

# Low Level RF Workshop 2022



9-13 Oct 2022, Brugg-Windisch, Switzerland



Contribution ID: 77

Type: **Poster**

## The self excited loop cavity field controller and the cavity simulator implemented in MTCA.4.

*Wednesday, October 12, 2022 3:05 PM (1 minute)*

The superconducting cavity vertical test stand at DESY is going to be updated with the MTCA.4 based system. The digital self excited loop (SEL) LLRF controller has been developed to fulfill the requirements for the controller to drive the cavity with high  $Q_L$  up to  $1e10$  and high cavity detuning up to 10kHz. In order to test the SEL controller, additionally the real-time cavity simulator has been developed. The electrical and mechanical model of a cavity represented by a differential equation, is implemented inside the FPGA. The model takes the forward power as an input and produces a probe signal based on given detuning and half-bandwidth parameters of a cavity. Microphonic disturbance is also added to simulate the high  $Q_L$  operation. Both, the cavity simulator and the SEL controller have been implemented in the SIS8300KU, DRTM-DW8VM1 pair boards.

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**Session Classification:** Poster Session

**Track Classification:** Low Level RF Workshop 2022