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Local and global betatron coupling correction based on beam position measurements in RHIC

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Local coupling correction in Interaction Regions (IRs) and global coupling correction based on Base-Band Tune (BBQ) measurement have been performed routinely for RHIC operation. However, one still observes significant residual local coupling measured by beam position data. For the Electron-Ion Collider (EIC) project, betatron decoupling for the hadron beam needs to be improved to maintain a large horizontal to vertical beam emittance ratio (12:1). In this paper, we will analyze the cause for noticeable residual coupling in RHIC and propose an integrated local and global betatron coupling correction based on beam position measurements. We will also present experimental results from ML-based optimization of the local and global coupling in RHIC.

Footnotes

Paper preparation format

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