Phoebus Screens for the Neutral Particle Spectrometer

Mary Ann Antonioli, Peter Bonneau, Aaron Brown, Pablo Campero, Brian Eng, George Jacobs, Mindy Leffel, Tyler Lemon, Marc McMullen, and Amrit Yegneswaran

Physics Division, Thomas Jefferson National Accelerator Facility, Newport News, VA 23606

May 31, 2023

This note describes the Phoebus control and monitoring screens for the Neutral Particle Spectrometer (NPS).

The NPS crystal array has 36 rows and 30 columns of lead tungstate crystal blocks, each crystal block measuring 200 mm x 20 mm x 20 mm. Monitoring temperatures of the crystals is critical as their light yield sensitivity is 2–2.5%/°C.

Two sets of Phoebus screens were made for the NPS—one set to monitor temperatures, and in some areas relative humidity and dew point, and one set to control with value inputs and enable buttons.

Initially, the screens used array widgets, with one variable for the array, since the LabVIEW program sending values to the screens also used arrays. It was discovered that the use of arrays would not work with the EPICS alarm server—each alarm signal needed its own variable. Therefore, the Phoebus screens were remade using individual widgets for each item being monitored or controlled, each widget being assigned its own variable.

In the process of remaking the screens, the monitoring screen and the control screen for each area were combined into one screen, reducing the number of screens. The menu screen was revised due to the reduced number of screens and the file name changes.

Eight screens were made. Figure 1, the back crystal zone screen, has both monitoring and control for the 56 sensors on the back of the crystals, listed by the crystal number where the sensor is located.

The left section of the screen, monitoring, has five indicators for each crystal. From left to right, the first three indicators show the current temperature value, the running average, by default the last 300 temperature values, and the standard deviation. These three indicators are followed by two LED indicators that turn red when there is an interlock or a latch. An interlock occurs when the sensor average goes out of limits; the interlock indicator returns to green if the average temperature returns to within limits. A latch occurs when there is an interlock—the latch must be cleared by the user.

The right section of the screen, control, allows the user to change the default low and high alarm limits. There is a button to disable the sensor, usually in the case of a non-functioning or incorrectly functioning sensor, so that the sensor is not read. A button to turn averaging on or off, followed by an input for the number of temperatures to average, if desired to be changed from the default of 300. The interlock enable and trip delay buttons allow the user to turn off an interlock or trip delay. If trip delay is enabled, the number of seconds allowed before a trip is initiated can be entered in the box to the right (default is 30 s).

To conclude, the NPS Phoebus screens have individual widgets. The screens have been tested and implemented in the NPS control and monitoring system
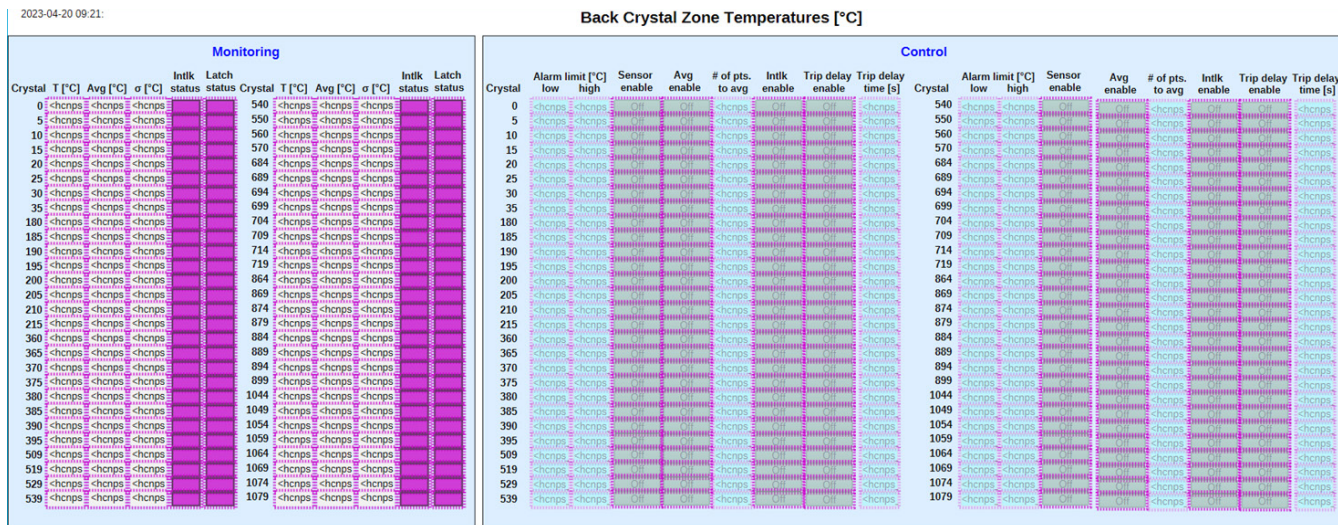

FIG. 1. Screenshot of back crystal zone temperature monitoring and control screen.