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# Facilitating X-ray beamline alignment with machine learning

Large scale research facilities for top-level science, such as synchrotrons, free-electron lasers and optical lasers like FLASH/DESY, European XFEL, CELIA etc., operate complex beamlines, where a set of optical elements is used to guide and shape photon pulses, and to perform advanced fundamental and applied science experiments. Such experiments place high demands on the quality of the delivered photon beam. One of the main requirements of a successful experiment is the optimized alignment and stability of such beamlines. To facilitate and even improve the alignment of a beamline, a self-optimization of a beamline based on machine learning can be applied which in turn would actively react on natural fluctuations of the photon beam characteristics. The project aims to develop such a tool and implement it at the newly constructed pulse length preserving double monochromator beamline FL23 at the world's first soft x-ray free electron laser FLASH.
For the current project the successful candidate should have a profound knowledge of geometrical and diffractive optics, as well as practical skills in programming, preferably also knowledge in machine learning.
Work on this project involves 70% of the tasks related to programming and 30% of the tasks directly related to physics.

## Field

A4: Development of experimental techniques (methodology oriented)

## DESY Place

Hamburg

## DESY Division

FS

## DESY Group

FLASH-B

## Special Qualifications:

Python + machine learning
Physical optics
Good English and/or German

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