2016 Run Plan

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BROOKHAVEN NATIONAL LABORATORY
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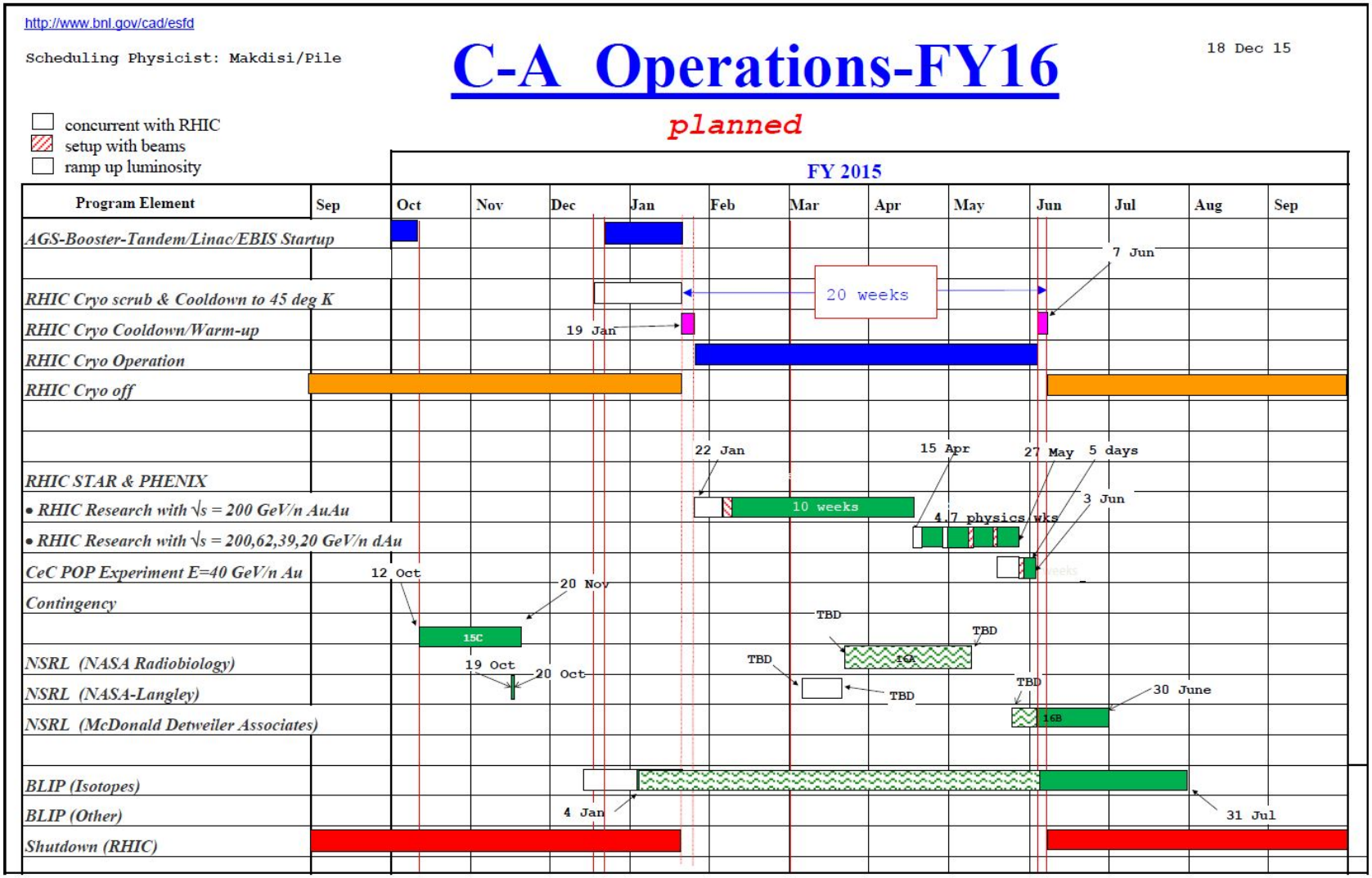
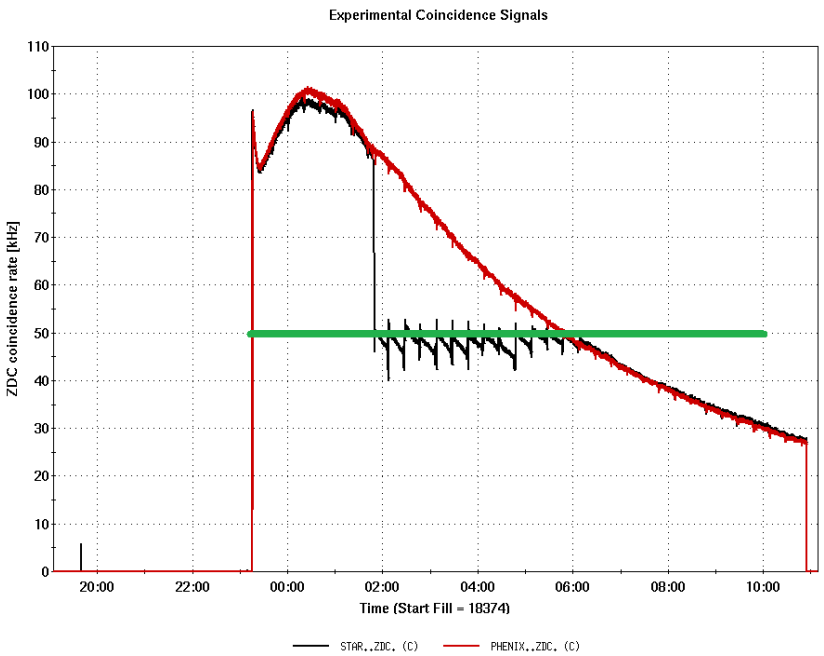
Office of Science
U.S. DEPARTMENT OF ENERGY

