Neutron Time-of-Flight Measurement with 1.7-MV Tandem Accelerator Irradiated to A Lithium Target

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Keywords: Time-of-Flight, Lithium Target, Neutron Measurement, Tandem Accelrator

Neutron time-of-flight (nTOF) measurement is arranged and conducted with neutrons generated by a 1.7-MV tandem proton accelerator. Neutron is generated by irradiating proton beam on a target covered with 300 nm Li layer. The accelerator is configured to operate in pulsed beam mode with its pulse width less than 60 ns at 20 kHz repitition rate, so that a gamma flash type nTOFmeasurement system is able to identify the generated neutron energy. The nTOF system consists of a 3” cylindrical NaI scintillation detector and four stilbene scintillation detectors. NaI scintillator is placed 50 cm away from lithium target to indicate time of beam irradiation on the target, and stilbene detectors are placed 2 m and 3 m separately to identify nTOF at each location. As a result, the nTOF system successfully measures energy spectra of neutrons irradiated by 2.6-MeV and 3.0-MeV protons with energy resolution within the beam pulse width. The result is compared with mesurement previously done with other methods for further verification.

Acknowledgments
This research was supported by National R&D Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Science, ICT & Future Planning (2018M2A2B3A02072240)