



Contribution ID: 343 Contribution code: MOPCO12

Type: Poster Presentation

## First Beam Commissioning Experience With RF System On Chip Based Bunch By Bunch Signal Processing Systems at SLS 2.0

*Monday 8 September 2025 16:00 (2 hours)*

After a dark time of 15 months, the new diffraction limited storage ring SLS 2.0 had first beam in January 2025. In April 2025, the nominal beam current of 400 mA was reached. In this contribution, we present the status and first beam commissioning experience with the RF System-on-Chip (RFSoc) based signal processing systems of the new SLS 2.0 ring. RFSocs integrate several fast multi-GSample/s ADCs and DACs, FPGA (programmable logic) fabric and multi-core CPUs all on the same chip. During SLS 2.0 commissioning, the integrated EPICS IOC of the RFSocs provided bunch-by-bunch diagnostics of dedicated BPM position and charge readings. Integrated DACs are driving newly developed transverse and longitudinal kicker magnets, enabling bunch-by-bunch excitation and damping. Bidirectional multi-Gigabit fiber optic links connect the RFSoc to the event system master, thus enabling both synchronisation of the RFSoc to the event system, as well as real-time control of the event system master by the RFSocs, e.g. for control of beam injection timing and filling pattern.

### Footnotes

### Funding Agency

### I have read and accept the Conference Policies

Yes

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**Session Classification:** MOP

**Track Classification:** MC07: Data Acquisition and Processing Platforms