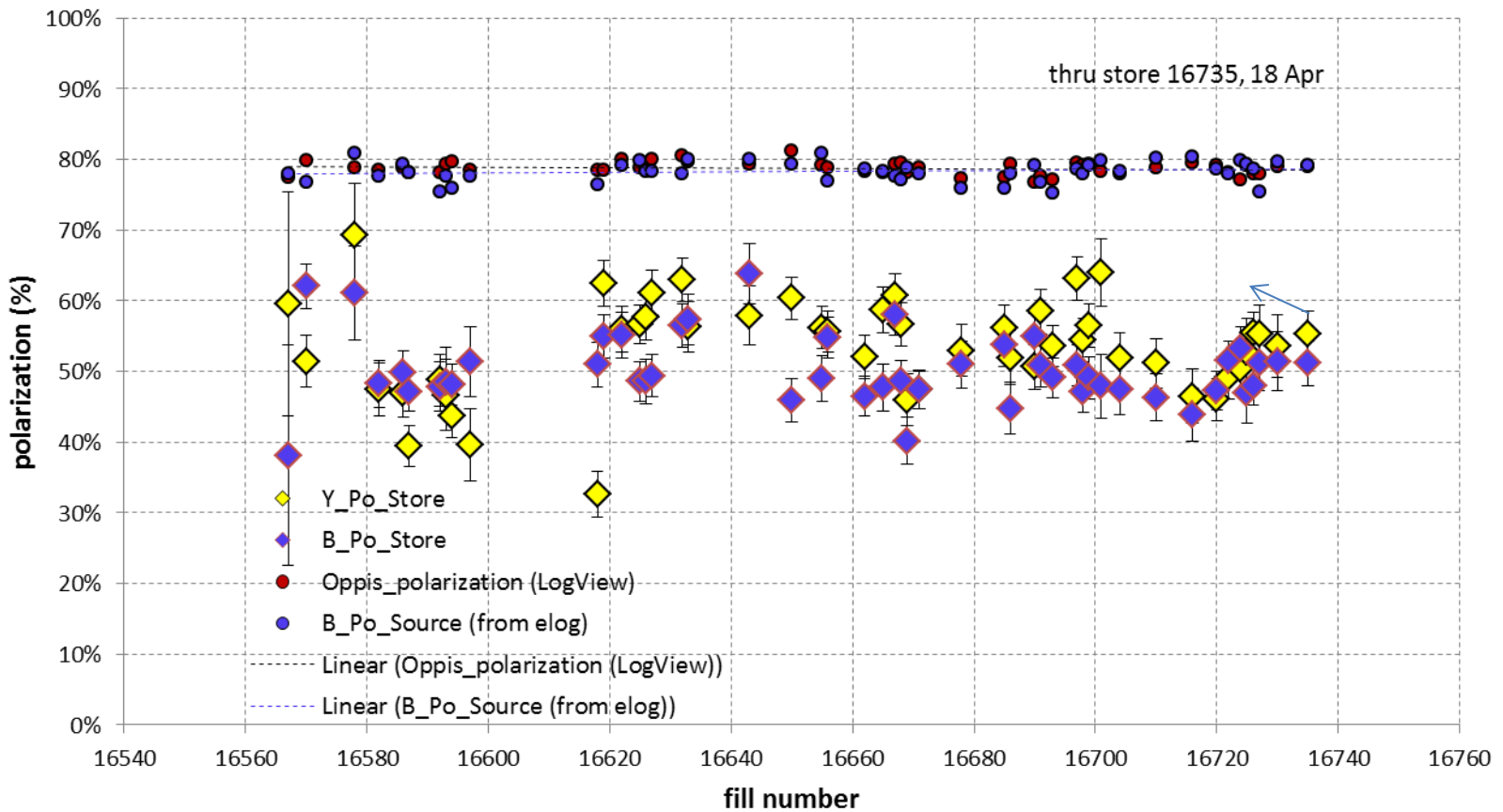
Blue average = $55.9 \pm 0.4\%$

Average = 56.8%



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

