Contribution ID: **54** Type: **Poster**

Batch spacing optimization at SPS injection by RL

Tuesday, 31 March 2026 12:00 (2 hours)

This contribution will be based on the paper "Batch spacing optimization by reinforcement learning" (DOI: https://doi.org/10.1103/g9wr-197z):
Beams designated for the LHC are injected into the SPS in multiple batches. Given the tight spacing of 200 ns between these batches, the injection kickers have to be precisely synchronized with the injected beam to minimize injection oscillations. Due to machine drift, the optimal settings for the kickers vary. This paper presents an active controller trained by reinforcement learning that counteracts the machine drifts by adjusting the settings. The agent was exclusively trained in a simulation environment and directly transferred to the accelerator. Although its results are slightly worse than those obtained by an explicit numerical optimizer, the BOBYQA algorithm, the agent attains these results much faster since it requires far less computation.

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Yes

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Session Classification: Poster session