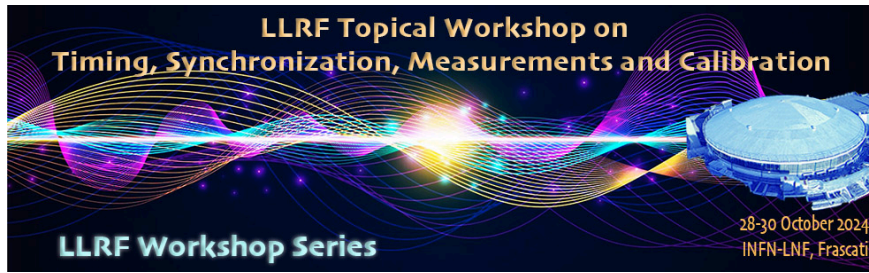


LLRF Topical Workshop - Timing, Synchronization, Measurements and Calibration



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Control & Monitoring Software for Fibre Optic Link Stabilization

Monday, 28 October 2024 16:55 (2 hours)

The CLARA Accelerator at Daresbury Laboratory requires timing information to be distributed to locations up to 100m apart with femtosecond accuracy. This information is delivered as laser pulses via 6 stabilized fibre optic links. Each link uses 3 main subsystems which condition and modify the laser pulses: a piezo-electric fibre stretcher provides closed loop length stabilization to compensate for timing jitter (up to ~5kHz) and drift produced along the transmission fibre; a motorized optical delay stage is used for calibration and to prevent saturation of the fibre stretcher; and an amplification stage is used to maintain sufficient signal strength (~10mW) through the link. Each of these components requires software control, however code that was previously used was fragmented, basic and not suited to use for multiple links simultaneously.

We have developed a new single piece of software to control and monitor these systems concurrently. As CLARA is transitioning to user operations, this software needs to have high reliability, operating 24/7 with minimal intervention. To facilitate commissioning of the systems, it will also automate calibration procedures. This poster presents an outline of the requirements; tools and techniques used to develop the software; and discussion of testing performed to date.

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