



Contribution ID: 128

Type: Poster

The Time-of-Flight Small Angle Neutron Scattering Instrument at CSNS

Thursday, 17 October 2019 16:30 (2 hours)

The time-of-flight small angle neutron scattering (ToF SANS) instrument at China Spallation Neutron Source (CSNS) is operating now. As the first SANS at pulsed neutron source in China, it is designed to be a general-purpose instrument to probe the inhomogeneous structure of bulk, powder and liquid materials at nano-scale. The SANS@CSNS utilizes beam port #1 of the target station facing a coupled hydrogen moderator and adopts a short straight beamline configuration with the classic point-focusing pin-hole camera geometry. The instrument consists of pre-sample collimation in segments, one T0 chopper blocking prompt-strike fast neutrons and one double-disk band-width chopper selecting the working wavelength from 0.5 to 12 Å [1]. The incident neutron beam is shaped by a set of three beam apertures and counted by one pre-sample beam monitor. The sample transmission can be measured by a GEM monitor after it while the scattered neutrons are detected by a Linear Position Sensitive Detector, which composed of 120 ³He tubes with 8 mm in diameter and 1 m in length. This detector arrays can move from 2 m to 4 m positions away from the sample, which are capable to cover a wide q range.

After a series of intensive hot -commissioning work, the beamline has been tuned to an optimum state. The instrument has been calibrated by three types of standard samples. The result demonstrates that the quality of the data from SANS@CSNS is comparable with those from other established SANS facilities. Increasing number of users from various fields have shown great interest in applying SANS in their research, as SANS provides an alternative/brand new view of their samples in nano-scale. The user program has been started since last October after the national acceptance test. For the next stage, we will start cultivating and serving the user community and keep exploring more scientific opportunities in the foreseeable future.

References

[1] Ke, Yubin , et al. "The time-of-flight Small-Angle Neutron Spectrometer at China Spallation Neutron Source." *Neutron News* 29.2(2018):14-17.

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Session Classification: Poster