

Low Level RF Workshop 2022



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The CERN SPS LowLevel RF: Architecture & Implementation

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The Super Proton Synchrotron (SPS) Low Level RF (LLRF) has been completely upgraded during the CERN long shutdown (LS2, 2019-2020). The novel architecture of the LLRF and the hardware used will be presented. The architecture is based on a White-Rabbit (WR) network and fast GigaBit links, and all the electronics is using fixed sampling and processing clocks. The WR network is used for the clocks and RF synchronization between RF stations. The clocks are reconstructed locally from the WR data stream and a PLL reduces the phase noise. The RF synchronization is done through the RFNCO IP which is implemented in every node of the network. The RFNCO is also a central component for the fixed-Frequency Acceleration scheme and the Ions slip-stacking to merge batches, these two examples show the flexibility of the SPS LLRF architecture. The hardware of the Beam-Control and 200MHz Cavity-controllers have been replaced with digital electronics implemented on the MicroTCA platform.

Finally, a brief list of result with beam from April 2021 until now will be presented.

Author: HAGMANN, Gregoire (CERN)

Co-authors: Mr SPIERER, Arthur (CERN); Mr STACHON, Ireneusz (CERN); EGLI, Julien (CERN); BAUDRENGHIEN, Philippe (CERN); Mr WLOSTOWSKI, Tomasz (CERN)

Presenter: HAGMANN, Gregoire (CERN)

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