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Performance evaluation of front-end attenuators and integrated gain calibration system for new BPM DAQ system at J-PARC MR

Wednesday 10 September 2025 16:00 (2 hours)

The J-PARC MR achieved its initial target of 750 kW operation and is currently upgrading its equipment to reach the next target of 1.3 MW. The Beam Position Monitor (BPM) must enhance position accuracy to less than one-third of that of the current system to mitigate beam losses caused by accelerating the high-intensity proton beam of 3.3E14ppp. To address this, a new Data Acquisition System (DAQ), comprising Front-end Attenuator Boards (ATT), ADC Boards, Network Interface Controllers, and a Data Storage System, is under development. Improving position accuracy relies on improving reflection at the ATT's input terminal and adjusting the gain balance for each signal channel. A self-contained gain tuning system using a self-generating test pulse and an input impedance tuning circuit has been adopted to mitigate the reflection at the ATT and enhance the gain balance across all components, including sensors, signal transmission cables (100–300m), and the DAQ. The installation of the DAQ system is for this winter and the ATT calibration and performance testing are currently underway. This report presents the calibration results and their impact on beam position accuracy.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

Author: SATOU, Kenichirou (High Energy Accelerator Research Organization)

Co-authors: TOYAMA, Takeshi (High Energy Accelerator Research Organization); YAMADA, Shuei (High Energy Accelerator Research Organization); Dr KOBAYASHI, Aine (High Energy Accelerator Research Organization); Mr OKADA, Masashi (High Energy Accelerator Research Organization)

Presenter: SATOU, Kenichirou (High Energy Accelerator Research Organization)

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