New Generation of Cryogen Free Superconducting Magnets for Neutron Scattering Experiments

O. Kirichek

ISIS Facility, STFC, Rutherford Appleton Laboratory, Harwell, Didcot, UK

Recent advances in superconducting technology and cryocooler refrigeration have resulted in a new generation of superconducting magnets for beam applications. These magnets have outstanding parameters such as high homogeneity and stability at highest magnetic fields possible, a reasonably small stray field, low neutron scattering background and big sample exposure to neutron detectors. At the same time the pulse tube refrigeration technology provides a complete re-condensing regime which allows to minimize the requirements for cryogens without introducing additional noise and mechanical vibrations. The magnets can be used with dilution refrigerator insert which expands the temperature range from 30mK to 300K. Here we are going to present design, test results and the operational data of the 14T magnet for neutron diffraction and the 9T magnet for neutron spectroscopy developed by Oxford Instruments in collaboration with ISIS neutron source. First scientific results obtained in neutron scattering experiments with these magnets are also going to be discussed.