PHENIX status

Ralf Seidl (RIKEN)
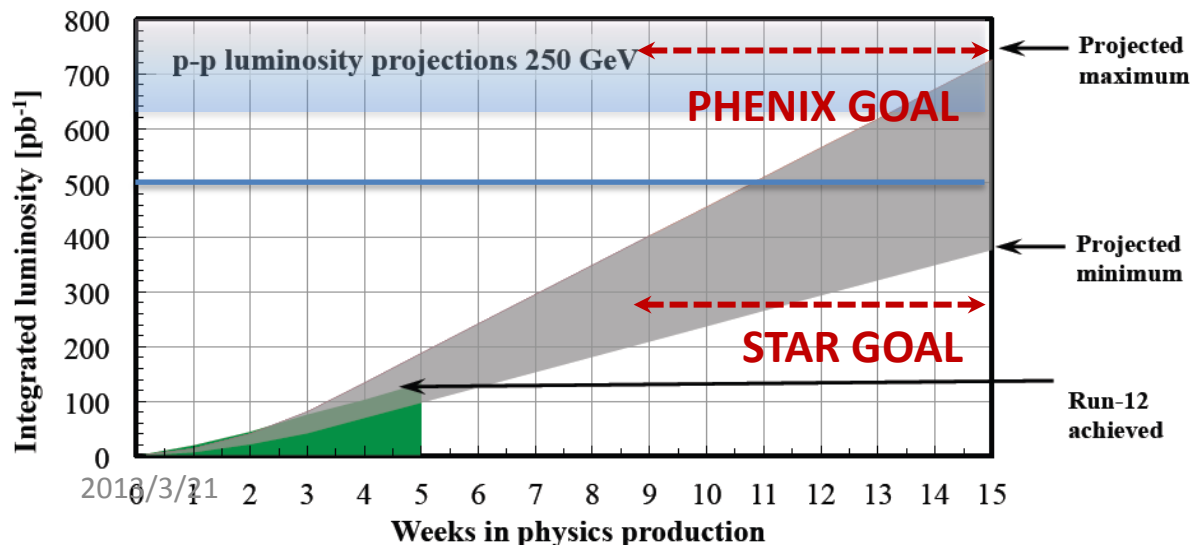
PHYSICS Goals

- W→mu A_L FOM: LP^2 , muon arms
- W→e A_L FOM: LP^2, central arms
- A_{LL} of forward clusters and central pions   FOM LP^4 , MPC, central arms, relative luminosity

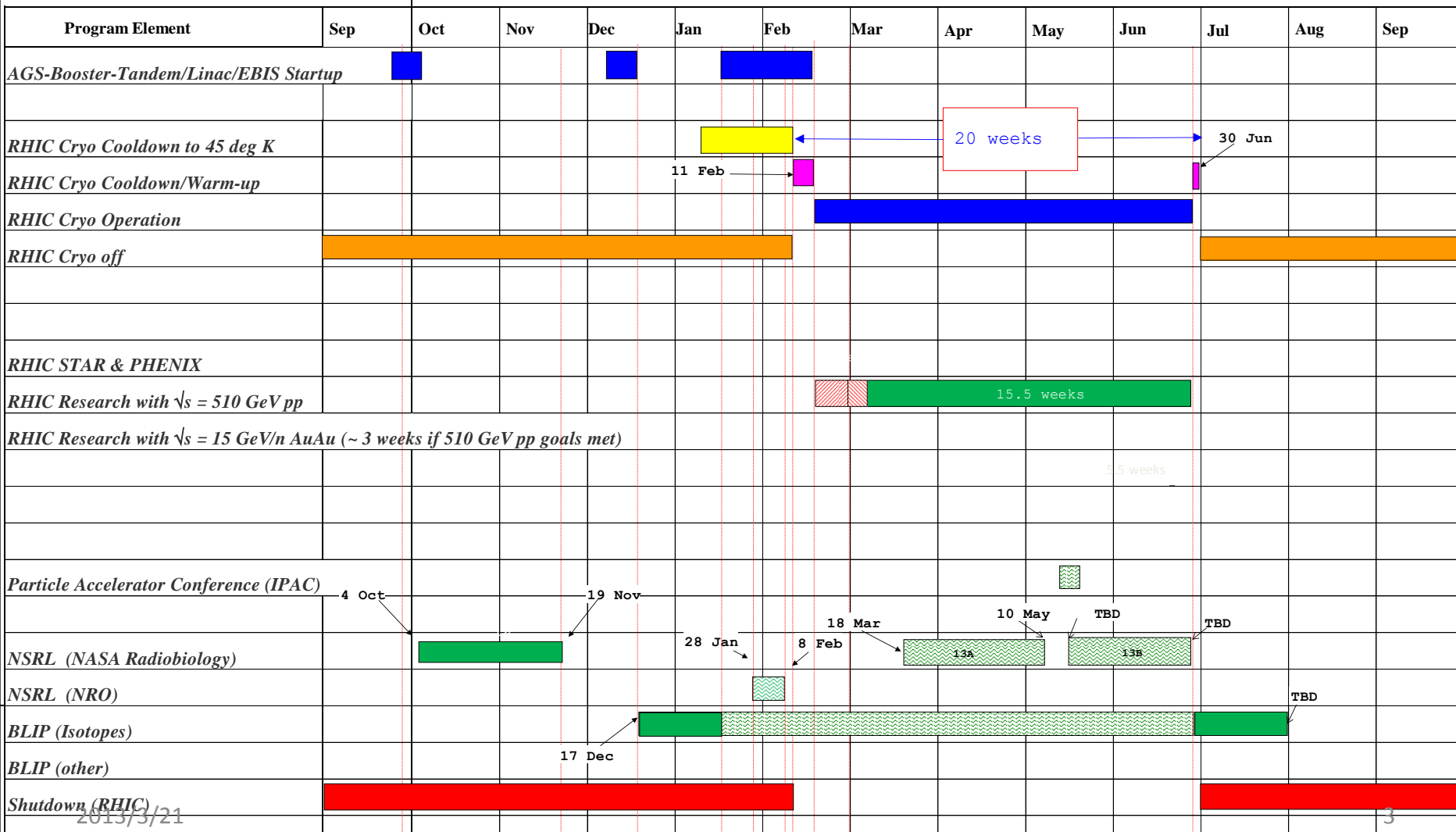From spin write-up:
Goal 500 pb^{-1} delivered
STAR goal: 275 pb^{-1} delivered
PHENIX goal:
300-(run11+12 lumi) pb^{-1}
recorded: 750 pb^{-1}
delivered

