Abstract

MESA is a multi-turn Energy-Recovery-Linac under construction at JGU Mainz, which aims to serve as user facility for particle physics experiments. Its RF-accelerating systems consist of four 9-cell TESLA superconducting cavities and 8 normal conducting cavities working in CW mode. MESA requires RF amplitude and phase stabilities better than 0.01% and 0.01°. The MicroTCA.4 based digital LLRF control system based on the development at DESY, Hamburg will be adapted for MESA cavities. A Matlab/Simulink model was created to find the proper control parameters and to predict the system performance. We present the simulation results and the progress of the implementation.

Overview of the MESA RF topology

MicroTCA.4 based LLRF system

LLRF test setup

The first test setup is built to check a phase shift of the VM output signal according to the phase shift of the RF input signal in an open-loop.

Model simulation

A Matlab/Simulink model is developed to proof the concept, simulate the system response, perform the stability analysis of the control system and optimize control parameters.

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