



Contribution ID: 1975 Contribution code: MOPC03

Type: **Poster Presentation**

Crossing angle implementation for luminosity maximization in a narrow vertex region in RHIC operation

Monday, 20 May 2024 16:00 (2 hours)

The Relativistic Heavy Ion Collider (RHIC) was designed for head-on collisions in the Interaction Regions. However, RHIC operation in recent years necessitated crossing angles to limit collisions to a narrow longitudinal vertex region, which created operating conditions with a large Piwinski angle (LPA). The angles were implemented by adjusting the shunt currents of four dipoles, the D0 and DX magnets, near the IP. The longitudinal bunch profile often deviates from Gaussian due to the utilization of high-order RF cavities, adding complexity to calculating luminosity reduction with crossing angle. This paper introduces two methods for implementing crossing angles, discusses resultant aperture concerns, conducts numerical calculations of luminosity reduction, and compares these findings with experimental observations.

Footnotes

Funding Agency

Work supported by Brookhaven Science Associates, LLC under Contract No. DE-SC0012704 with the U.S. Department of Energy.

Paper preparation format

LaTeX

Region represented

North America

Primary author: LIU, Chuyu (Brookhaven National Laboratory)

Co-authors: HOCK, Kiel (Brookhaven National Laboratory); DREES, Kirsten (Brookhaven National Laboratory); BLASKIEWICZ, Michael (Brookhaven National Laboratory); BINELLO, Severino (Brookhaven National Laboratory); SHREY, Travis (Brookhaven National Laboratory); FISCHER, Wolfram (Brookhaven National Laboratory)

Presenter: LIU, Chuyu (Brookhaven National Laboratory)

Session Classification: Monday Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators:
MC1.A01 Hadron Colliders