ACCELERATING BEAM DYNAMIC SIMULATIONS

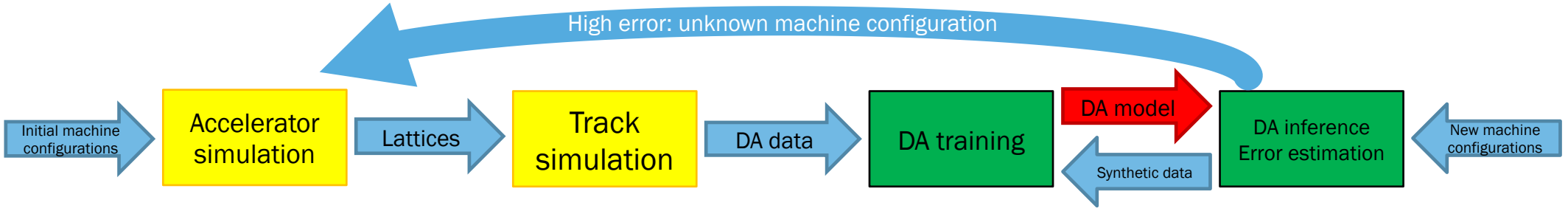
R. DE MARIA[1], D. DI CROCE[2], Y. EL BACHIR[3], M. GIOVANNOZZI[1], G. IADAROLA[1], E. KRYMOVA[3], T. PIELONI[2], F. F. VAN DER VEKEN[1]
[1]CERN, [2]EPFL, [3]SDSC

JUN 8, 2023 | FCC–*ee* ACCELERATOR: CODE DEVELOPMENT

This work was carried out under the auspices and with the support of the Swiss Accelerator Research and Technology programme (CHART) and the Swiss Data Science Centre (SDSC)

MACHINE LEARNING 4 FUTURE CIRCULAR COLLIDER

- The ML4FCC project (epf.ch/labs/lpap/machine-learning-applied-to-accelerators) is a collaboration between EPFL, CERN, and SDSC. We are working towards implementing an Active Deep Learning framework that provides an FCC model and tuning knobs for machine design and optimization based on particle tracking simulations.
- Currently, we have developed a first Active Learning framework that incorporates machine learning tools to accelerate Dynamic Aperture (DA) simulation using HL-LHC data (presently available). This framework includes smart sampling of machine parameters and particle phase-space for specific machine configurations, as well as the implementation of a Deep Neural Network for DA regression.



- To keep the active framework functional, we continuously submit tracking simulations to generate new data for the ML model.