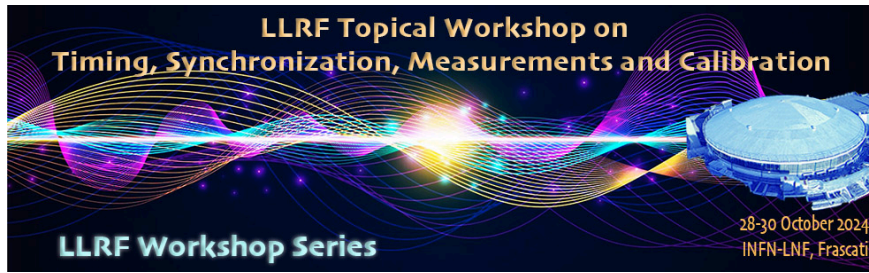


LLRF Topical Workshop - Timing, Synchronization, Measurements and Calibration



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Novel phase-averaging reference system for the CiADS facility

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

The China initiative Accelerator Driven System (CiADS) requires a stable phase reference distribution system (PRDS) to provide low-drift reference signals for over 300 radio-frequency (RF) clients on its superconducting linac and beam transport lines. PRDS is realized using a coaxial cable that transmits 162.5 MHz reference signals, and the phase averaging technique will be employed to counteract phase drift caused by changes in the cable length due to temperature variations. To address the limitations of the traditional phase-averaging solutions due to the presence of reflected signals, such as standing wave effects, demanding directivity requirements of directional coupler, and difficulties in phase reference line expansion, we propose an improvement based on a bi-line structure with unidirectional transmission of the reference signal and front-end phase locking. The design of the PRDS for the CiADS and signal processing in the low level RF system are detailed. The feasibility of the new scheme is verified by testing a prototype PRDS.

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