Contribution ID: **1594** Contribution code: **THPS141** Type: **Poster Presentation**

Next-generation LLRF control and monitoring system for S-band linear accelerators

Thursday 5 June 2025 15:30 (2 hours)

The low-level RF (LLRF) systems for S-band linear accelerating structures are typically implemented with heterodyne base architectures. We have developed and characterized the next generation LLRF (NG-LLRF) based on the RF system-on-chip (RFSoC) for C-band accelerating structures and the platform delivered the pulse-to-pulse fluctuation levels considerably better than the requirement of the targeted applications. The NG-LLRF system uses the direct RF sampling technique of the RFSoC, which significantly simplified the architecture compared with the conventional LLRF. We have extended the frequency range of the NG-LLRF to S-band and experimented with different RFSoC devices and system designs to meet the more stringent requirement for S-band LLRF applications. In this paper, the characterization results of the platform with different system architectures will be summarized and the high-power test results of the NG-LLRF with the S-band accelerating structure in the Next Linear Collider Test Accelerator (NLCTA) test facility at SLAC National Accelerator Laboratory will be presented and analyzed.

Footnotes

Paper preparation format

LaTeX

Region represented

America

Funding Agency

Author: LIU, Chao (SLAC National Accelerator Laboratory)

Co-authors: DHAR, Ankur (SLAC National Accelerator Laboratory); NANNI, Emilio (SLAC National Accelerator Laboratory); SNIVELY, Emma (SLAC National Accelerator Laboratory); OTHMAN, Mohamed (SLAC National Accelerator Laboratory); HERBST, Ryan (SLAC National Accelerator Laboratory)

Presenter: LIU, Chao (SLAC National Accelerator Laboratory)

Session Classification: Thursday Poster Session

Track Classification: MC6: Beam Instrumentation and Controls,Feedback and Operational Aspects: MC6.T27 Low Level RF