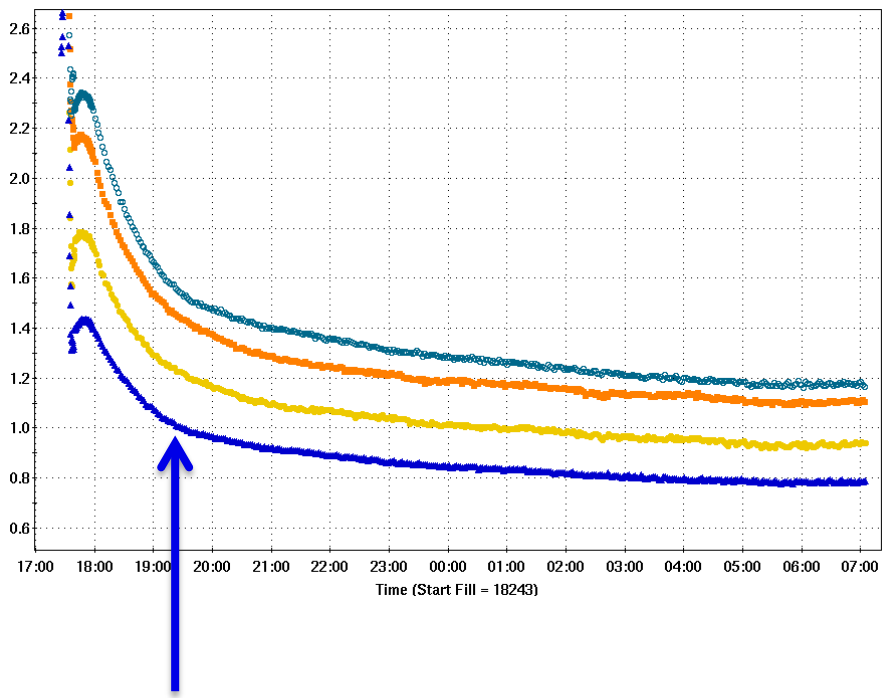
2016 Run Plan



Phil Pile

STAR Luminosity and Beta Squeeze





STAR Luminosity Leveling:

