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Deep-Learning Approaches for Noise Removal in Neutron Imaging

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Neutron imaging provides a powerful means to investigate samples in real space. At the FRM II, the ANTARES instrument represents a state-of-the-art facility for such studies. However, due to direct viewing of the source and secondary processes, a considerable number of gamma particles reach the detector. These contribute significantly to noise and degrade the overall measurement quality.

The currently employed algorithm *Find&Replace* relies on user-defined parameters and requires substantial computational time. To address this limitation, we propose a supervised deep learning approach as a replacement. Several established neural network architectures are presented, and we introduce a dedicated data pre-processing strategy tailored to the characteristics of neutron imaging data.

As this study is ongoing, only preliminary results are presented. Nonetheless, the findings already indicate a clear improvement compared to the status quo, demonstrating the potential of supervised learning to advance neutron imaging analysis at ANTARES.

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