

Overview of MicroTCA-based LLRF at SXFEL

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The Shanghai soft X-ray Free-Electron Laser facility (SXFEL) is the first X-band FEL facility in China, being developed in two steps, the SXFEL test facility (SXFEL-TF) and the SXFEL user facility (SXFEL-UF). The SXFEL-TF, generates 8.8 nm FEL radiation using an 840 MeV electron Linac passing through the two-stage cascaded HGHG-HGHG or EEHG-HGHG (echo-enabled harmonic generation, high-gain harmonic generation) scheme, started construction at the end of 2014, began commissioning by the end of 2016, and passed national acceptance testing in November 2020. Now, the SXFEL-UF is under construction, with an upgrading the linac energy to 1.5 GeV, and the building of a second undulator line and five experimental end-stations.

MicroTCA-based Low Level RF (LLRF) system plays an important role in electromagnetic field control, signal monitoring and machine protection. There are 12 RF stations in SXFEL-TF with different frequencies (S-band, C-band and X-band). This talk gives an introduction of the development of the software and the firmware, operation status and performance of the LLRF system.

Summary

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