

Operation and Experiments of the CSNS Back-n Facility

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Abstract: CSNS (China Spallation Neutron Source) is a large scientific facility which was completed in the construction and open to general users in 2018, aiming for multidisciplinary research mainly based on neutron scattering techniques. The CSNS Phase-I includes a high-power proton accelerator complex, a target station and three neutron scattering instruments, with a proton beam of 1.6 GeV and 100 kW, which will be upgraded to 500 kW at Phase-II and twenty instruments in total. During the Phase-I construction, a white neutron facility (Back-n) which is mainly for nuclear data measurements was also constructed with multiple support resources. The Back-n makes use of the back-streaming neutrons at the spallation target, which is among the world-class white neutron beams with a very intense flux of 10^7 n/cm²/s at a flight distance of 55 m, very wide energy spectrum of 0.1 eV to 200 MeV, and a good time resolution of less than 1% for almost the whole energy range. In the first three operation years, the Back-n has provided a beam time of 4500 hours or more per year, for wide applications from neutron-induced nuclear data measurements, detector tests, neutron imaging and element identification analysis to chips irradiations. With nuclear data measurements, five common spectrometers are available for neutron capture cross-section, total cross-section, fission cross-section, and user-owned HPGe detectors for in-beam gamma spectroscopy. More than 40 nuclides have been measured. This talk will give an overview about the operation status and the experiments that have been conducted at the Back-n. The future prospects will be also discussed.

