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SoC based time-resolved scaler DAQ and amplifier-discriminator upgrade for BECOLA

Tuesday, 21 May 2024 16:00 (2 hours)

The BEam COoler and LAser spectroscopy (BECOLA) is a collinear laser spectroscopy facility at Facility for Rare Isotope Beams (FRIB) at Michigan State University. Time resolved laser spectroscopy experiments are performed to study the nuclear structure of radioactive isotopes. The current data acquisition (DAQ) system being used is based on Xilinx Spartan 6 field programmable gate array (FPGA) and supports time resolution of 8 ns. There was a need to upgrade existing hardware to meet the requirements for higher time resolution of fast ion detectors. A new DAQ system with Xilinx Zynq System on Chip (SoC) FPGA based time-resolved scaler was designed, developed and fabricated; and is achieving a time resolution of 2 ns. The current amplifier-discriminator (AD) has an output pulse resolution of 10 ns. To address this constraint and fully leverage the 2 ns time resolution provided by the new SoC FPGA, a new AD with an output pulse resolution of 1 ns was designed. A brief overview of the upgraded DAQ system will be discussed in this poster, including its features, improvements, Experimental Physics and Industrial Control System (EPICS) Input / Output Controller (IOC), and future updates.

Footnotes

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