1. Project supervisors

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2. Name of project

Automation and data acquisition in a physical laboratory - problems and available solutions.

3. Introduction

A large number of available electronic components used in physical laboratories around the world generate numerous problems in the acquisition of experimental data. Electronics companies provide software dedicated to the solutions they offer. However, due to individual needs, the software is often created locally, for the unique needs of one laboratory, created by a team of physicists with appropriate programming knowledge. The main goal of the project is to present problems related to the integration of automation systems and data acquisition software, and preliminary analysis of online data. The student will learn about issues in the areas of communication with measuring devices, using ADC(analog to digital converter), software engineering, event programming, multi-threaded programming, and the basics of FPGA (field-programmable gate array).

4. Description of work

Students will be introduced to the problems of experimental data acquisition using of the MBS (multi branch system) data acquisition system of the ACCULINNA-2 separator in the Nuclear Reaction Laboratory. The student's main tasks:
• preparation of a laboratory stand (selection of automation components for the system operation, supplying power and necessary elements for reading data from measuring elements),
• configuring a working data acquisition system and remote parameters control,
• development of a preliminary data analysis method

Photographs: flow cell model (on the left); fragment of the data acquisition system for the experiment on the ACCULINNA-2 separator (center); view of the Go4 program window while the acquisition is in progress (on the right).

5. Requirements to the student

• Knowledge of C ++,
• Nice to have - knowledge of Qt libraries and issues in the field of automation

6. Number of apprentices

The maximum number of participants is 3.