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Control System of MIRACLS at ISOLDE

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The Multi Ion Reflection Apparatus for Collinear Laser Spectroscopy (MIRACLS) is a new experiment in the ISOLDE facility at CERN which aims to conduct collinear laser spectroscopy (CLS) on exotic nuclei with low production yields by exploiting a 30-keV multi-reflection time-of-flight (MR-ToF) device [2, 3, 5]. Ions bunches prepared by MIRACLS' Paul trap are sent into the MR-ToF instrument, where they are reflected back and forth between two electrostatic mirrors. Hence, the ion bunch interacts with a laser beam thousands of times before leaving the device, which yields a significant boost in sensitivity over conventional, single-passage CLS.

The experimental setup of MIRACLS is controlled by the Experimental Physics and Industrial Control System (EPICS). EPICS is a robust set of open-source software tools for creating control systems, for both small and large scale experiments [6]. It is used internationally at dozens of facilities [7], such as IGISOL [8] at Jyvaskyla, Finland and ISAC [9] at TRIUMF, Canada. In EPICS, process variables (PVs) can be defined on a server, and then accessed from anywhere within a particular network. This allows the user to easily create, get, set, and monitor these PVs in order to control a wide range of instruments, such as pressure gauges, vacuum valves, switches, and power supplies.

Powerful EPICS-based graphical user interfaces and displays have been developed at MIRACLS using Python which can control virtually every aspect of the experiment remotely.

This poster contribution will describe the different user interfaces that have been created with EPICS and showcase its power as a control system for nuclear physics experiments.

References

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