The LLD and ULD for the uranium standard samples were finally set as 2.2 and 2.6 V respectively to eliminate the interferences from ^{40}K and ^{232}Th. The relationship between the count of standard ^{238}U samples and the weight of ^{238}U content in the samples was shown in Fig. 2, which were in good agreement in the error range. As for standard ^{232}Th samples, the threshold values were set as 2.8～3.8 V, and the results were shown in Fig. 3. It's shown that the weight of ^{232}Th content and the counts of standard samples is in a good linear relationship within statistical errors.

The portable rapid detection device has four individual channels, which could measure the background, ^{40}K, ^{238}U and ^{232}Th at the same time. It's the second generation of our potassium-measuring device, which has single channel only, and works in the same mode. We will further optimize the measuring conditions of ^{238}U and ^{232}Th samples in the future for the development of the four-channel detection device.

5 - 13 Nuclear Data Measurement Facility for ADS Spallation Target Design

Chen Zhiqiang, Liu Jianli, Han Rui, Shi Fudong, Zhang Suyalatu, Liu Xingquan
Jin Zengxue, Lin Weiping and Roy Wada

The nuclear data measurement facility for ADS spallation target design has been preliminarily constructed, which provides a very important platform for the experimental measurements of spallation reactions. The facility consists of a high vacuum thin metal foil ion beam window, a remote controlled moving target system, a beam pickup time-of-flight detection system, a light charged particles time-of-flight spectrometer, a neutron time-of-flight spectrometer, a radiation protection system and electronics and data acquisition system. The high vacuum thin metal foil beam window is equipped with a gate valve, a vacuum chamber, a mechanical pump, a molecular pump, a vacuum measurement system and a metal foil ion beam window. The remote controlled moving target system includes a stepper motor controller that controls an operation of a stepper motor to move target frame in the beam position by a 4 0 m long cable . The beam

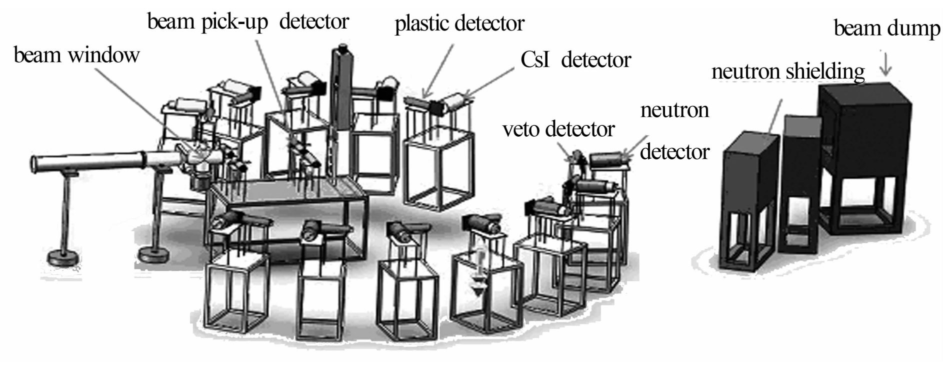

Fig. 1

pickup time-of-flight detection system includes a plastic scintillator detector with dual-PMT readout, which can give the time and position information of the beam and two plastic scintillator detectors with single-PMT readout, which can limit the size of the beam profile. The light charged particles time-of-fight spectrometer consists of a plastic scintillator detector and CsI(Tl) detector. The plastic scintillator detector is used to measure the TOF and energy loss of the particles and the remaining energy of the particles is collected in the CsI(Tl) detector. The light charged particles can be identified with TOF-dE-E technique. The neutron time-of-flight spectrometer consists of a plastic scintillator detector and a liquid scintillation detector. The energy spectrum of the neutron can be obtained by time-of-fight method. The plastic scintillator detector is used to veto the charged particle in the neutron detector. The liquid scintillation neutron detector can be used to measure the quick timing information and excellent neutron-gamma discrimination capability. The radiation protection system includes beam dump and neutron shielding wall. The beam dump is used to stop the beam so that it can prevent the radiation pollution since the high energy beam passes through the target and hits on the wall of experimental hall. The neutron shielding wall shields the neutron coming from the beam dump to neutron detector.

5 - 14 Measurement of Gamma Response Function of EJ301 Organic Liquid Scintillator

Zhang Suyalatu, Chen Zhiqiang, Han Rui, Liu Xingquan, Lin Weiping
Jin Zengxue, Liu Jianli and Shi Fudong

The gamma response functions of EJ301 (5 cm in diameter and 20 cm in height) organic liquid scintillator detectorwith standard ^{22}Na, ^{60}Co and ^{137}Cs gamma sources were measured in experiment. Standard gamma sources were mounted on the center of the entrance windowof a cylindrical (5 cm in diameter and 20 cm in height) scintillator cell. The gamma rays emitted from sourcewere detected by EJ301 scintillator coupled to ET 9813KB photo-multiplier tube.

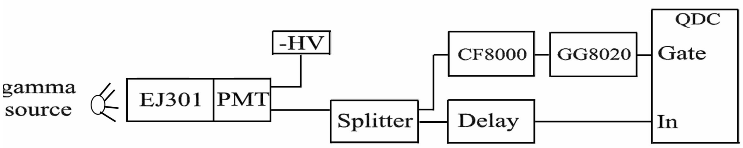

Fig. 1 Experimental setup and electronics setup of electron responses measurement of gamma source.

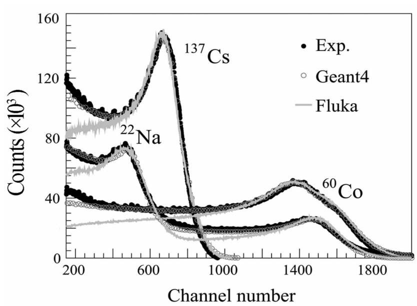

Fig. 2 Comparison of experimental light output with simulation results.

The layout of experimental setup and electronics setup is shown in Fig. 1. The anode pulses from the photomultipliers of the EJ301 neutron detector were split intotwo by signal dividers. The electronic charges of the one branch were recorded by the Phillips 7166 QDC. Another one was sent to ORTEC CF8000 (constant fraction discriminator) and ORTEC GG8020 (Gate Generator)for a common gate of QDC. The light output data are collected event by eventbasis using a CAMAC-based online data acquisition system. The light output distributions ofstandard ^{22}Na, ^{60}Co and ^{137}Cs gamma sources were obtained. Background was measured and extracted in the offline data analysis.

In the present work, the gamma response functions of EJ301 neutron detectorwere also simulated by using GEANT4[1] and FLUKA[2]. The simulation results of GEANT4 and FLUKA are compared with experimental data. As shown in Fig. 2, the results of simulation well agree with the experimental data.

References

[1] Geant4 Reference Manual, available from http://cern. ch/geant4.
[2] Fluka Reference Manual, available from http://www. fluka/org/.