



Contribution ID: 45

Type: Poster

A SEDCNN Machine Learning Model for Textured SAXS/WAXD Image Denoising

Tuesday, September 20, 2022 5:44 PM (2 minutes)

With the advancements on instrumentations of next-generation synchrotron light sources, methodologies for small angle x-ray scattering (SAXS)/wide angle x-ray diffraction (WAXD) experiments have dramatically changed. Such experiments have evolved into dynamic and multi-scale in-situ characterizations, leaving prolonged exposure time as well as radiation-induced damage a serious concern. However, reduction on exposure time and dose may result in noisy images with much lower signal-to-noise ratio, thus requiring powerful denoising mechanisms for information retrieval. Here, we tackle the problem from an algorithmic perspective by proposing a small, yet effective encoder-decoder-structured machine learning model for experimental SAXS/WAXD image denoising, allowing more room for exposure time and dose adjustment. From preprocessing to architecture design and final performance evaluation, our network provides a bespoke denoising solution for SAXS/WAXD experimental images. Compared with classic image processing models like U-Net, REDCNN, and PMRID for natural images, our proposed model demonstrates superior performance on highly textured SAXS/WAXD images.

Email address of presenting author

lichun@ihep.ac.cn

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

Primary author: Mr ZHOU, Zhongzheng (Institute of High Energy Physics, Chinese Academy of Sciences)

Co-author: LI, Chun (Institute of High Energy Physics, Chinese Academy of Sciences)

Presenter: LI, Chun (Institute of High Energy Physics, Chinese Academy of Sciences)

Track Classification: NOBUGS 2022