

Clock generation for the HIE-Isolde linac

The HIE-ISOLDE project is a major upgrade of the ISOLDE and REX-ISOLDE (radioactive nuclear beams) facilities at CERN. The most significant improvement will come from replacing most of the existing REX accelerating structure by a 40 MV superconducting linac based on 32 independently phased superconducting quarter-wave resonators (cavities). The resonators operate at a frequency of 101.28 MHz and at a relatively high Q, providing an operational bandwidth of only a few Hertz.

The LLRF system is designed to be fully digital, with direct RF sampling and digital quadrature demodulation, as well as direct RF generation by a fast DAC. The field in the superconducting resonator needs to be stabilized with an accuracy of 0.2°/0.2%. This imposes strict requirements on the system reference clock quality in terms of stability and aperture jitter. A low phase-noise clock generator locked to a GPS disciplined reference oscillator has been developed. This poster presents the design and performance of the clock generator as well as achieved results with the direct RF sampling and generation.

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