Contribution ID: **147** Type: **Oral presentation**

Research on neutron/X-ray CT image denoising method based on semantic context aggregation

Improving the quality of neutron/X-ray CT images is a critical challenge for the energy-resolved neutron imaging spectrometer (ERNI) with dual-modality imaging system at China Spallation Neutron Source (CSNS). Noise and artifact removal is the core process to enhance image quality. However, most existing denoising methods for neutron/X-ray CT cannot handle various noise and artifact types simultaneously. To address this, we focus on the post-processing of neutron/X-ray CT images and employ multiple ways to preserve the details in original image. In particular, we initially investigate the creation of a learning framework based on a transformer-based macro-architecture for semantic representation of image structures in low-quality CT images. Subsequently, we explore the aggregation of contextual information for semantic representations using spatial attention mechanisms and channel attention mechanisms to model contextual relationships. Finally, we conduct experiments on neutron and X-ray CT image datasets, separately evaluating the denoising of low-dose X-ray CT images and the sparse-view reconstruction of CT images. In both application scenarios, we achieve promising results. This approach will help improve the accuracy and completeness of imaging structural details and generate clear neutron/X-ray CT images with different noise and artifacts removed. The implementation of this project will overcome the limitations of existing methods in adaptability, reliability and robustness. We will provide new perspectives, algorithms and models for the neutron/X-ray CT imaging field, thereby supporting key applications such as large scientific facility CT, medical CT, and industrial CT.

Primary authors: 李, 健芳 (高能所); 王声翔, UNKNOWN; 李, 亚康 (高能所); 齐, 法制 (高能所)

Presenter: 李, 健芳 (高能所)

Session Classification: Instruments