Contribution ID: **5** Type: **Poster**

Status and preliminary Test of LLRF System for the MESA Project

Wednesday 4 December 2019 15:50 (1 minute)

The Mainz Energy-recovering Superconducting Accelerator (MESA) is currently under construction at the Institut für Kernphysik (KPH) at Johannes Gutenberg-Universität Mainz. MESA is a multi-turn Energy Recovery Linac (ERL) and aims to serve as user facility for particle physics experiments. The RF-accelerating systems of MESA consist of two cryomodules, each with two 9-cell TESLA superconducting (SC) cavities, and eight normal conducting cavities. They operate in continuous wave (CW) mode. The MicroTCA.4 based digital low-level radio frequency (LLRF) system developed at DESY, Hamburg is adapted for the MESA cavities to guarantee a cavity accelerating field amplitude and phase RMS stabilities of 0.01% and 0.01°.

In this presentation, a LLRF system test with a stand alone normal conducting MESA single cell buncher cavity is shown. The amplitude and phase stabilities of the test are 0.05% and 0.05° respectively, which are limited by the stability of the master oscillator of the test bench. Furthermore, the overview of the LLRF system integration into the MESA cryomodules test bench at Helmholtz-Institut Mainz (HIM) test bunker is presented, as well as the preliminary LLRF test results at a temperature of 2 K. The RMS stability requirements are not yet reached due to the lack of the frequency detuning control and the controller parameter optimization. Both are still under development.

Primary author: Dr BAI, Jiaoni (Institut für Kernphysik , Johannes Gutenberg-Universität Mainz)

Co-authors: Prof. HUG, Florian (Institut für Kernphysik, Johannes Gutenberg Universität Mainz); Mr FICHTNER, Frank (Institut für Kernphysik, Johannes Gutenberg Universität Mainz); Prof. AULENBACHER, Kurt (Institut für Kernphysik, Johannes Gutenberg Universität Mainz); Dr HEINE, Robert (Institut für Kernphysik, Johannes Gutenberg Universität Mainz)

Presenter: Dr BAI, Jiaoni (Institut für Kernphysik , Johannes Gutenberg-Universität Mainz)

Session Classification: Poster session