Contribution ID: **96** Contribution code: **TUMR019**   Type: **Poster Presentation with Mini Oral**

Proof of concept of a PLC based emittance meter for the NEWGAIN project

Tuesday 23 September 2025 15:54 (3 minutes)

The SPIRAL2 accelerator features several diagnostic devices used to characterize, adjust, and monitor the beam. As part of its NEWGAIN (New GANIL Injector) upgrade project, SPIRAL2 will be equipped with a new source and a new injector. Therefore, new diagnostic tools will be developed, including an ALLISON-type emittance meter. To manage the emittance meter, we opted for a modern industrial PLC solution, leveraging its expanding capabilities and established maintenance advantages over a traditional PLC/VME combination. This paper details the architecture and programming concepts of our proof-of-concept system. It further outlines the test campaign conducted to validate the PLC's capabilities in several key areas: controlling the motors for measurement head positioning within the beam, managing high-voltage ramps, acquiring experimental data, and communicating results to the EPICS control system. The paper will also discuss findings related to current measurement accuracy, measurement rate, and synchronization, as well as the repeatability of the overall measurement process.

Footnotes

Funding Agency

Manuscript formatting

LaTeX

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Session Classification: TUMR Mini-Orals (MC03, MC04, MC08)

Track Classification: MC08: Diverse Device Control and Integration