



Contribution ID: 21 Contribution code: THPT59

Type: **Poster Presentation**

Techniques and progress in beam transverse emittance measurement at the CSNS RCS

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

The Rapid Cycling Synchrotron (RCS) of the China Spallation Neutron Source (CSNS) is a key part of the accelerator chain. It accelerates the 80 MeV low-energy beam from the linac to 1.6 GeV and extracts it to hit the target for neutron production. As an important optics parameter, the precise measurement of the transverse emittance is vital for understanding the space charge evolution in the RCS and enhancing the beam quality. In 2019 summer maintenance, a Residual Gas Ionization Profile Monitor (IPMs) was installed for measuring the beam profile turn by turn but failed to work due to external noise. To address this, a new approach was proposed: using a kicker to extract the beam early, with a downstream wire scanner system scanning the beam envelope to get the emittance indirectly. By implementing this method, the emittance data at 170 kW operating power were successfully obtained, and the emittance results under different beam powers were compared and analyzed. In addition, the measurement-related issues are discussed, and future optimization directions were proposed to boost measurement accuracy and RCS performance.

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

Authors: LI, Yong (Dongguan Neutron Science Center); LI, Zhiping (Dongguan Neutron Science Center); HUANG, Ming-Yang (Institute of High Energy Physics)

Presenter: LI, Yong (Dongguan Neutron Science Center)

Session Classification: THPT poster session

Track Classification: WGD:Operations and Commissioning