Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

RHIC Status

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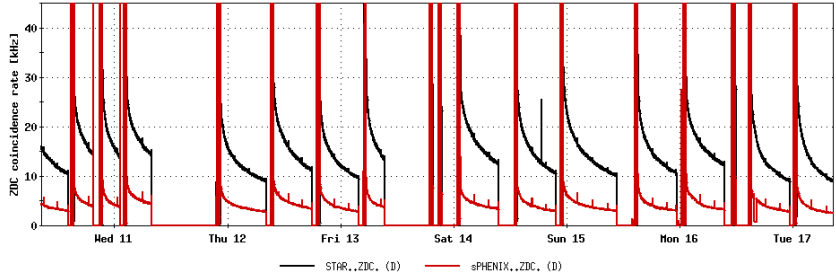
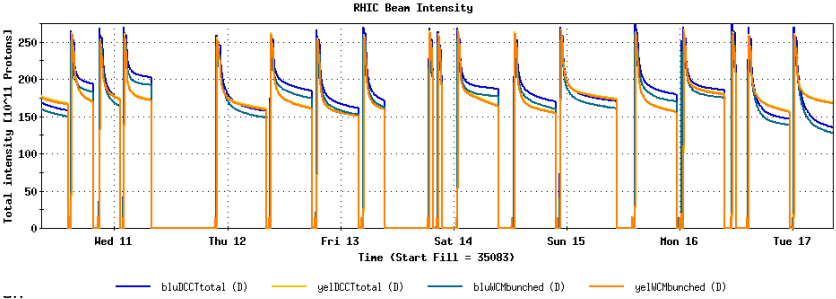
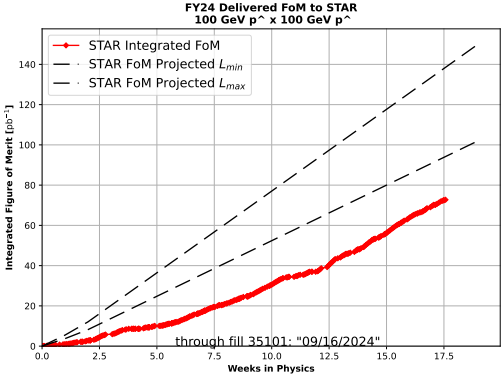
Last Week at RHIC

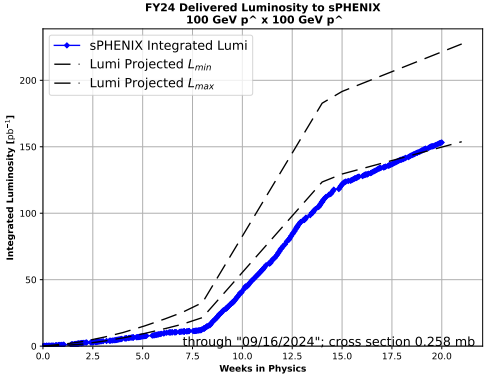




RHIC status and Lumi Projections

111x111 physics running since 4/30. Preliminary luminosity accounting





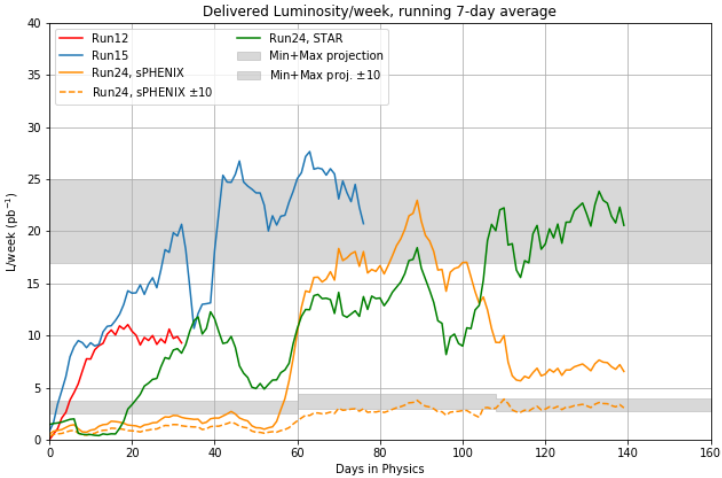
Inflection for sPHENIX projections coincides with change in crossing angle.