p-p luminosity projections 250 GeV

PHENIX GOAL

STAR GOAL

Integrated luminosity [pb^{-1}]

Weeks in physics production

Projected maximum
Projected minimum
Run-12 achieved

C-A Operations-FY13

4 Feb 13

Scheduling Physicist: Andrei Poblaguev

planned, budget permitting, Preliminary

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

FY 2013

Program Element	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
AGS-Booster-Tandem/Linac/EBIS Startup													
RHIC Cryo Cooldown to 45 deg K							20 weeks			30 Jun			
RHIC Cryo Cooldown/Warm-up					11 Feb								
RHIC Cryo Operation													
RHIC Cryo off													
RHIC STAR & PHENIX													
RHIC Research with √s = 510 GeV pp							15.5 weeks						
RHIC Research with √s = 15 GeV/n AuAu (~ 3 weeks if 510 GeV pp goals met)										5.5 weeks			
Particle Accelerator Conference (IPAC)													
NSRL (NASA Radiobiology)	4 Oct		19 Nov		28 Jan	8 Feb	18 Mar		10 May	TBD	TBD		
								13A		13B			
NSRL (NRO)													
BLIP (Isotopes)				17 Dec							TBD		
BLIP (other)													
Shutdown (RHIC)													

Spin pattern issues

- Two errors in CAD:
  - Literal base patttern repetition:

    + + + + - - - - + + + + - - … and next

    + + + + - - - - + + + + - -

    instead of repetition of first 8:

    + + + + - - - - + + + + - - - - + + + + - - - - + + + + - - - -

  - Pattern "paused" for empty bunches:

    + + + + - - e e - - + + + +

    instead of continuing pattern

    + + + + - - e e + + + +

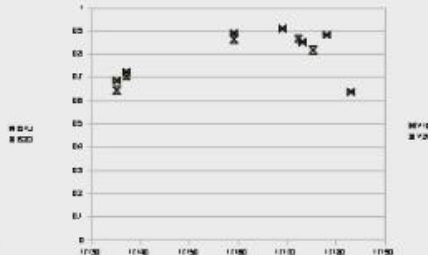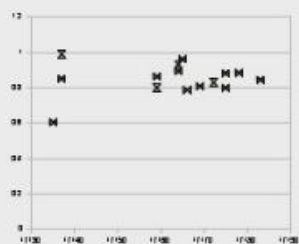 - New patterns will be set up and called p21-p28 instead

Polarization and efficiency
is Magic

- Increase data taking efficiency over polarization measurements (ramp down as few detectors as possible, start a new run immediately??) – new shielding will help

