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Next generation horizontal SANS magnet (NHSM) for quantum phenomena in nanostructures and correlated electron systems

Tuesday, 10 December 2019 13:00 (45 minutes)

The results of two research studies on the development of the “Next generation horizontal SANS magnet (NHSM) for quantum phenomena in nanostructures and correlated electron systems” are presented. The NHSM project is a high performance compensated 12T horizontal magnet optimized for small angle neutron scattering (SANS), reflectometry and the resonance spin echo technique MIEZE (Modulation of Intensity with Zero Effort). The magnet is dedicated for research on quantum phenomena in nanostructures, strongly correlated electron systems and superconductivity.

NHSM will be optimized for lowest possible parasitic background scattering with the least possible amount of material in the beam. Together with a dedicated integrated cryostat, it will offer a wide temperature range of 50mK to 350K. Only the use of modern high-temperature superconducting (HTS) technology will allow the fringe field compensation of a split coil magnet as large as NHSM at reasonable weight (~500kg) and size (75cm x 75cm) enabling the use on a large number of beamlines at MLZ with minimized interference and stray fields. NHSM will be a pioneering project using HTS technology without cryogenic liquids (dry system). As such, NHSM will be the prototype for all future high performance sample environment magnets at large scale neutron scattering or photon scattering facilities.

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