1. Start leveling from the beginning of store
2. Vertical separation is used for the beginning of store;
3. Beta* at IP6 is kept as 0.7m through store
4. ZDC rate during Leveling is aimed to be kept between 55~60 kHz

PHENIX Luminosity:

1. Start to squeeze from 0.7m to 0.4m ~2 hours after store
2. 56 MHz is not accounted.

Lattice Parameters

Energy	**100 GeV**
No of Bunches	111
Ions/bunch	1.85E9
Working Point	28.229/29.215
No of Collisions	2
Beta* IP2	5 m (CeC PoP)
Beta* IP4	Free (56 MHz)
Beta* IP6	**0.7 m**
Beta* IP8	**0.7 m -> 0.4 m (after ~2 hours)**
Beta* IP10	Free (E-lens)
Beta* IP12	5m
$\emptyset_{\mathrm{Mask_Kicker}}$	$\pi/2$ (Pre-fire Mask)
$\emptyset_{\mathrm{Pickup_Kicker}}$	$\pi/2$ (SC Cooling)
$\emptyset_{\mathrm{IP6_IP8}}$	π (Collision Points)
Pre-fire bump	**20 mm**

Beta* :

1. Beta* Base Line: (0.7 m, 0.7 m) for IP6 and IP8

2. (0.7m, 0.4m) ~2hours after store

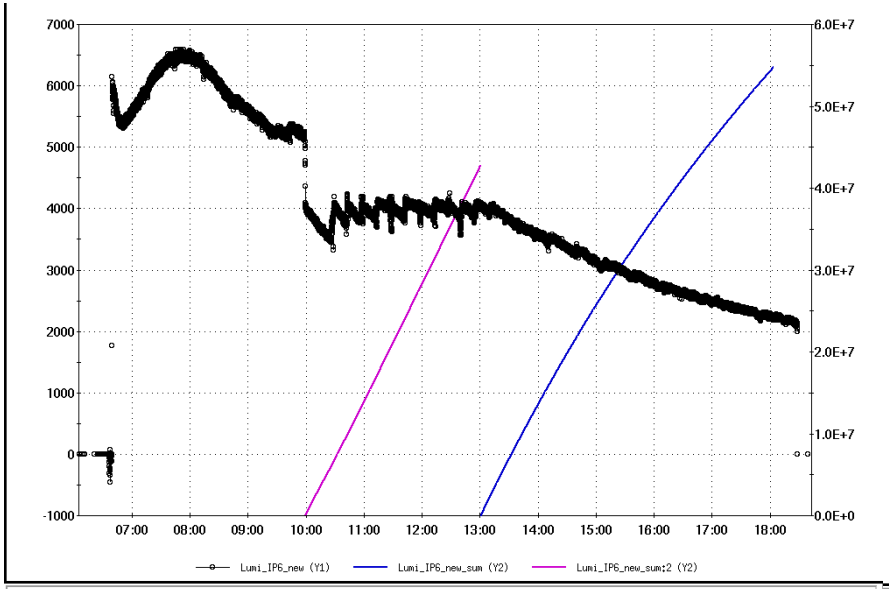
Estimated Average Integral Luminosity

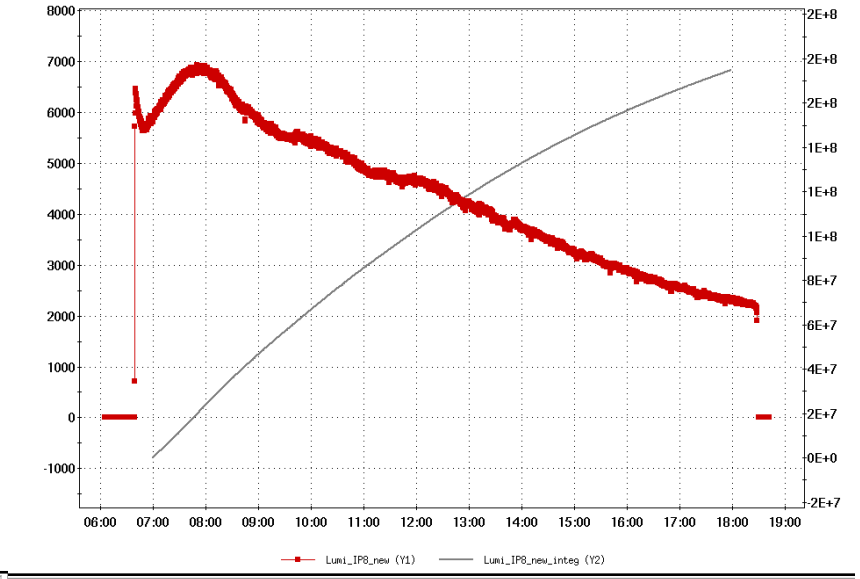
STAR: ~1.6 [nb^{-1}/week]
~14 [nb^{-1} Total] 10 weeks

1. Assume 20% more luminosity than Run14 (50 kHz-> 60kHz);
2. Total store length = 11 hours
3. 60 kHz store length = 6 hours
4. 65% store time (Run11: 59%, Run14: 68%)
5. Estimated by one store data of Run 14

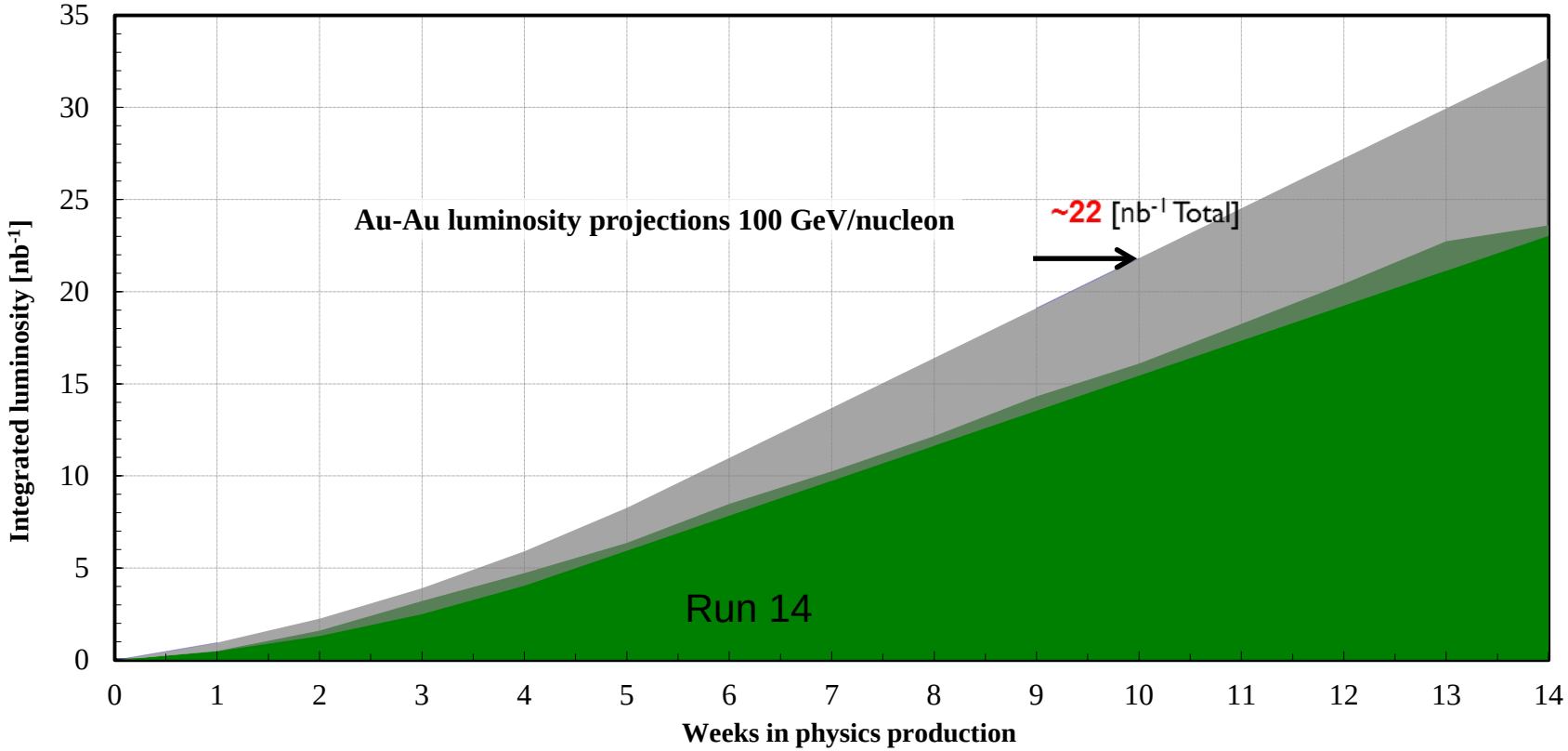
PHENIX: 2.5~2.8 [nb^{-1}/week]
~22 [nb^{-1} Total] 10 weeks

