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Jupyter Notebooks for Neutron Radiography Data Processing Analysis

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The High Flux Isotope Reactor (HFIR) CG-1D neutron imaging facility accommodates a broad range of research applications such as materials science, engineering, energy, physics, biology and plant physiology. This instrument is equipped with a modern data acquisition system that helps users to acquire data in a semi-automated fashion. Until now, raw data were processed using MatLab and/or ImageJ, which required extensive training by beamline staff. In order to improve user experience and to allow live feedback processing of the raw data, the imaging software team has developed tools such as semi-automated reconstruction and Jupyter Notebooks that can be adapted to the specific scientific questions from the research team. One of the advantages of the notebooks is that facility users do not need to be advanced image processing scientists, nor do they need expertise in Python programming. Another advantage is that an existing notebook can be readily adapted for a new experiment without a tremendous time commitment from the imaging software team. Using a few research examples, this talk will present the tools developed and used by the the scientific community coming to CG-1D.

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