RHIC Status

- Physics running with up to 2.4e11/bunch at physics and up to 60% polarization.
- sPHENIX MVTX cooling issues has prompted several accesses to investigate, implement a temporary repair and a permanent repair.
- Sector 8 lead flow issues. Investigation is ongoing.
- RHIC status meeting switched to Monday, Wednesday, and Friday until switch to Au.

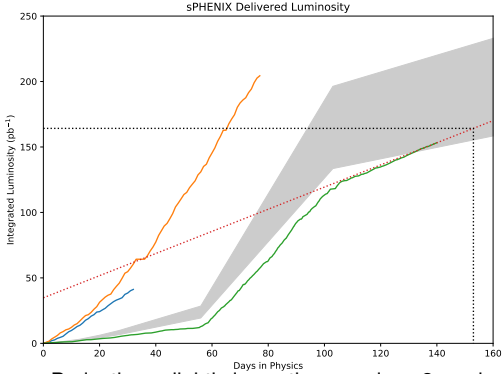
Key dates	Event
April 15, 2024 through September 30, 2024	RHIC polarized proton operations
September 30, 2024 through October 21, 2024	RHIC Au operations
October 21, 2024	End of RHIC Run24

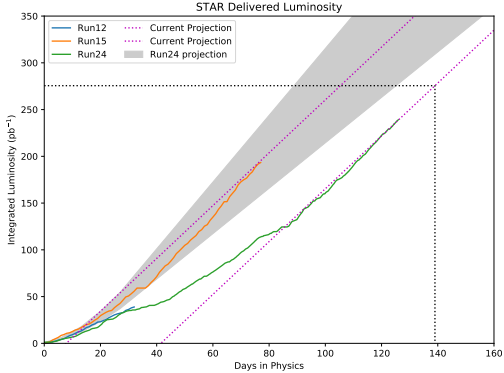
RHIC Performance



- Both STAR and sPHENIX are within the minimum and maximum projected window.

RHIC Performance II



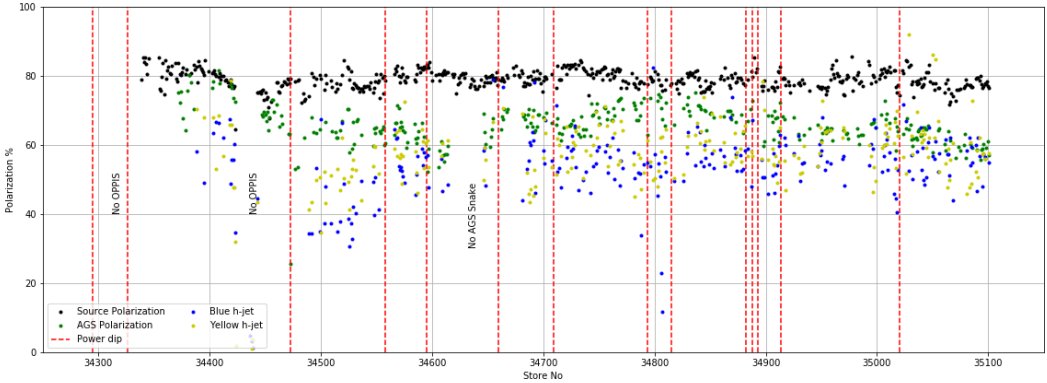


- Projections slightly lower than previous 3 weeks
- STAR projections currently on trend with Run15, 19.8 pb^{-1}/week
- sPHENIX projections are currently at 5.9 pb^{-1}/week which is $\sim$ 3.0 pb^{-1}/week within $\pm$10 cm

Based on current projections by 9/30:

- STAR will have 275 pb^{-1} delivered luminosity and $\sim$83 pb^{-1} FOM .
- sPHENIX will have 164 pb^{-1} delivered luminosity and $\sim$49 pb^{-1} within $\pm$10 cm.