1. Assume 20% more intensity than Run14 nominal;
2. Total store length = 11 hours;
3. **2.8** [nb^{-1}/week] is calculated If beta* = 0.4m lattice can be used;
4. 65% store time (Run11: 59%, Run14: 68%)
5. Estimated by one store data of Run 14
6. 56 MHz is not included





2014 Integrated luminosity compared to projections



More Luminosity

EBIS:

- o EBIS to RFQ transmission
- o EBIS electron gun current or ion intensity
- o 12 Pulses Test

Booster-AGS:

- o Longitudinal Emittance.
- o **6->3->1**
- o 12->6->2

RHIC:

- o Beta* = 0.4 m squeeze ramp
- o 56 MHz cavity

Concerns for high luminosity:

Intensity and Beta*

Concerns for nominal run

- o 0.7 m Ramp
- o Dry run
- o Hardware Check list
- o ….

Pre-fire Protection

	2015 p-Au	2016 d-Au	2016 Au-Au
Pre-fire Possibility	Nominal	Nominal	Nominal
Pre-fire Mask	NO	Yes	Yes
Pre-fire bump	Yes	Yes	Yes
Amplifier Protection	NO	Yes(100%?)	Yes(100%?)
LV Control Protection	NO	Yes(100%?)	Yes(100%?)
Crystal protection	NO	NO	NO
DX further movement	NO	Yes	Yes
Beam Close to Magnet	Bad	Better	Best

What we can do for Run 16

Need to be checked.

Protection Methods	Status	Need to do
Pre-fire Mask	existing	Will be improved and verified
Pre-fire Bump	existing	Will be implemented
Amplifier Protection	progressing	Will be implemented
LV Control Protection	progressing	Will be implemented
New Mask	Future	Budget
Kicker and Dump Movement	Future	Budget and Time
Mechanical Relay	Future	Budget, Safety
Other (similar to Relay)	Future	Time, Safety, Budget

Website of Run 16

Dry Run:

- http://www.cadops.bnl.gov/Controls/ControlsWiki/index.php/RHIC_Dry_Run_FY16

Run 16:

- http://www.cadops.bnl.gov/AP/RHIC2016/

Run Planning To Do List:

- http://www.cadops.bnl.gov/AGS/Operations/OpsWiki/index.php/FY16_Run_Planning_To_Do_List

Schedule update:

- http://www.rhichome.bnl.gov/AGS/Accel/Maintenance/Schedules/This_week.htm#sched1