

Multi Role (Extreme Environment) Instrumentation for the ESS

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Abstract

The European Spallation Source (ESS) is going to be the brightest source of neutrons in the world for scientific research. It will be based on a 5 MW long pulse source of neutrons driven by a superconducting proton linac. The ESS is a European project of 17 countries co-hosted by Sweden and Denmark.

Currently, the ESS is in the Pre-Construction phase. One line of activities here is Design Update in which a Technical Design Report will be produced. As a part of German in-kind contribution to the Design Update phase, development of instrument concepts as well as design and test of instrument components is performed by German Helmholtz centres.

In this contribution we report on development of concept for instrument optimized for scientific research under extreme environment conditions, such as high and low temperature, high pressures, high magnetic fields and combinations of those. Based on general complexity of extreme sample environment, often restricted angular access and small sample sizes, we propose a hybrid instrument concept that combines Diffraction, Small Angle Neutron Scattering and Spectroscopy. In this contribution ideas of combining three different techniques together within one instrument will be summarized and first results from instrument simulations presented.