-03-27 13:30:00. RPC1 North and South trips

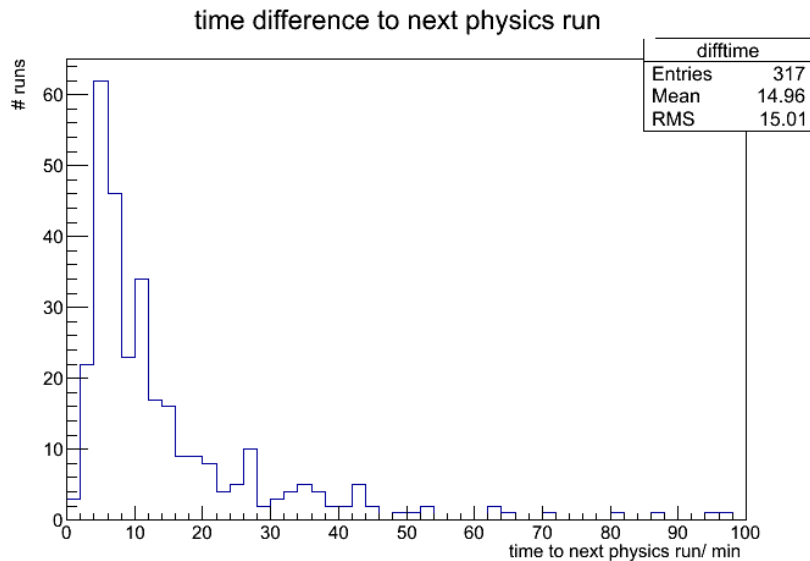Tunnel Scalers 1-6 (red/orange/violet), BBC novtx (green), South

south

north

Polarization Transmission Efficiency in RHIC

2013/3/21
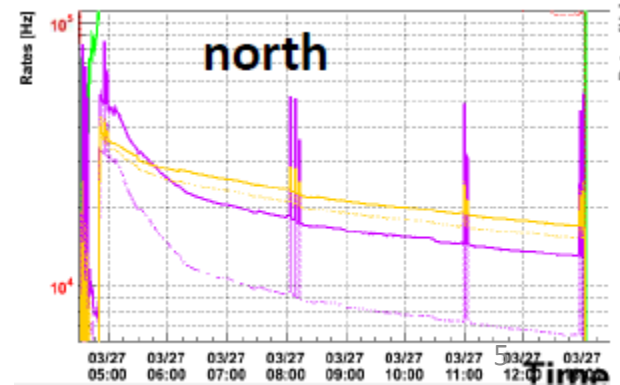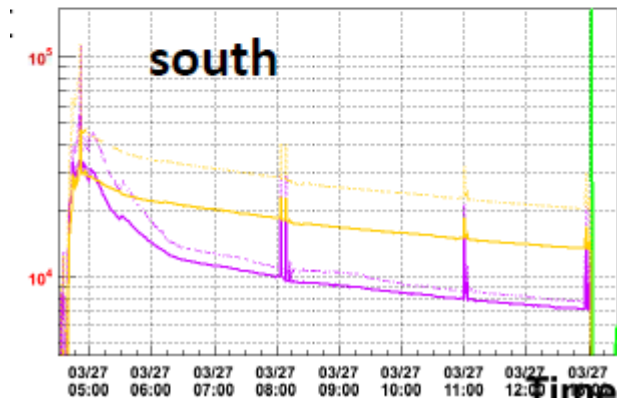
Vertex distribution

Run12 vertex efficiency (30 cm vs novertex)

Run13 vertex efficiency (30 cm vs novertex)
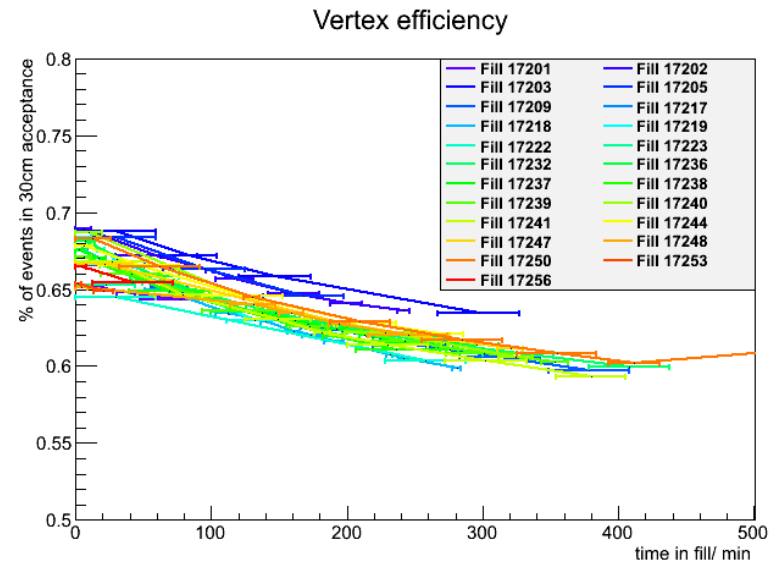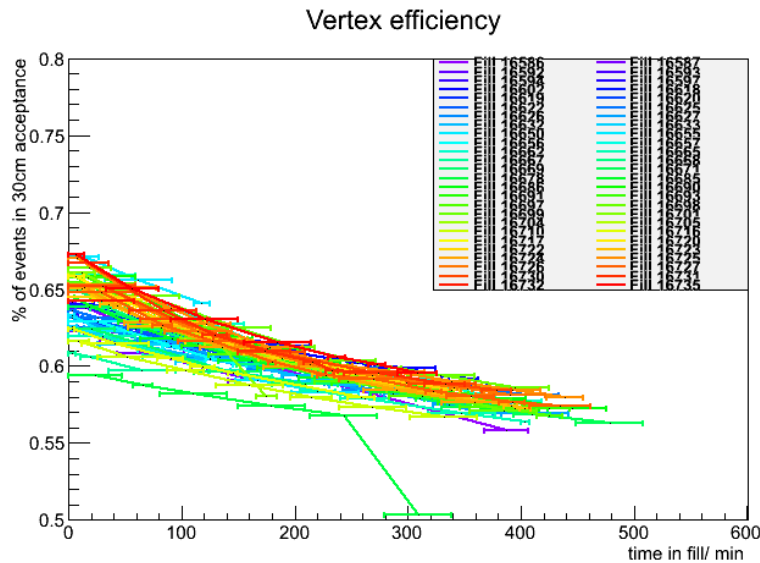
Time between physics runs (within a fill)

