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Perspectives for accelerator based neutron sources - The HBS project

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Neutrons can be produced by fission in nuclear reactors, spallation using high-power proton accelerators, and nuclear capture reactions with low-energy proton accelerators. While the first two techniques are used very successfully in Europe, the later option only recently gained greater interest. Using high current low energy proton beams bombarding a metal target a neutron flux comparable with current neutron sources is accessible. In the HBS project a scalable accelerator driven neutron source optimized for scattering and neutron analytics is developed. The whole chain ranging from the accelerator to the target / moderator / shielding assembly and the neutron optics is optimized to the needs of the neutron experiments. This approach makes the HBS very efficient enabling competitive neutron fluxes at sample position equivalent or better to existing ones. Due to the scalability in accelerator power the source can vary from a low power pulsed neutron source with an average power at the target of a few kW to a high performance neutron source with ~100 kW average power serving as a full-fledged national neutron source.

The baseline specification of the HBS is a high current low energy proton accelerator to drive a 100 kW neutron source serving up to 3 independent target stations with up to 6 individual instruments at each station for experiments. We will describe the current status of the project and its perspective within the European landscape of neutron sources.

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