ICAP'24     GSI   TECHNISCHE UNIVERSITÄT DARMSTADT

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# Automation and AI integration at the CERN injectors

*Wednesday, 2 October 2024 16:30 (30 minutes)*

CERN has recently launched the Efficient Particle Accelerators (EPA) project to enhance the reliability, efficiency, and beam performance of its injector complex. Over the next five years, both classical automation concepts and advanced machine learning (ML) techniques will be pivotal in achieving the project's goals. This talk will provide a brief overview of the EPA project scope and CERN's control systems infrastructure, before delving into the application of ML techniques in various aspects of beam operations.

Key topics will include equipment automation, the mitigation of magnetic hysteresis effects, dynamic beam scheduling, and the implementation of on-demand optimization and continuous control. The discussion will feature specific (near-)operational examples, highlighting the challenges encountered and lessons learned from integrating ML into the control room. The presentation will conclude with an outlook on future plans and the timeline for the EPA project.

**Primary authors:** SCHENK, Michael (CERN); KAIN, Verena (CERN); HUSCHAUER, Alexander (CERN)

**Presenter:** SCHENK, Michael (CERN)

**Session Classification:** Sessions in Living Room 1+2

**Track Classification:** E-2 Surrogates and Machine Learning, Optimisation, Control