Contribution ID: **133** Contribution code: **THPT16** Type: **Poster Presentation**

Design considerations of the bunch-by-bunch transverse feedback system for the CSNS RCS

Thursday, October 23, 2025 5:10 PM (20 minutes)

The CSNS RCS (Rapid Cycling Synchrotron) is a proton accelerator designed to achieve a target beam energy of 1.6 GeV, with a typical operating intensity of 170 kW, which is expected to be 500 kW with the CSNS-II upgrade. However, a significant beam instability has been observed in the RCS during the early 100 kW beam commissioning. To mitigate this instability, several countermeasures, for instance the optimization of the tunes, the dual-harmonic magnetic alloy cavity, and tuning of the chromaticity, has been implemented. To leave sufficient margin for the high-current operation and damp the beam oscillation associated with the beam instabilities, a bunch-by-bunch transverse feedback system is under development. The current initial design is based on the existing pickup, exciting kicker, and the MTCA.4 platform with the potential upgrade to an intra-bunch feedback system.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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Session Classification: THPT poster session

Track Classification: WGE: Beam Instrumentation, beam Interaction and AI technology