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Beam Based Alignment in the CeC Experiment

Monday 11 August 2025 14:30 (30 minutes)

During the coherent electron cooling (CeC) experiment at RHIC, we have encountered various challenges to align the electron beam both in the low energy beam transfer line (LEBT) and in the cooling section. For example, the electrons exit the SRF gun with an orbital angle of tens of milli-radian, which is likely caused by the misalignment of the cavity inside the cryostat as well as the tilted cathode. The significant orbital angle leads to transversely asymmetric beam in the LEBT section with deteriorated emittance. In run 23 and run 24, we have demonstrated that such orbital angle at the exit of the gun can be minimized by adjusting the position of the laser spot at the cathode. Another challenge is to align the orbit of the cooling electron beam with the circulating ion beam in the cooling section. Over the past few years, we have developed a procedure to ensure the transverse alignment to the precision of 0.1mm. The proper alignment of the two beams has been confirmed by significant growth of the ion beam's longitudinal emittance due to its interaction with the electron beam as well as increased signal from the recombination monitor. In this paper, we will present the techniques developed for beam alignment with experimental results obtained in the CeC experiment.

Please consider my poster for contributed oral presentation

Yes

Would you like to submit this poster in student poster session on Sunday (August 10th)

No

Footnotes

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Yes

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