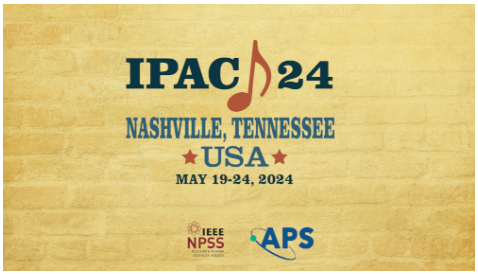


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# High fidelity numerical modelling and condition monitoring applied to septum magnets at CERN

*Thursday, 23 May 2024 16:00 (2 hours)*

The CERN Accelerator Beam Transfer group has recently launched a study to investigate the life cycles of pulsed septum magnets. The development is aiming to enhance the prediction of anomalies, leading to reduced life cycles of these beam transfer equipment. For this reason, the standard vacuum operated, direct drive septa magnet has been chosen to investigate critical design features. In the initial project phase, a so called High-Fidelity (HF) numerical simulation has been carried out, providing insight on critical components, like brazed joints, reducing the fatigue life. In parallel a dedicated test setup with state-of-the-art instrumentation has been developed, allowing to confirm the predicted system response. The novel approach for the beam transfer equipment will allow to review presently established design criteria. In a further iteration, the project is now aiming to demonstrate an anomaly detection and their prediction based on novel machine learning techniques. This paper presents the initial phase of developing the HF model, as well as the results of the instrumented magnet tests which will be compared to results from the numerical simulations.

## Footnotes

## Funding Agency

## Paper preparation format

## Region represented

Europe

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