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MicroTCA.4 based RF and Laser Cavities Requlation Including Piezo Controls

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In the paper we are presenting universal solution for RF and laser cavities regulation including piezo controls based on MTCA.4 electronics. The RF field control electronics consists of RTM for cavity probes sensing and high voltage power source driving, AMC for fast data processing and digital feedback operation. The piezo control system has been setup with high voltage RTM Piezo driver and low cost AMC based FMC carrier. The laser cavity electronics uses the same hardware setup. The laser RF signal is a product of analog down conversion to intermediate frequency of nth harmonic of the laser repetition rate which is one above the reference frequency the laser needs to be locked. The fine tuning of the laser is carried out using cavity fiber stretcher. The coarse tuning of the supported optics is done using piezo motor driver application. The both channels can be operated using digital feedback controllers. The communication between AMC modules is performed using low latency link over the AMC backplane with data throughput up to the 3.125 Gbps. First results from CW operation of the RF field controller and the cavity active resonance control with the piezo tuners are demonstrated. The laser lock application performance using both fine and coarse channel feedbacks is shown and briefly discussed.

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