Detector Control System for the MPD experiment at NICA collider

Purpose and objectives of the project

MPD - (Multi-Purpose Detector) has been designed to record particles emitted during the heavy ions collisions. MPD is a component of the experimental NICA complex (Nuclotron-based Ion Collider fAcility) under construction at the Joint Institute for Nuclear Research (JINR) in Dubna.

MPD is a multi-detector that includes many subdetectors, including the TOF (Time Of Flight) detector. The purpose of these systems is to determine the trajectory of emitting after collision particles and their deposited energy in the detector's active area.

Complex physical processes leading to the formation of the electrical signal make measurement systems to be maintained at a proper temperature, specific for each type of detector. Ensuring and maintaining the right temperature also applies to electronic circuits cooperating with detection systems.

Slow Control Systems

The Slow Control system is not a subject of physics studies, but it is an inalienable part of any physical experiment. The information from all the detectors has to be saved very quickly. However, each detector needs to have special conditions, such as temperature, gas pressure, voltage. The Slow Control System allows one to measure, monitor, and control those parameters. Thus, the Slow Control System (SCS) is an electronic system intended to support and enable the operation of complex equipment for any physical experiment, for example, for detectors in high energy physics experiments. This kind of system should be modular, and each module should be able to adapt itself to other experiments. That is, it has to be scalable. Many different types of users will have access to this system. It is rather apparent that a shifter should have different access rights than management or maintenance personnel. The majority of program sources should be open if required to do additional coding. It is necessary to save all parameters and their maximal and minimal values. Due to this fact, the EqDb database has been created.

Tasks for student

The student will work with the LabView on the PXI device. The main tasks are:
   a. arrangement of the system in the assembly block and connection to the network of measurement systems,
   b. Developing the software,
   c. Developing the Data Acquisition System,
   d. Performing test measurements and preparing documentation.

Note:

To better understand the project, check other projects that this supervisor offers to students.

It is possible to continue cooperation, for example, in the form of an engineering or a master's thesis and further scientific contacts.