Contribution ID: 9

# Performance Comparison of Machine Learning Classifiers for the Calibration of the Hard X-Ray Single-Shot Spectrometer at the European XFEL

Single-crystal monochromators are used in free electron lasers for hard x-ray self-seeding, selecting a very narrow spectral range and further amplifying the original SASE signal. When a crystal is rotated, one can exploit several symmetric and asymmetric reflections as established by Bragg's law. A ML classifier is used during experimental setup to identify the crystal indices corresponding to a given reflection, and eventually calculate the difference between the photon energy as measured by the single-shot spectrometer and the actual one.

By comparing a range of ML classifiers in terms of their performance, the student will have the opportunity to work with experimental data from the European XFEL. Moreover, the student will obtain a general overview of several ML classifiers and will be able to carry such knowledge into their future studies.

### Field

B2: Data processing (software-oriented)

## **DESY Place**

Hamburg

### **DESY Division**

М

#### **DESY Group**

MXL

## **Special Qualifications:**

- Good level of programming in Python (required)
- Prior knowledge in ML tools like Scikit-learn, TensorFlow/Keras, PyTorch (beneficial, but not required)

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