

Data Acquisition Electronics for ^3He Position Sensitive Detectors

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For high intensity neutron scattering experiments, it required fast data processing because neutron-counting rate is increased. Furthermore, neutron pulse-by-pulse counting is expected for new method of measurements such as observation of transient phenomena by pulsed neutron.

As one of the methods of achieving these measurements, a new data acquisition (DAQ) system has been developed in the Materials and Life Science Experimental Facility (MLF) of Japan Proton Accelerator Research Complex (J-PARC). In this DAQ system, we have developed a new signal processing electronics (NeuNET) for ^3He position sensitive detector (PSD), and a new timing processing electronics (GateNET) for time-of-flight (TOF) measurements. The NeuNET supports fast signal processing by FPGA, high-speed data transfer with the SiTCP technology, and synchronizing every NeuNET under the GateNET, all of which are enable to a scalable and distributed DAQ system. The GateNET is satisfied precise timing control for TOF measurements with the NeuNET, and has neutron-beam monitor interface. Both of these electronics have event-mode data acquisition. Event-mode is one of the characteristic of the DAQ system, which is recording the detection of neutron by the time series as an event data.

We will report detail of the new DAQ electronics system for ^3He -PSD.