

Overview of the LLRF Activities at SLAC

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The Linac Coherent Light Source (LCLS) utilizes the last 1 km of the SLAC Linac to serve as the electron beam source for the free electron laser (FEL). The FEL provides the x-ray pulses from several to a few hundred femtoseconds. To achieve this goal, the RF system is required to be temporally stable below 100fs in several critical klystron stations. A lot of R&D and upgrades of the LLRF systems have been completed. These upgrades include the Linac source Master Oscillator, Master Amplifier, new design of the LCLS Reference System, new Phase and Amplitude control and detecting system, and the solid state sub booster (SSSB) amplifiers used as klystron pre-amplifiers. LCLS's successful operation has enabled the investment in light-source and accelerator related research facilities at SLAC. Several LLRF systems have been provided for these facilities such as Accelerator Structure Test Area (ASTA), X-Band Test Area (XTA), FACET XTCAV and recently the X-Band Transverse Deflector for Femtosecond Electron/X-ray Pulse Length Measurements at LCLS. The LLRF team has also been working on beam induced RF phasing, intra-pulse feedback, and more compact and robust control with MicroTCA based LLRF system. This paper will give an overview of all the LLRF activities at SLAC.

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