Run12 255 x 255 Gev pp Jet target Polarization final results



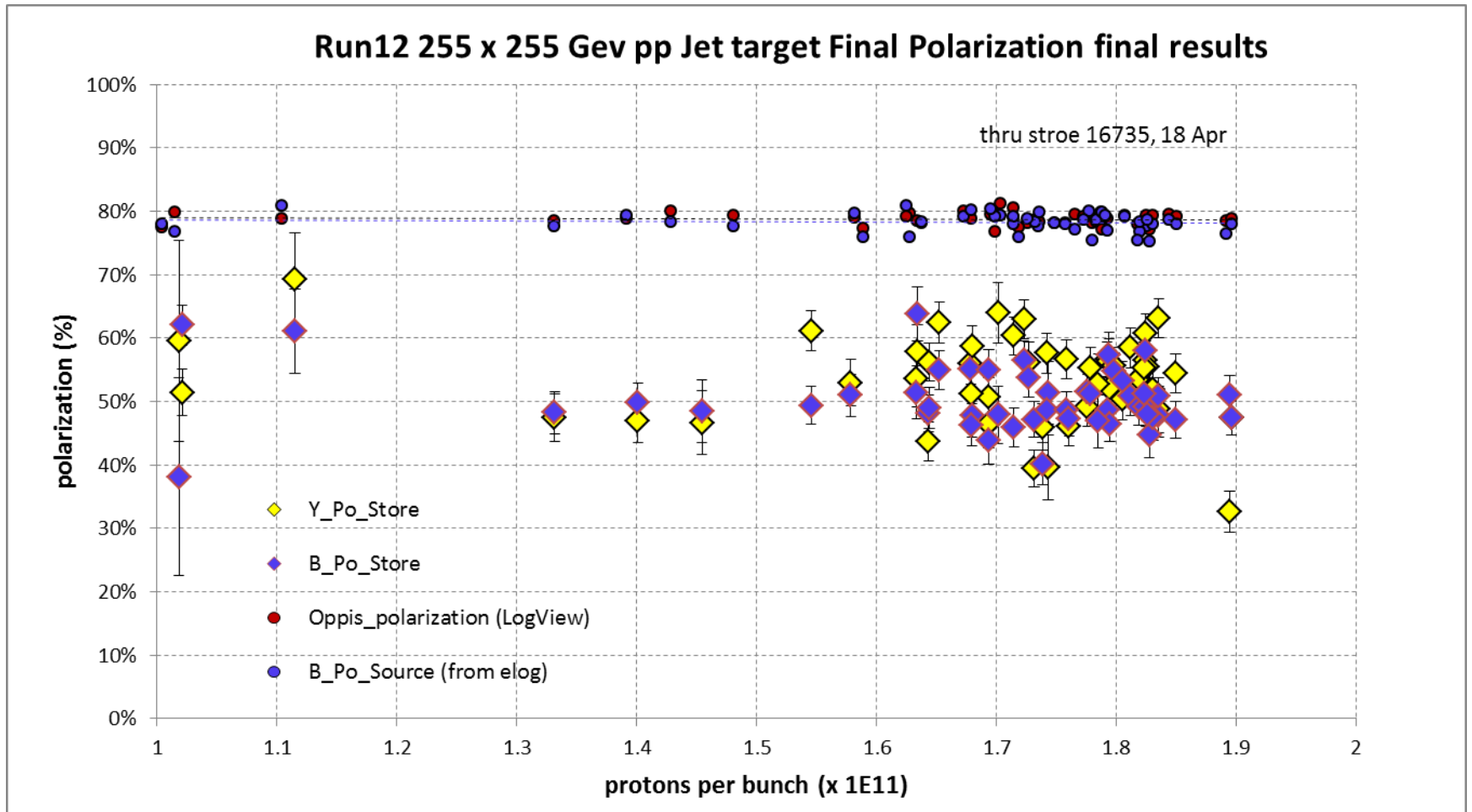
And Yellow beam at injection jet target Run 12 result = $63.0 \pm 4.4\%$

