

Development of Scalable High Current Accelerator Based Neutron Sources

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Despite the commissioning of the ESS only about half of neutron capacity will be available for research in Europe in the next decade due to the outage of aging reactors. There is an urgent need for a new class of efficient neutron facilities to offer competitive capabilities with neutrons for many research areas compact. High Current Accelerator based Neutron Sources (HiCANS) are currently in development for this purpose. The basic features of HiCANS are a medium-energy proton accelerator with of tens of MeV and up to 100 mA beam current, a compact neutron production and moderator unit and an optimized neutron transport system to provide a full suite of high performance, fast, epithermal, thermal and cold neutron instruments. The goal is to develop state of the art scalable HiCANS facilities based on proton Linacs with a wide range of beam currents (1-100 mA) and energies (2-100 MeV). The accelerator technology is based on the developments for the MYRRHA project aiming for possible high duty factors and high availability. These facilities are able to deliver different pulse lengths with different repetition rates to several target stations simultaneously in the average power range from kW to MW. The current state-of-the-art in this technology is presented.

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