Run12

Run13
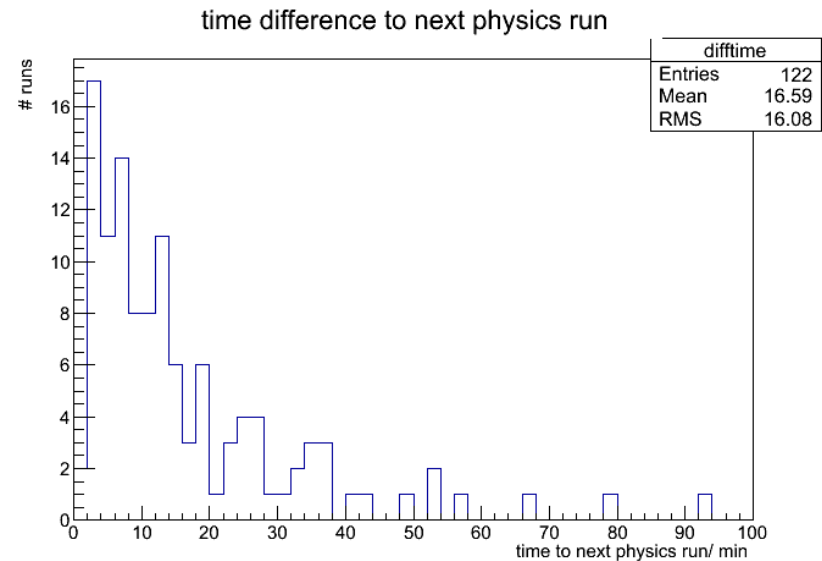
Overall efficiency

Data taking efficiency

ZDC rate

Green: PHENIX Physics runs

- Several steps taken to improve data taking efficiencies:
  - Prioritize subsystems
  - Minimize downtime during pol measurements
  - Diagnostics for downtime
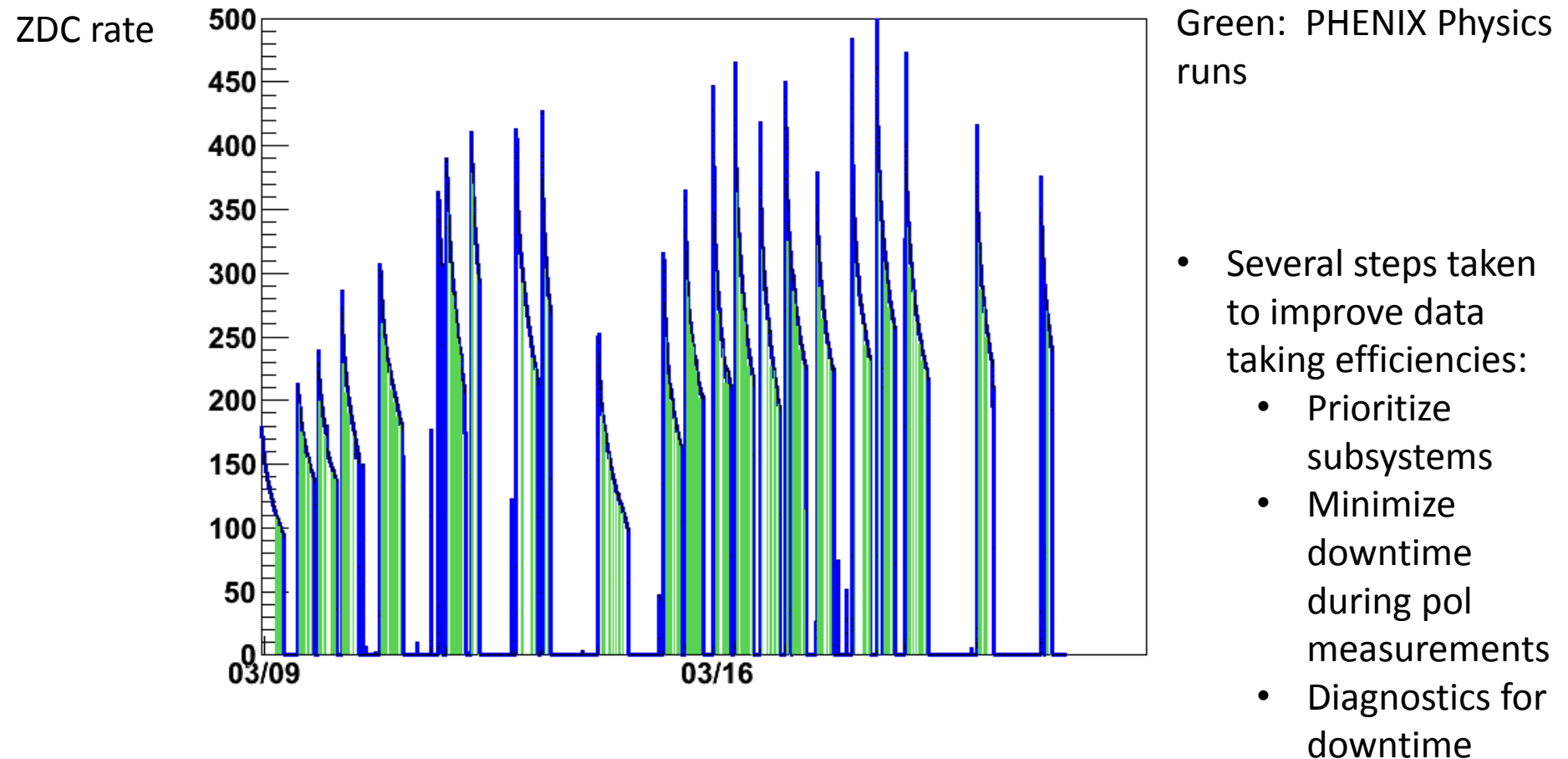
Criteria for start-of-physics

