



Contribution ID: 1311 Contribution code: WEPR60

Type: **Poster Presentation**

Algorithmic access to beam control and beam diagnostics at COSY Jülich

Wednesday, 22 May 2024 16:00 (2 hours)

During the last years of operation of the COSY facility, significant improvements were made in beam control and diagnostics. Many systems have been upgraded from a Tcl/Tk based control system to EPICS. One of the advantages of EPICS is the coherent communication via Process Variables (PVs). This allowed us not only to control the synchrotron and its injection beam line (IBL) through GUIs but also allowed us to control the beam with algorithms. In our case, these algorithms covered a range of applications from variation of the currents of the electromagnets up to more advanced techniques of AI/ML such as Bayesian Optimization or beam control with Reinforcement Learning. Due to the unified nature of the PVs, the algorithms can be fed with a plethora of input parameters such as beam positions, beam current, or even live images of a camera. Depending on the algorithm, it is also possible to switch the target quantity (e.g. from measured current at the beam cups to the intensity of the injected beam at COSY). The algorithms can also trigger model calculations and access their results, if desired. We present an overview of different applications and our efforts to prepare COSY for them.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

Primary author: HETZEL, Jan (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Co-authors: AWAL, Awal (GSI Helmholtzzentrum für Schwerionenforschung GmbH); DELIEGE, Christine (Forschungszentrum Jülich GmbH); SIMON, Michael (Forschungszentrum Jülich GmbH); THELEN, Michael (Forschungszentrum Jülich GmbH); GEBEL, Ralf (GSI Helmholtzzentrum für Schwerionenforschung GmbH); MODIC, Robert (Cosylab); KAMERDZHIEV, Vsevolod (GSI Helmholtzzentrum für Schwerionenforschung GmbH); OVEN, Ziga (Cosylab)

Presenter: HETZEL, Jan (GSI Helmholtzzentrum für Schwerionenforschung GmbH)

Session Classification: Wednesday Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D11 Code Developments and Simulation Techniques