

Commissioning of CW Digital Low-Level RF for 50 MHz Cyclotrons at PSI

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In the long-term project frame of the HIPA (High Intensity Proton Accelerator) RF systems, the replacement of analogue LLRF from the decades 1980 with a digital system is ongoing.

This new digital LLRF system will be used the first time in HIPA for beam operation with a new cavity in autumn 2023.

The tuning system, with hydraulic aggregate and valve actor for the plunger, is working in closed loop. Regulated operation is keeping the cavity on resonance under all changing environmental conditions.

The tuning system controls two independent plungers for the same cavity, which are used in different operation schemes. Phase detection between the accelerating voltage and RF input Power acts as the input to the tuning loop. Phase error Offset, fixed position control, independent plunger tuning and position offset offers the variety of operation scenarios.

The RF system is working with amplitude and phase regulation to maintain the precision and performance of the accelerating field.

For the start-up sequence and also for the operation of the system there are various exception handling procedures implemented.

This poster shows the first test results at the Injector-II/Resonator 2 system.

Keyword

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