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New Digital LLRF System for CNAO Linear Accelerator

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CNAO is one of the six hadrontherapy centers able to treat cancer with proton beams and carbon ions. It is a synchrotron with a diameter of 77 meters, equipped with a LINAC as the injector. The stability of the RF in the LINAC being fundamental for the quality of the beam injected into the ring impelled CNAO to decide to upgrade the actual analogic LINAC LLRF to a digital one.
This proceeding describes the CNAO Linear Accelerator LLRF upgrade, and the Libera LLRF system modifications and extensions necessary to fulfill the CNAO requirements. The newly introduced features include: the ability of the LLRF system to process a dual-trigger source, the extension to additional interlock inputs, and the introduction of trigger output signals of configurable timing. It furthermore describes the upgrade of the CNAO LLRF with specific drive-power limitation functions, integrated within a non-linear high-power amplifier response calibration and the commissioning results of the CNAO Linear Accelerator Digital LLRF system.

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