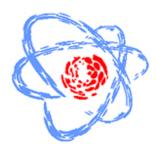
## The XXI International Scientific Conference of Young Scientists and Specialists (AYSS-2017)



Contribution ID: 227 Type: Poster

## Possibility of fast neutron detection with position sensitive pixel detector Timepix

Tuesday, 3 October 2017 16:30 (1h 50m)

This paper presents a position-sensitive detection method for fast neutrons by proton recoil in a plastic scintillator. The detector consists of a plastic scintillator with silicon photomultiplier readout and pixel detector Timepix. As a known plastic scintillators are hydrogen-rich materials adopted as neutron to proton convertors by elastic (n, p) scattering. Silicon pixel detector Timepix is used for position-sensitive detection of recoil protons which exit the plastic scintillator. Scintillation light is read out using micropixel avalanche photodiode of type MAPD-3NK from Zecotek Photonics Inc. MAPD-3NK allows to measure the energy loss by protons in the plastic scintillator and to trigger Timepix detector.

Timepix detector is a silicon based hybrid pixel detector which allows obtaining information from each pixel. The detector consists of 256256 square pixels (55  $\mu$ m) with pitch size of 55  $\mu$ m. The active area and thickness of the detector is about 1.96 mm2 and 300  $\mu$ m, respectively.

Micropixel avalanche photodiode of type MAPD-3NK is one of silicon based alternatives to common vacuum photomultipliers. MAPD-3NK consists of deeply burned pixels connected in parallel and operating in the Geiger mode. MAPD-3NK has a total photosensitive area of 3.73.7 mm2 and 10000 pixels per mm2. Operating voltage is about 90 V for this photodiode.

Experiments have been carried out with 239Pu-Be radioisotopic neutron source and monoenergetic neutrons from the reaction D(d, n)3He on the EG-5 Van de Graaff accelerator, FLNP, JINR.

Primary author: CHUPRAKOV, Igor (JINR,FLNP)

**Presenter:** CHUPRAKOV, Igor (JINR,FLNP) **Session Classification:** Poster session