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Control systems for the CRIS experiment

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The collinear resonance ionization spectroscopy (CRIS) experiment at ISOLDE has grown over the years to include a multitude of devices and hardware. Control of these devices, and logging of the data that they produce, requires software that communicates across several computers, in different locations (beam line, laser laboratory, data center). In this poster, a schematic overview of the CRISTAL (CRIS Tuning, Acquisition and Logging) software will be presented.

The CRISTAL software is responsible for tuning and recording of the laser wavelengths, recording of transmission fringes produced by Fabry-Perot interferometers, control of high voltages for ion optics, logging of information regarding the proton-synchrotron booster, readout of Faraday cups and other charged-particle detectors, etc. Since these various activities are performed by different computers, the CRISTAL software is built upon a network communication protocol that ensures time synchronization and centralized data storage. Furthermore it features rich graphical user interfaces that allow for e.g. on-the-fly configuration and control. New hardware is added easily with small plugin scripts, which means the CRIS experiment can be continuously upgraded. For example, a recent addition to CRIS was a new time discrimination card with a 500 ps resolution. Using this card, the precise arrival time of laser-ionized ions can be recorded. This has added a new dimension to datasets produced by CRIS. By exploiting this new information dramatic improvements in resolution, when using the (also new) laser ablation source were obtained. Examples of these time-of-flight lineshape reconstructions will be presented.

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