

PhotonMEADOW 2023

Contribution ID: 75

Type: Poster

X-ray lens aberrations retrieved by deep learning from several beam intensity images

In this study, we explore the capability of a Convolutional Neural Network (CNN) trained on synthetic data to accurately estimate the profile error in an x-ray lens. The CNN is able to retrieve the profile expressed as a list of Zernike coefficients from a series of intensity distributions simulated (or measured) at several positions. This approach offers a promising method for profile error assessment in x-ray lenses without wave-front sensor measurements, potentially reducing the need for time-consuming and costly characterization techniques. The results highlight the potential of using machine learning algorithms trained on synthetic data as a valuable tool in the field of x-ray optics for efficient and accurate error analysis.

Journal of Synchrotron Radiation Special Issue: will you submit your contribution?

no

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Session Classification: Poster Session