- 109 bunches in the machine
- Longitudinal polarization established, <5% transverse component
- >=55% polarization at the start of the store
- Beta* = 0.65
- >1*10^{11} protons/bunch

| Fill	Type	Beam Energy, GeV	Start Time	Polarization, % In collisions			Polarization, % In collisions		
				Avrg.	P_0	Slope, %/h	Avrg.	P_0	Slope, %/h
			Feb 24, 2013 17:02:55						
17248	phys	255	Mar 19, 2013 13:05:06 Tue	49.77 ± 4.02	53.96 ± 3.41	−1.57 ± 0.64	46.63 ± 2.96	47.87 ± 2.41	−1.05 ± 0.4
17250	phys	255	Mar 19, 2013 23:44:10 Tue	50.91 ± 3.64	50.46 ± 2.92	0.22 ± 0.47	51.16 ± 2.91	54.48 ± 2.63	−0.67 ± 0.3
17253	phys	255	Mar 21, 2013 02:11:03 Thu	55.31 ± 3.68	57.40 ± 3.09	−0.85 ± 0.60	51.78 ± 3.08	50.48 ± 2.74	−0.23 ± 0.4
17256	phys	255	Mar 22, 2013 02:03:58 Fri	57.02 ± 4.12	58.32 ± 3.27	−0.72 ± 1.17	52.16 ± 3.56	54.68 ± 3.10	−1.50 ± 0.9
Mean				52.43 ± 0.62	53.34 ± 0.54	−0.41 ± 0.10	47.19 ± 0.57	50.38 ± 0.53	−1.27 ± 0.0
$\frac{\Delta \langle P \rangle}{\langle P \rangle} \times 100\%$				1.19			1.21		

