

The future and the present of neutron detectors for instruments at China Spallation Neutron Source

Neutron science and technology plays an irreplaceable role in national defense and industry. China spallation neutron source (CSNS) is a major science and technology platform for multidisciplinary applications. As one of the most expensive core equipment of neutron instruments, the neutron detector plays a very important role in the construction and operation of neutron instruments at CSNS. Based on the requirements of the instruments, many common key technologies of neutron detectors have been studied and the detector system of large-scale engineering application has been preliminarily established. A professional and young team has been cultivated to be engaged in developing the advanced neutron detectors. The team has completed the construction of neutron detectors for General Purpose Powder Diffractometer (GPPD), Small Angle Neutron Scattering (SANS), Multifunctional Reflectometer (MR), Multi-Physics Instrument(MPI), Energy-Resolved Neutron Imaging instrument(ERNI), High Energy Direct-Geometry Inelastic Neutron Scattering Spectrometer(HD), Very Small Angle Neutron Scattering Instrument(VSANS) and Engineering Material Diffractometer (EMD). We have successfully developed a large area of scintillator detector (Fig.1 (a)), a large area of ^3He tube array detector (Fig.1 (b)), an energy resolved neutron imaging detector (Fig.1 (c)) and a ceramic GEM neutron detector (Fig.1 (d)). These detectors are under the final commissioning for operation. At the present, CSNS II will be constructed in this summer. Many kinds of detectors will be further developed to realize better performances including larger area, higher spatial resolution, higher detection efficiency and higher integration.

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