Contribution ID: **369** Contribution code: **THPB052** Type: **Poster Presentation**

High-response PLC-based machine protection system development and performance for SRILAC

Thursday 29 August 2024 16:00 (2 hours)

The RIKEN Linear Accelerator (RILAC), one of the injectors at RIBF was upgraded by installing a superconducting RILAC (SRILAC) to search for superheavy elements with element number 119 and above. Before the SRILAC upgrade, the machine protection system in the RILAC was constructed using simple relay circuits. On the other hand, most of the accelerators at RIBF other than RILAC have been equipped with machine protection systems using Mitsubishi MELSEC-Q Programmable Logic Controllers (PLCs) since 2006. They have a mechanism that triggers an anomaly signal to drive the beam chopper to stop the beam and are called beam interlock systems (BIS). Machine protection was needed in the SRILAC project to prevent vacuum deterioration of the superconducting cavity due to changes in the beam orbit. We have developed an FA-M3 PLC-based system to realize a BIS with high response performance at a lower cost than conventional systems. This system is characterized by implementing relatively slow response and I/O requiring high response performance. For example, in the case triggered by an anomaly signal of the electromagnet power supply, simulation of the beam orbit shows that the response performance is relatively slow, a few milliseconds being sufficient. In this conference, the performance results of the constructed BIS will be reported based on the types of anomaly signals in actual SRILAC operation.

Footnotes

Funding Agency

Primary author: UCHIYAMA, Akito (RIKEN Nishina Center)

Co-authors: KOMIYAMA, Misaki (The Institute of Physical and Chemical Research); FUJIMAKI, Masaki (The Institute of Physical and Chemical Research); NISHI, Takahiro (Nishina Center for for Accelerator-Based Science); KUMAGAI, Keiko (RIKEN Nishina Center); YAMAUCHI, Hiromoto (SHI Accelerator Service Ltd.); KANEKO, Kenta (SHI Accelerator Service Ltd.)

Presenter: UCHIYAMA, Akito (RIKEN Nishina Center)

Session Classification: Thursday Poster Session

Track Classification: MC4: Technology: MC4.5 Other technology