Contribution ID: **186** Contribution code: **WEPCO31** Type: **Poster Presentation**

Development and evaluation of an RFSoC based stripline BPM readout hardware prototype

Wednesday 10 September 2025 16:00 (2 hours)

We have developed a Stripline BPM readout device based on an AMD/Xilinx RFSoC chip which integrates multiple ADCs, DACs, a large scale FPGA, and an ARM processor in a single package. The developed device is intended for use at the beam transfer line connecting the KEK injector Linac to the SuperKEKB collider rings. SuperKEKB will operate at unprecedented luminosities requiring very high beam currents. To reach and maintain such currents, high injection efficiency is essential which in turn requires precise tuning of the injection process. The RFSoC based BPM will provide a highly flexible platform for beam orbit measurements near the injection point required for the tuning. One objective is to enable the separate resolution of the orbit of both bunches in the two-bunch injection mode, where two bunches are accelerated and injected with 96 ns spacing. Additionally, we plan to utilize resulting measurements as inputs for real-time automated injection tuning and feedback to the upstream steering in the beam transport line. Here, we present the status of the development including results from prototype tests conducted at the KEK injector Linac.

Footnotes

Funding Agency

I have read and accept the Conference Policies

Yes

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Session Classification: WEP

Track Classification: MC03: Beam Position Monitors