Figure of Merit

Figure of Merit single spin measurements
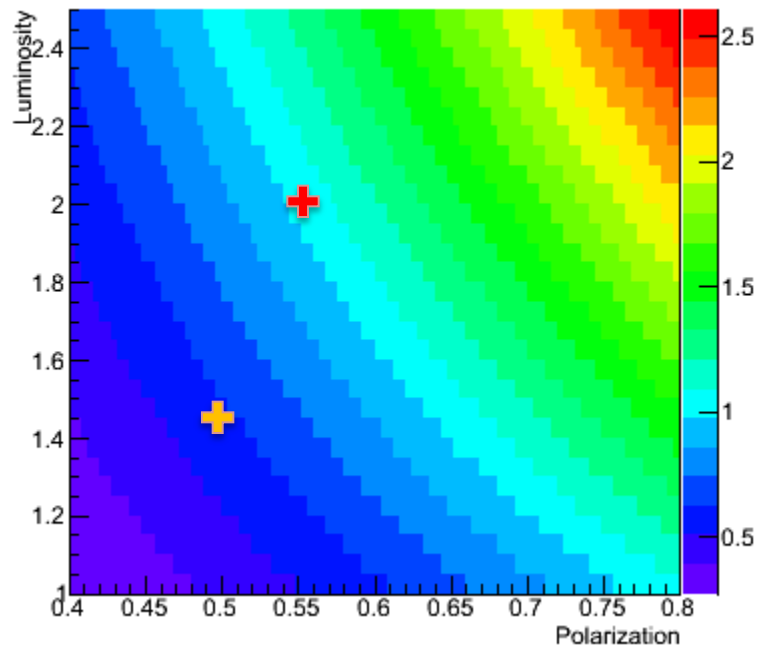
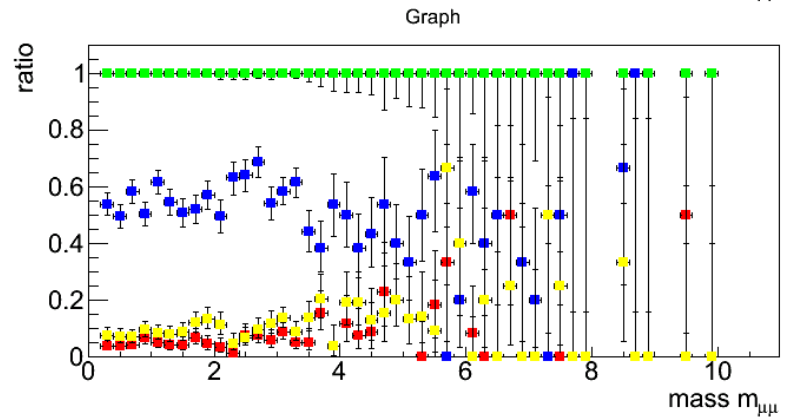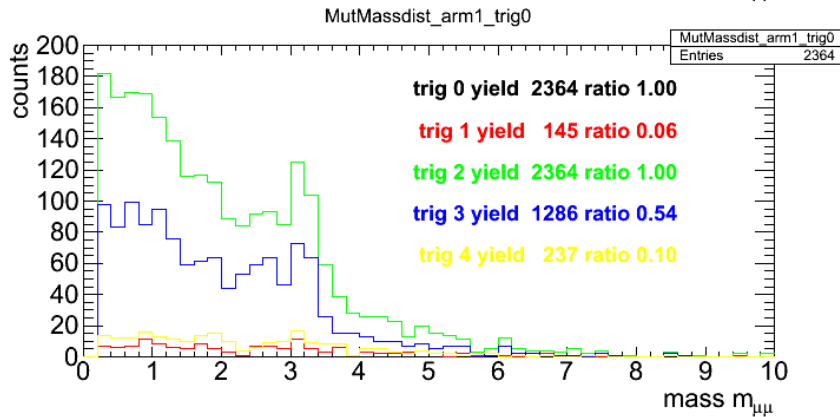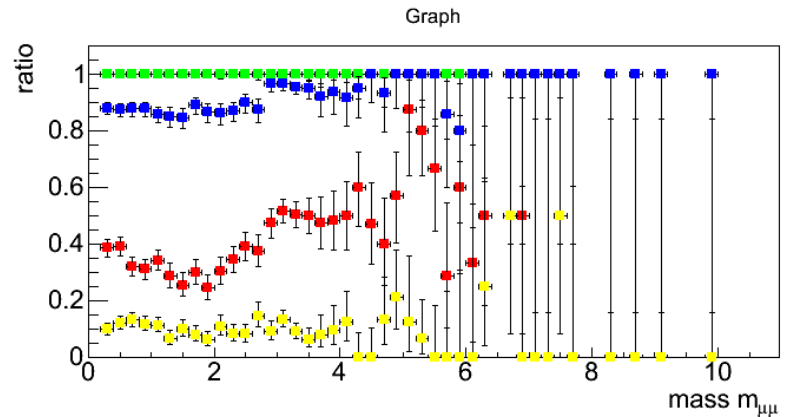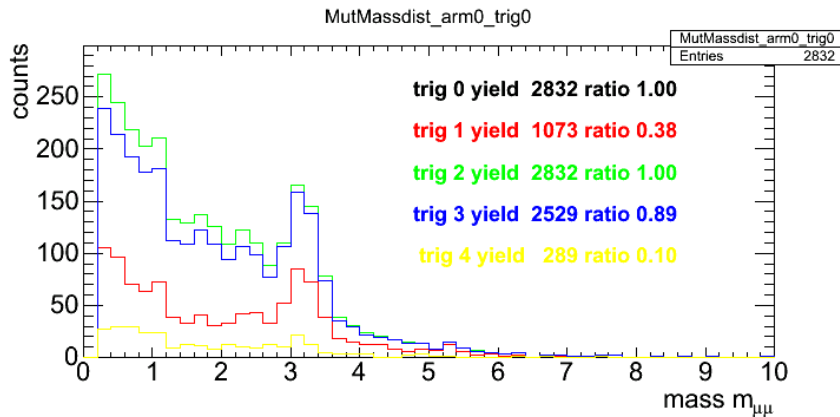Figure of Merit double spin measurements
