

5th ICFA Beam Dynamics Mini-Workshop on Machine Learning for Particle Accelerators



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Photon systems automation activities at EuXFEL 15'+5'

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Large-scale facilities like European XFEL consist of a multitude of subsystems, which often require frequent calibration. Additionally, accurate real-time tuning of many of these subsystems is critical to maintain stable and optimal performance. Automation techniques can be leveraged to reduce operators' time investment and potentially increase the exploitation of allotted beamtime, both in quantity and quality. One example is the automation of photon beam alignment through an instrument, achieved by adjusting multiple optical components, such as mirrors and lenses, using precise and constrained actuation. This process uses Bayesian optimization to iteratively determine the optimal configuration by evaluating system performance metrics, such as beam intensity, shape and position, which requires reliable image processing. In this talk, I will introduce ongoing activities aimed at automating selected components of the photon system at the European XFEL.

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