Contribution ID: **349** Contribution code: **TUPD016** Type: **Poster Presentation**

Online analysis for kicker missing pulse diagnosis

Tuesday 23 September 2025 16:00 (1h 30m)

The PS beam extraction system includes 12 kicker magnet modules, nine in section 71 and three in section 79, designed to deliver full kick strength for ejecting a 28 GeV/c beam. Since 2020, sporadic missing pulses caused by aging HV generators linked to old electronic control equipment have reduced performance and have been challenging to diagnose. This led to the development of a Missing Pulse Detection Analyser to assist expert diagnostics. Started in 2021, the offline tool correlates kick pulse waveforms with timing data logged in CERN's data logging system (NXCALS), providing an analytical and statistical overview. It has since become an online pulse-to-pulse analyzer that uses data from post-mortem acquisition, the Internal Timing System, and the Generator State Controller, all accessed through Front-End Software Application (FESA) classes. A compact feed-forward neural network, added in 2024, improves early detection of waveform deviations and missing pulse patterns. Developed in Python within CERN's Unified Control Application framework (UCAP), the analyzer interfaces seamlessly with FESA and the Java API for Parameter Control (JAPC), publishing diagnostics through control middleware. This paper details its architecture and initial deployment on the PS Complex (KFA71/79), highlighting operational experience, diagnostic advantages, and plans for integration within the Efficient Particle Accelerator (EPA) framework, including expansion to additional subsystems for the upcoming control consolidation during the 2026 long shutdown.

Footnotes

Funding Agency

Author: Mr BOUCLY, Christophe (European Organization for Nuclear Research)

Co-authors: MONIER, Colin (European Organization for Nuclear Research); Dr VOSCEK, Dominik (European Organization for Nuclear Research); ALGELLY, Malik (European Organization for Nuclear Research); MAGNIN, Nicolas (European Organization for Nuclear Research); YAGCI, Omer Yusuf (European Organization for Nuclear Research)

Presenter: Mr BOUCLY, Christophe (European Organization for Nuclear Research)

Session Classification: TUPD Posters

Track Classification: MC02: Control System Upgrades in Existing Facilities