Experimental research automation system

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Abstract

A software system, intended for automation of a small scale research, has been developed. The software allows one to control equipment, acquire and process data by means of simple scripts. The main purpose of that development is increase experiment automation easiness, thus significantly reducing experimental setup automation efforts. In particular, minimal programming skills are required and supervisors have no reviewing troubles.

Interactions between scripts and equipment are managed automatically, thus allowing to run multiple scripts simultaneously. Unlike well-known data acquisition commercial software systems, the control is preformed by an imperative scripting language. This approach eases complex control and data acquisition algorithms implementation.

A modular interface library performs interaction with external interfaces. While most widely used interfaces are already implemented, a simple framework is developed for fast implementations of new software and hardware interfaces.

While the software is constantly development with new features being implemented, it is already used in our laboratory for automation of a helium-3 cryostat control and data acquisition. The software is opensource and distributed under Gnu Public License.