

Eric Breeding - MicroTCA Real-time Monitoring of Injection Kicker Magnets Performs Critical Interlock for High-Power Operation of the Spallation Neutron Source

Wednesday 5 December 2018 15:00 (15 minutes)

The Spallation Neutron Source is a 1.4 MW pulsed neutron source which uses an H⁻ beam accelerator, accumulator ring and Hg target. The proton beam is painted in the accumulator ring for optimum phase space via two sets of the injection kickers, a set of four for each plane. The accumulator ring compresses the 1 ms pulse to 650 ns for delivery onto target.

The previous implementation of the Injection Kicker Waveform Monitor used a set of 5 Oscilloscopes. While this implementation the required function; the data was not real time, the scopes were out of production and a loss of the monitoring system would require halting operations.

The new MicroTCA implementation is based upon the VadaTech AMC502 with two custom FMCs. One FMC provides an interface to the SNS timing and machine protection systems, and the other provides an 8 channel 2.5 MSPS ADC. This system provides real time full length waveforms via a dual channel DMA over PCIe for all 8 channels at 60 Hz.

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Session Classification: Session 3