Contribution ID: **72** Type: **Poster**

Machine-learning driven beamline alignment at EuXFEL

Tuesday, September 20, 2022 5:26 PM (2 minutes)

EuXFEL is a large scale laser facility which operates seven different instruments and the eighth is coming into operation now. All the instruments have a few hundred meters multi-component optical setups, which includes grazing incidence offset mirrors and focusing elements, such as CRL or KB mirrors. To increase efficiency of operation, automation of the beamline alignment procedure has a great importance to deliver the XFEL radiation with its unique properties to the experiment.
At EuXFEL the SiMEX platform [1] for simulating FEL experiment was developed and operated. Here we present an extended approach, in which a Convolutional Neural Network (CNN) model is trained with beam-profile simulations extracted from FEL simulations [2] in combination with the wavefront propagation package [3]. The CNN model is used to estimate and optimize the alignment parameters of the optical components, in order to implement digital shadowing and drastically facilitate the alignment of the XFEL beamlines. The first results of application of the technique to one of the EuXFEL beamlines will also be presented.

1. https://github.com/PaNOSC-ViNYL/SimEx
2. AIP Conference Proceedings 2054, 030019 (2019)
3. Journal of Applied Crystallography 08/2016; 49(4) pp.1347-1355. doi:10.1107/S160057671600995X, https://github.com/samoylv/WPG

Email address of presenting author

liubov.samoylova@xfel.eu

I agree to recordings of my presentation being made at NOBUGS 2022

Primary authors: BRAUSSE, Felix (European XFEL); Dr SAMOYLOVA, Liubov (Europaen XFEL)

Co-authors: Dr BUZMAKOV, Alexey (FSRC "Crystallography and Photonics"); Dr FORTMANN-GROTE, Carsten (Max Planck Institute for Evolutionary Biology); Dr VANNONI, Maurizio (European XFEL)

Presenter: Dr SAMOYLOVA, Liubov (Europaen XFEL)

Track Classification: NOBUGS 2022