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Analyzing neutron imaging data – an open-source collaboration

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It is well-known that a neutron imaging experiment is not finished with the acquisition of the data, but merely is the starting point for data processing and evaluation in order and to extract the information that is needed to draw conclusions about the sample or the observed process. This can be very time consuming depending on the amount of data and complexity of the information it contains [1]. Imaging at pulsed neutron sources enables efficient acquisition of wavelength resolved image data sets, but typically leads to an increased complexity of data analysis. In the majority of cases, the analysis of imaging data includes a sequence of similar operations, at least for the first steps. Later in the process, analysis steps will be more specific with regards to method and sample, but they in general still benefit from available building blocks to solve subtasks. While novel methods, in particular wavelength resolved techniques, still require significant development of software and analyses tools, conventional experiments would profit from unification and interoperability of analyses tools across available instrumentation at different sites. The authors represent software development initiatives for neutron imaging like [2] [3] at four major neutron sources and have decided to join forces to develop corresponding open source analysis tools for neutron imaging [4].
The neutron imaging user community is very heterogeneous, which is typically reflected in the requirements for software tools. All stakeholders agree that a full understanding of particular tools should not be a hurdle or prerequisite for users to analyze their data. This shall also be reflected in flexibility with regards to that some users might require graphical user interfaces while others prefer scripting tools that allows flexible handling of multiple data sets. With this in mind, we aim at making different aspects of energy resolved imaging [5] available to a wider user community and allowing scientists to produce more high quality scientific results in shorter time. The presentation will provide an overview of the project, its objectives as well as an outline of developments and progress.
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