Brookhaven National Laboratory

U.S. DEPARTMENT OF ENERGY

RHIC Status

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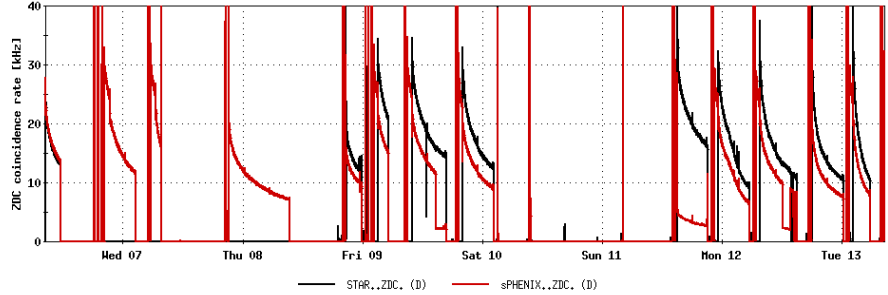
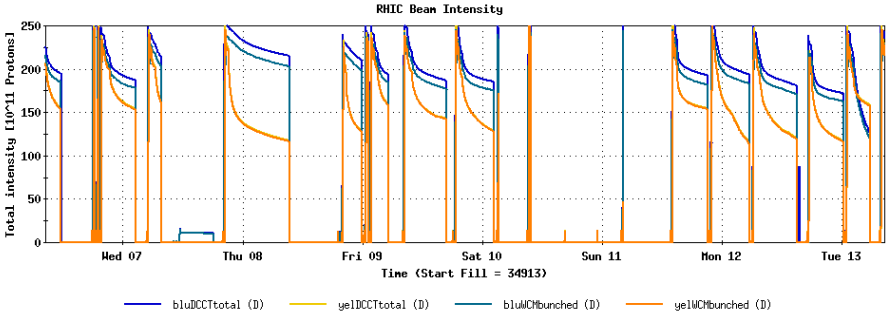
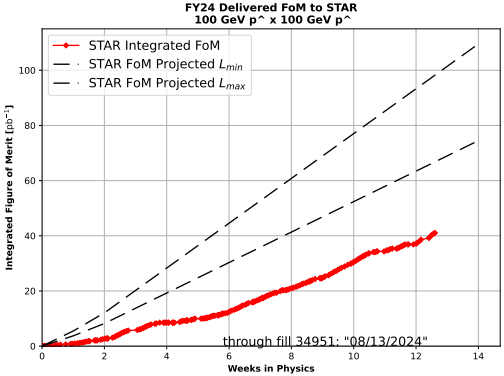
Last Week at RHIC

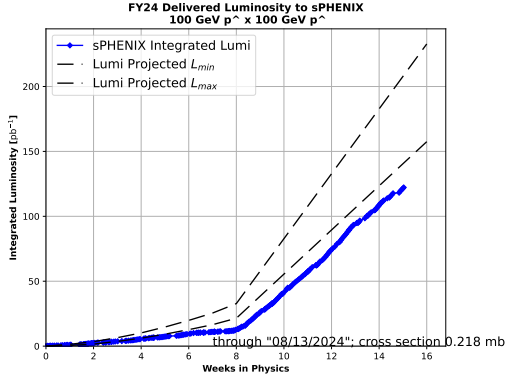




RHIC status and Lumi Projections

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



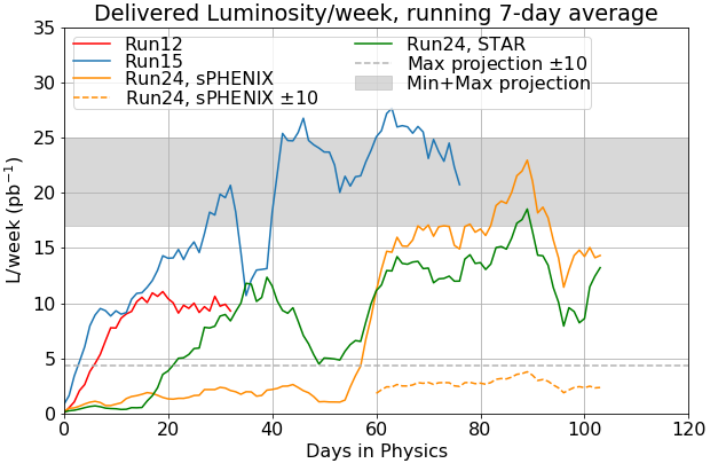


Singles correction reinstated into analysis.

