Measurement of the Neutron Energy Response Curve of Fission Target Detection System Based on CSNS Back-n

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Abstract

For the sensitivity of fission target detection system, we can only use Cockcroft-Walton accelerator's 14MeV neutrons to calibrate its sensitivity previously. In this work, using time of flight method in the back-streaming white neutron beam line (Back-n) of the China Spallation Neutron Source (CSNS) in Hall 1(with flight path of ~55 meters) with double-bunch mode and single-bunch mode, we acquired the ~0.3-10MeV neutron sensitivity of a detection system based on U-235 fission target and SiC detector (with thickness of about 30μm). A preamplifier with amplitude output and timing output coincidence with accelerator's delayed FCT signal was used as TOF signal, which were all inputted to the CAMAC system as DSP. The gamma-flash signal of a Si-PIN detector with thickness ~300μm placed in the symmetrical "target leg" was use as zero time. The results of single-bunch mode get well compared with that of double-bunch mode.

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