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Commissioning of the Complex Bend Prototype Beamline

Thursday 14 August 2025 16:00 (2 hours)

For the NSLS-II upgrade, a novel Complex Bend (CB) optics solution has been proposed to achieve near-diffraction-limited emittance. A key challenge in this design is the requirement for high-gradient quadrupoles (150 T/m) in a compact space. To demonstrate feasibility, a CB prototype was developed and tested using the NSLS-II linac beamline, scaling the beam energy to 100–200 MeV while maintaining strong focusing. The prototype utilized a 16-wedge symmetric Halbach permanent magnet design, achieving a gradient of 140 T/m within ultra-compact quadrupoles. The CB beamline was installed and commissioned in two phases, first as a strong periodic focusing element and later as a combined bending and focusing system. The beam commissioning results showed good agreement with theoretical models, confirming that the Complex Bend functions effectively as both a strong focusing and bending element by offsetting CB poles. This validates the strong focusing design of the Complex Bend for future synchrotron light source upgrades.

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No

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

No

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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