Beitrag ID: **38** Typ: **Poster**

Focusing with a nested mirror optic on the thermal triple-axis spectrometer PUMA at MLZ

Dienstag, 17. September 2024 22:40 (20 Minuten)

A persistent challenge for the inelastic neutron scattering technique is the low scattering cross-section of neutrons, necessitating larger sample sizes compared to other techniques. Focusing the neutron beam is a viable method to increase the flux reaching the sample. However, previous techniques have limitations concerning beam size and quality or require positioning excessively close to the sample, which interferes with sample environments. The nested mirror optic (NMO) is an ideal solution to overcome these challenges, providing a small, well-behaved beam at the sample position while maintaining space for sample environment equipment. The development of supermirror coatings with large m-values has opened the possibility of applying this technique to the thermal TAS instrument PUMA at MLZ. While monochromator focusing with PUMA yields a beam size of about 20 mm x 20 mm at the sample position, the ongoing NMO project seeks to develop, install, and commission an NMO setup that will reduce the beam size to 5 mm x 5 mm while preserving 50% of the incoming neutrons, resulting in an 8-fold increase in flux on small samples. Additionally, it will provide space for the sample environment and will be straightforward to mount and dismount to adjust for the needs of each user.

The use of novel and complex optics necessitates developing new tools to understand the beam characteristics, such as the beam shape and resolution function. The McStas neutron simulation package offers a general tool for Monte Carlo simulations of neutron scattering instruments and experiments. By integrating with the McStasScript Python API, we have built a user-friendly GUI for simulating the PUMA instrument with McStas, including the new NMO optics. This combined program enables the simulation of neutron scattering experiments on a virtual PUMA instrument. For staff, a virtual instrument is useful for testing optics, particularly the NMO arrays. For users, a virtual instrument allows simulating experiments to test instrument parameters and acquire resolution functions. For students, a virtual instrument serves as a learning platform for neutron scattering, allowing them to practice alignment or take measurements without needing to be at the instrument.

We will discuss the planned setup and our current progress in designing the NMO setup for PUMA, along with the scientific case for this device, highlighting several planned use cases. Additionally, we will showcase the progress on the McStasScript-PUMA integration and discuss the planned features and capabilities.

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Sitzung Einordnung: Mounting Posters, Beer and light Dinner

Track Klassifizierung: Instrumentation & Data Management