RHIC Run24 Preparations

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RHIC Coordination Meeting
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Overview of Major Works, updates

Valve box and DX repair

- DX has been removed and two spares are present in B912 (more details on next slide)
- One spare is being wired for installation
- No evidence of damage after removing DX endcaps
- DX estimate 5+ weeks for reinstall
- Parts for valve box on order, insufficient knowledge for timeline.

Blue snake reinstall

- Rewiring delayed to this week
- On schedule to be reinstalled and warm tested.

Diode removal and testing. New diode installed and hi-pot successful (pressure test in several weeks, on schedule).

All AGS skew quad magnets have been received. A PS was successfully tested with the magnet.

DX Move

10/10/23

• Update on RHIC/1004B valve box: The DX magnet was removed from the cryostat and, last Friday, transported to a repair area set up in Bldg. 912 where also the spare DX magnet and a DX magnet prototype were brought from storage. Inspection of the DX magnet is foreseen this week following removal of the DX magnet's very large end-volume cylinders. Both spares were tested during RHIC construction however end connections and splices to the Cold Crossing Bus (which contains the superconducting cables) leads will need to be made. A couple of staff from the Magnet Division, who worked on the DX magnets 25 years ago, will also support preparation of the DX magnet for operation. Electrical testing performed last week of the rest of the superconducting cable distribution system indicated no other damage beyond this DX magnet. A schedule for completion is contingent on inspection of the DX magnet.

DX magnet in tunnel prior to removal (IR 4 region)

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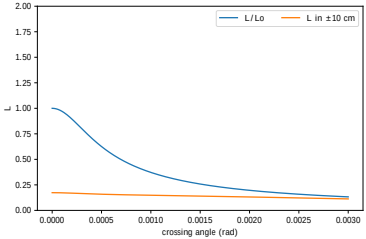
Lattice development is underway with zero DX shifts (GRD).

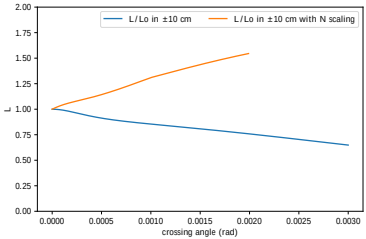
Beam-beam effects with crossing angle simulations (X. Gu and Y. Luo).

- Preliminary results show significant tune shift suppression from crossing angles.

Dynamic aperture simulations with crossing angle simulations (X. Gu and Y. Luo).

sPHENIX Luminosity



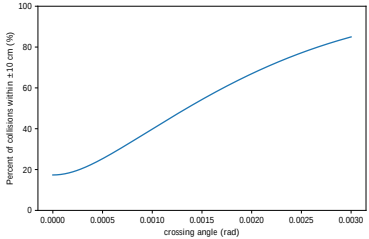


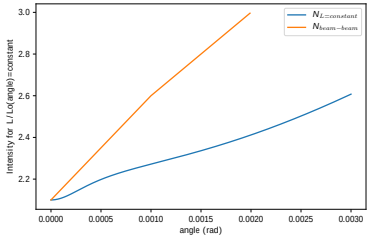
Top: Luminosity reduction with crossing angle and within 10 *cm*

Bottom: Luminosity reduction with crossing angle normalized to L_o within 10 *cm* and luminosity increase with intensity scaling

Because of the L in 10 cm, benefits from ramping the crossing angle are not as substantial.

sPHENIX Luminosity II





Percent of collisions within 10 cm are 78% at 2 mrad, and 19% at 0 mrad.

Intensity scaling to achieve $\mathrm{L}(\theta) = \mathrm{L_o} f_{-10\ \mathrm{cm}}^{+10\ \mathrm{cm}}$, and the beam beam intensity limit.

At 2 mrad, 2.41 10^{11} is required to match the luminosity of 0 mrad and 2.1 10^{11}. 2.4 10^{11} is approximately the maximum achieved intensity in Run15.

Questions:

Does any sPHENIX systems care about collisions outside of 10 cm vertex?

Is 2 mrad the maximum desired crossing angle?