

Low Level RF Workshop 2022



9-13 Oct 2022, Brugg-Windisch, Switzerland



Contribution ID: 3

Type: **Poster**

Consolidation of SwissFEL LLRF system

Wednesday, October 12, 2022 2:25 PM (1 minute)

SwissFEL LLRF system was well designed with precise RF detection, reliable amplitude and phase feedback, and high degree automation. After the start of user operation, new requirements on robustness and reproducibility have been raised for LLRF. Efforts have been spent to consolidate the LLRF system. We implemented lookup-table-based algorithms for the fast setup of klystrons for desired operating points. Amplitude feedback loops manipulating the klystron high-voltage were implemented for C-band klystrons operating in saturation for long-term stability. We optimized the reference tracking scheme for preserving the beam phase after rebooting or power cycling any LLRF components. The race conditions between LLRF triggers and clocks were smartly handled in LLRF firmware. This poster illustrates these consolidations and their results at SwissFEL.

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Session Classification: Poster Session

Track Classification: Low Level RF Workshop 2022