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 = $50.3 \pm 0.5\%$

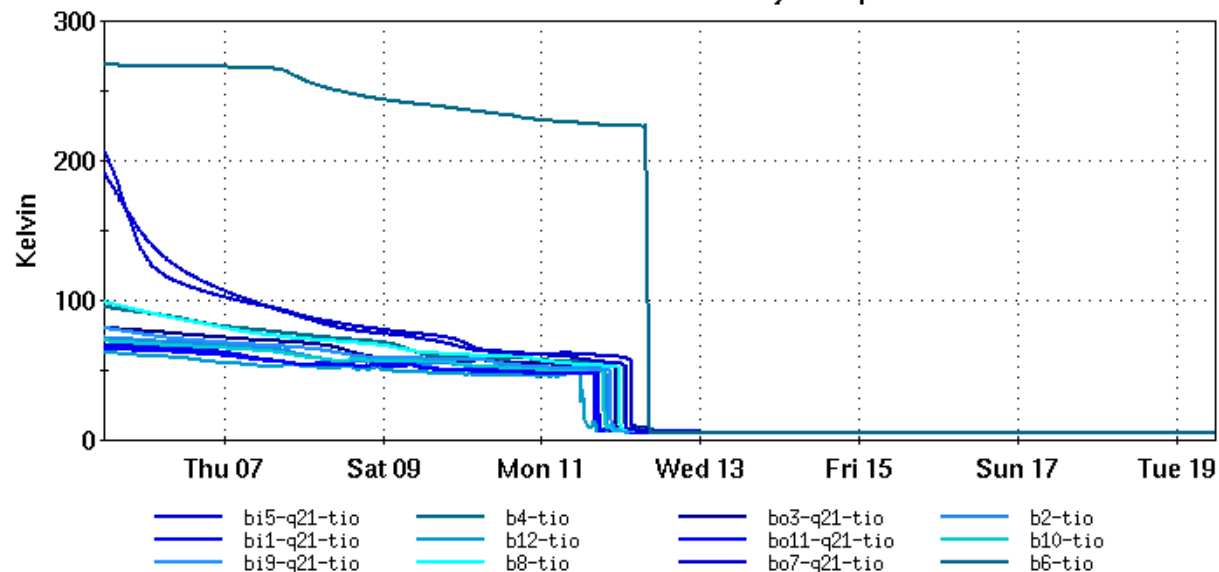


Cryogenic Blue & Yellow Rings (14 days)

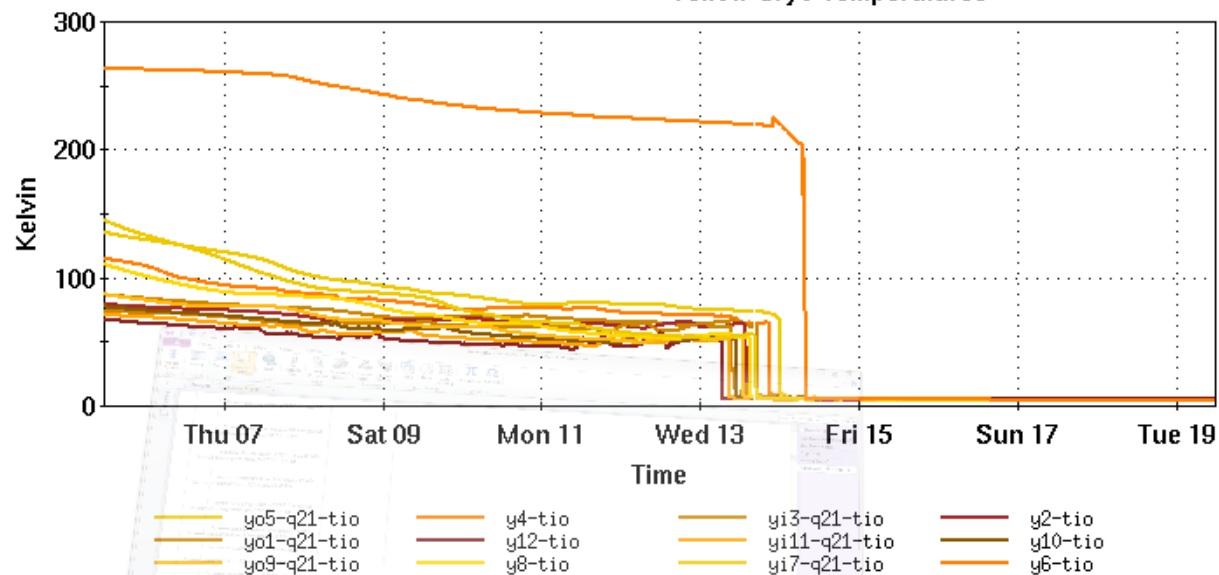
[Ring Summary \(1 day\)](#) [Sector Plots \(1 day\)](#) [Sector Plots \(14 days\)](#)

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.