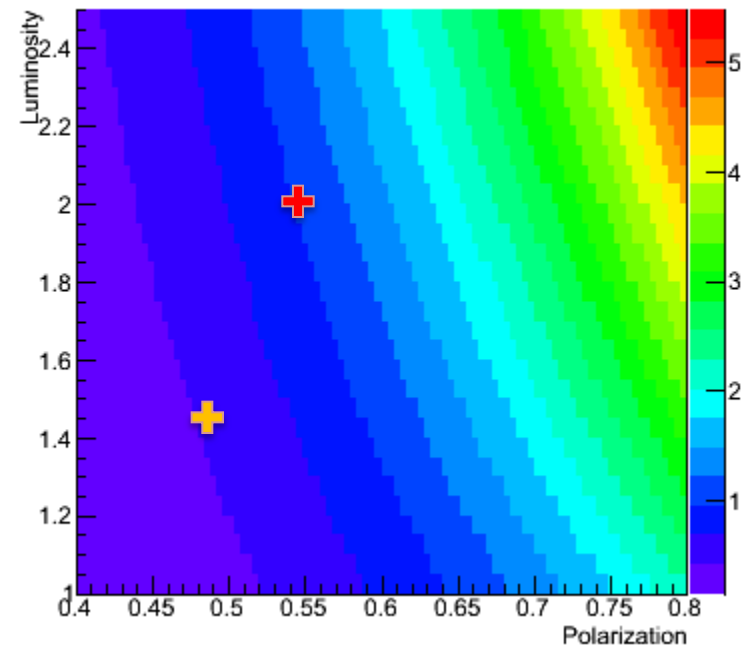
Fast QA:
Single muon physics output
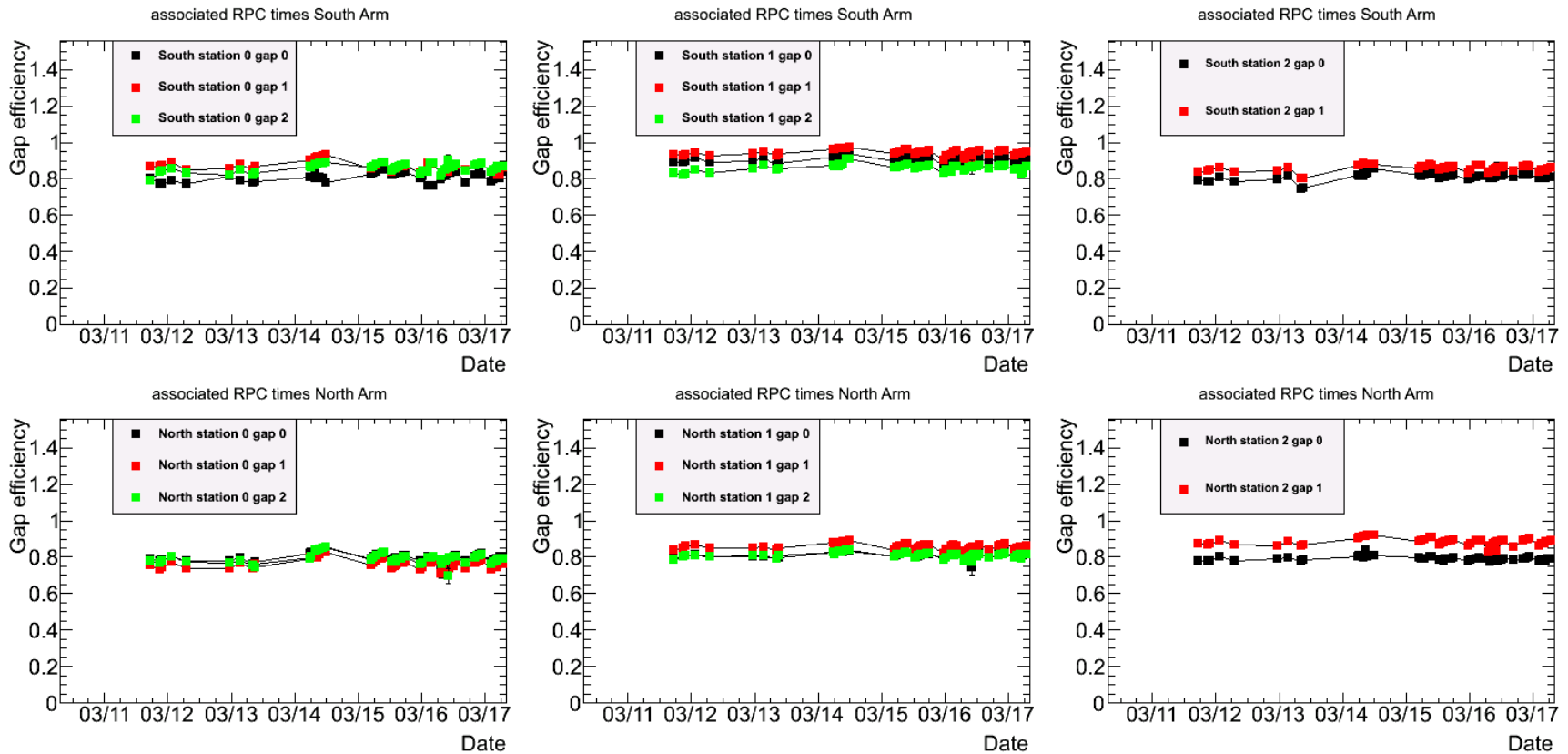
RPCQA Run 387793
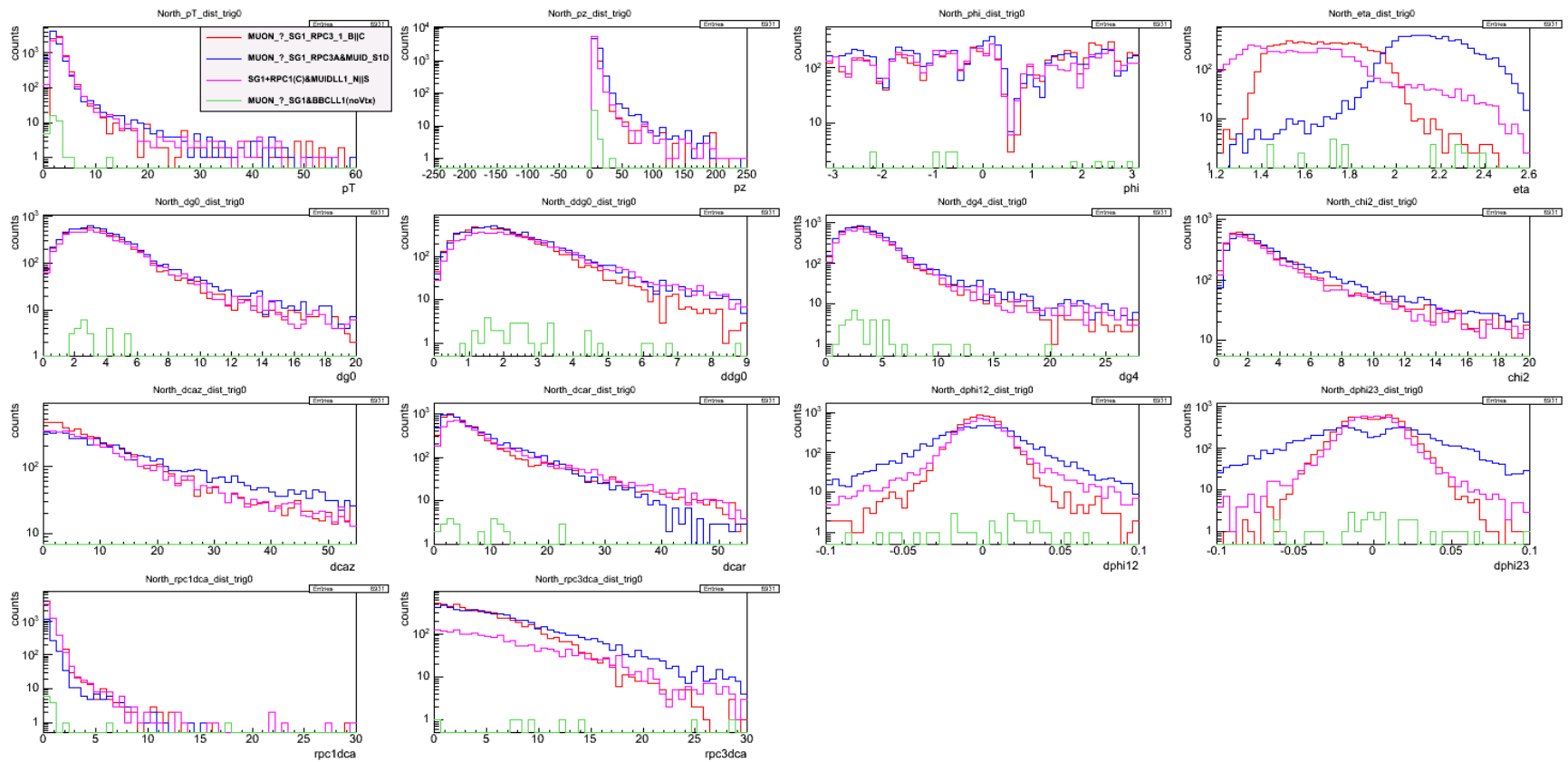
Fast QA:
dimuon physics output

DIMUOQA Run 387793

Fast QA:
muon tracker efficiency output

MUTRQA Run 387793

Summary and status

- Spin patterns were wrong, are updated
- Working on increasing data taking efficiency
- Online QA
- ➔ Taking PHYSICS data

PHENIX Run13 p+p 510 Integrated Luminosity (σBBC=32.5mb)

PHENIX Run13 p+p 510 Integrated Luminosity (σBBC=32.5mb)