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The High Brilliance Neutron Source (HBS) Project for a Next Generation Neutron Research Facility

Content

With very few large-scale facilities left to serve a leading community of about 5000 European neutron users in the 2030s, the European neutron ecosystem will become extremely vulnerable and capacity-limited. Neutron research in Europe risks losing its strength and diversity if limited access to neutron beam time makes it extremely difficult to maintain a sustainable research program based on the use of neutrons.
High Current Accelerator driven Neutron Sources (HiCANS) are a completely new type of neutron research facility based on an innovative concept. They have the potential to rejuvenate the European neutron ecosystem and provide complementary capabilities. The High Brilliance Neutron Source (HBS) project is a highly ambitious HiCANS project characterized by cost efficiency, sustainability, reliability, resilience, easy access and flexibility.
We present the concept of the HBS, discuss the physical and technical solutions for challenging components such as the high-power target, report on simulations and experimental verifications, and prototyping for all major components of the facility. The HBS features a complete set of instruments for diffraction, large-scale structural research, inelastic scattering, and high-resolution spectroscopy, imaging, and neutron analytics with highly competitive instrument performance. The Technical Design Report (TDR) provides a blueprint for construction of the facility.
This work is part of the collaboration within ELENA and LENS on the development of HiCANS.

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