Polarization Performance



Recent drop in source polarization due to excess Rb, recovered slightly. Injector polarization did not rebound.
h-jet values from: https://www.cnipol.bnl.gov/hjet/run24.html
cni values from: https://www.cnipol.bnl.gov/fills/?rp=24&fn=&ft=&be=100&mode=11&sb=Select

Au Startup Schedule, tentative

Day(s)	Objective
9/30	Maintenance +DX training, injection setup during the evening, RF conditioning overnight
10/1	ramp development during day, RF conditioning overnight
10/2	rebucket setup and store development, possibly more RF conditioning more development needed
10/3	finish setup and hand store over for experimenter setup
10/4-10/8	ramp up and start setting up stochastic cooling 1 plane/store
10/7+	week of, look to setup 56 MHz (1-4 shifts required)

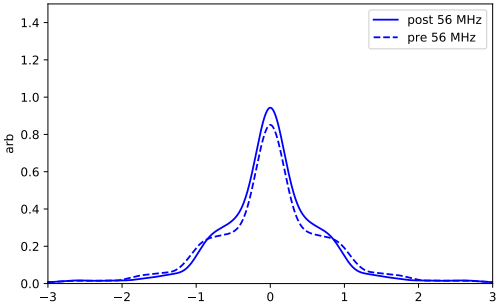
Start date 9/30.

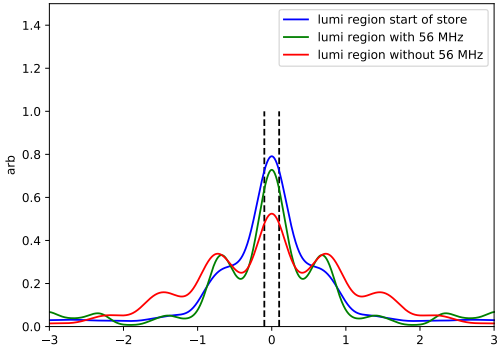
Meeting tomorrow to discuss and refine the startup schedule.

Startup schedule is available here

Luminosity with 56 MHz

Luminosity distributions using longitudinal distributions before and after the 56 MHz turned on (left). Luminosity distributions using longitudinal distributions at the end of a store with and without the 56 MHz(right).

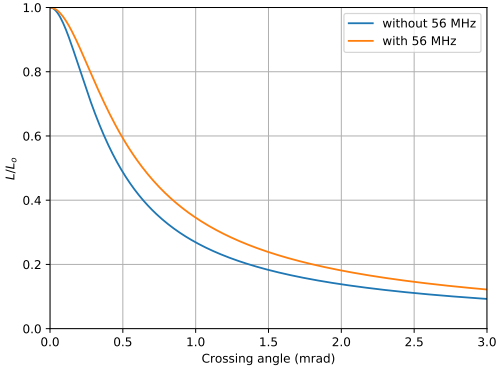


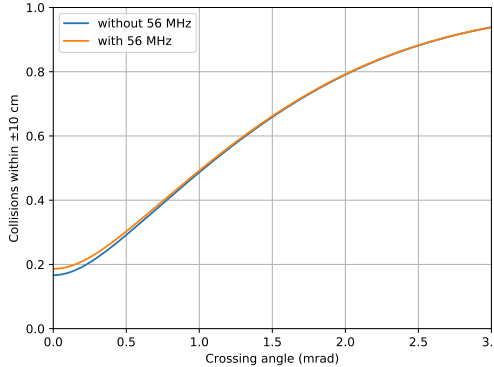


- Start of store, peak current leads to a 16% increase to luminosity delivered within $\pm$10 cm.
- Less prominant shoulders at start of store, even with 0 mrad.
- End of store luminosity within $\pm$10 cm 40% higher.

Luminosity with 56 MHz, II

Luminosity scaling (left) and collisions within 10 cm (right)





- 56 MHz improves luminosity scaling throughout the store.
- This is due to the highly cooled horizontal emittances.
- Can reduce crossing angle during store to increase data volume.
- With the 56 MHz, start of store collisions within ± 10 cm is $\sim$18% vs 15%, end of store $\sim$14% vs $\sim$10%.

Luminosity Outlook

- Based off Run23→ Intensity ramp 1.0e9/bunch to 1.3e9/bunch over first two weeks.
- Two weeks of luminosity delivery will have interruptions for:
  - 56 MHz setup (1-4 shifts).
  - STAR and sPHENIX background diagnostics.
  - sPHENIX absorber installation (2 shifts).
  - One maintenance day, one APEX day.
- From projections document, 1.8e9/bunch max expected for Run25.