



Design concept of a diffractometer for the HBS Science Demonstrator

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High-Current Accelerator-driven Neutron Sources (HiCANS) are seen as the next-generation medium sized neutron sources working in the same league as the shut down BER II reactor in Berlin or ORPHÉE reactor in Saclay. In Germany, the Jülich High Brilliance neutron Source (HBS) has been developed at Forschungszentrum Jülich (FZJ) and has been published in a technical design report in 2023 [1] containing 4 volumes (‘Accelerator’, ‘Target Stations and Moderators’, ‘Instrumentation’ and ‘Infrastructure and Sustainability’).

The technological feasibility has been proven at the JULIC facility at FZJ. The next step will be to build the HBS Science Demonstrator to prove that such a neutron source enables a large variety of scientific measurements. It is supposed to have about 1% of the neutron flux expected for the HBS and 5 instruments: a diffractometer, a SANS instrument, a reflectometer, an imaging instrument und an analytics instrument.

The diffractometer is designed as a flexible instrument running with different source frequencies, operation modes and detector arrangements, which will enable different kinds of measurements: powder diffraction, single crystal diffraction, engineering diffraction and maybe even PDF measurement for local structure determination. A preliminary design and first virtual powder diffraction experiments are presented to give a flavor of the instrument performance and to start a discussion about the instrument requirements to enable the foreseen measurements, which will be the basis for the final design.

[1] T. Brückel, T. Gutberlet (Eds.), “Technical Design Report HBS”, Schriften des Forschungszentrums Jülich, General Vol. 9 (Forschungszentrum Jülich GmbH, 52425 Jülich, 2023).

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Sitzung Einordnung: Mounting Posters, Beer and light Dinner

Track Klassifizierung: Instrumentation & Data Management