RHIC Status

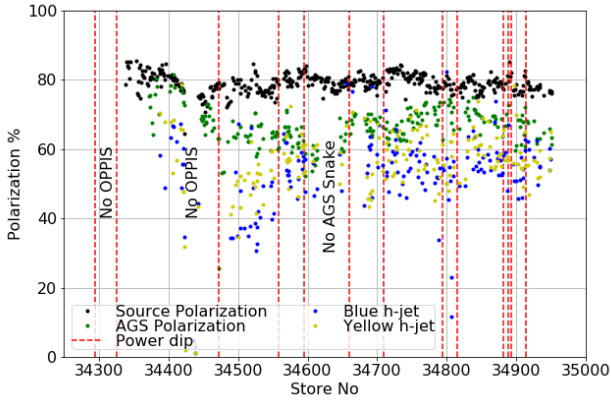
- Delivered intensity up to 2.3e11 at physics.
- Power dip on 8/6
  - STAR ZDCs TCIM logic board failed and was replaced during Maintenance period on 8/8
- Supported sPHENIX TPC commissioning
  - 4 hour access on 8/6 to adjust resistance on TPC GEM modules
  - 8 hour access on 8/8 for additional resistance adjustments
  - 4 hour no beam time on 8/11 to update firmware for zero suppression (behind RHIC PS failure)
- DX training on 8/8: IP6 still needs 0 mrad and then +30 A for IP6, IP8 and IP4. Training quench of IP4 DX.
- 3He APEX on 8/7.
- RHIC PS issues starting on 8/10 stemming from AC issues at 1004B
  - 0142 MCR contacted CAS about cooling in 1004B
  - 0312 Blue QLI requiring a circuit breaker to be thrown to solve the hanging current readback of the Blue mains
  - 0615 During hysteresis ramp b8-dhx-ps crowbarred resulting in QLI. Contactors cleaned and recovered at 0850.
  - 0946 b4-dhx-ps under investigation for QLI. Replaced: 3 channel Iso Amp board, contactors, relays, current regulator card and ZFCT card (last two being the final solution). Recovered at 1300 on 8/11.
  - 1218 AC at 1004B repaired
- Lead flows at 1002 due to comm fault on node cards.

RHIC Performance



Reduction compared to previous weeks due to re-implementation of singles correction

Polarization Performance



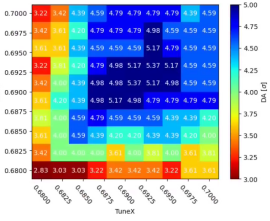
Power dips early in the run greatly affected availability of PP

Of the last 100 stores, $P_{blue} = 55\%$ and $P_{yellow} = 59\%$

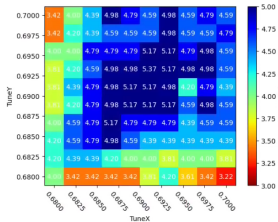
Of the last 10 stores, $P_{blue} = 57\%$ and $P_{yellow} = 56\%$

Dynamic aperture simulations I

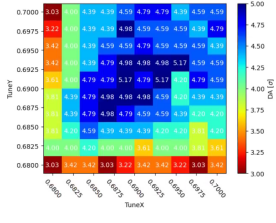
Blue-60cm-2E11-0mrad



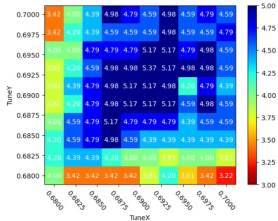
Blue-60cm-2E11-2mrad



Blue-60cm-2.5E11-2mrad



Blue-60cm-2E11-2mrad



- Initial DA simulations prior to the run assumed only IP8 would be squeezed from 85→60 cm with IP6 remaining at 85 cm
- Simulations shown on right are with this assumption. 5σ is a suitable value (dark blue)
- crossing angle doesn't increase the maximum DA but increases the DA footprint
- Squeezing IP8 alone could support up to 2.5e11

Simulations by X. Gu

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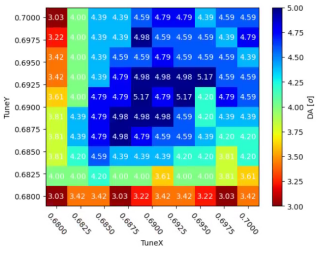
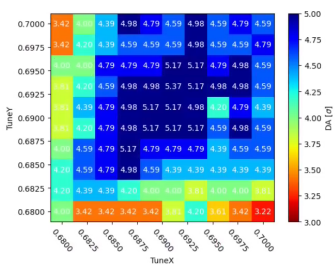
Dynamic aperture simulations II

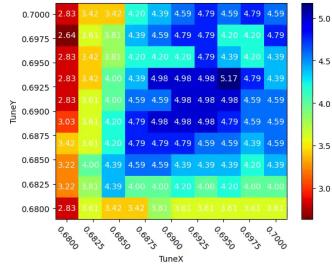
$\beta^*_{IP6} = 70$ cm,$\beta^*_{IP8} = 60$ cm, 2e11

Blue-60cm-2.5E11-2mrad



Blue-60cm-2E11-2mrad





- squeezing both IPs at 2e11 would likely reduce our DA too much to be supported
- Can possibly squeeze at lower intensity, say 1.5e11

Going Forward

MD Thursday

1. MD session to establish collisions at the desired crossing angle at the start of store (this will free up an additional ramp if the collapse of STAR occurs at the same time as sPHENIX, allowing)

Notes

- MD to commission beta squeeze likely at 3 hours or 1.5e11/bunch
- With initial DX training complete, we should look to finish during Au setup