Contribution ID: **257** Type: **Poster Presentation**

Development of Wall Current Monitor on FETS-FFA Test Ring

Monday 8 September 2025 16:00 (2 hours)

The conceptual design studies of FETS-FFA demonstration ring has been actively performed to confirm the reliability of Fixed Field Alternating gradient (FFA) accelerator for future high-power spallation neutron source, called ISIS-II. Wall Current Monitor (WCM) is a choice of non-destructive intensity monitor to evaluate circulating proton beams from 3 MeV (about 1 MHz in revolution frequency) to 12 MeV (about 2 MHz in revolution frequency) in the FETS-FFA test ring. As the beam orbit shifts radially with beam energies in FFAs, the aperture of FETS-FFA WCM will be about 700 mm in horizontal. The maximum mean beam current is ˜100 mA and tomographic and Schottky measurements require a bandwidth of 370 MHz (100 harmonics) with an intensity resolution of 1%. This is a challenge for such a large monitor. The half-width of demonstration WCM (demo-WCM) was designed and manufactured to benchmark numerical simulations and to understand monitor responses. Whilst measured frequency band was shorter than expected, 1% intensity resolution was achieved in demo-WCM. In this paper, the detail design study as well as the signal response of demo-WCM will be presented.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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Session Classification: MOP

Track Classification: MC01: Beam Charge and Current Monitors