

PROTOTYPE OF TWO-DIMENSIONAL SCINTILLATOR DETECTOR BASED ON ZnS(Ag)/⁶LiF WITH WAVELENGTH-SHIFTING FIBERS

M. M. Podlesnyy^{1,2}, V. Milkov¹, A. A. Bogdzel¹, V. I. Bodnarchuk¹, O. Daulbaev^{1,3,4},
A. K. Kurilkin¹, M. O. Petrova¹

¹ Joint Institute for Nuclear Research (JINR), Dubna, Russian Federation

² Moscow Institute of Physics and Technology (National Research University), Dolgoprudny, Russian Federation

³ The Institute of Nuclear Physics, Ministry of Energy of the Republic of Kazakhstan, Almaty, Kazakhstan

⁴ Al-Farabi Kazakh National University, 050038 Almaty, Kazakhstan

E-mail: maxim.podlesnyy@nf.jinr.ru

Prototype of two-dimensional scintillator detector based on ZnS(Ag)/⁶LiF with wavelength-shifting fibers has been developed in the Frank Laboratory of Neutron Physics of the Joint Institute for Nuclear Research (Dubna).

The detector consists of 4-layers of scintillator plates (ND screen) 9.6 x 9.6 cm² and 5-layers of wavelength shifting optical fibers with a thickness of 1 mm (square cross section), located between plates (fig. 01). The detector is divided into 16 channels along the X coordinate and the Y coordinate. One channel equals 6 mm and includes three fibers. The channels are separated using 14 μm aluminum foil.

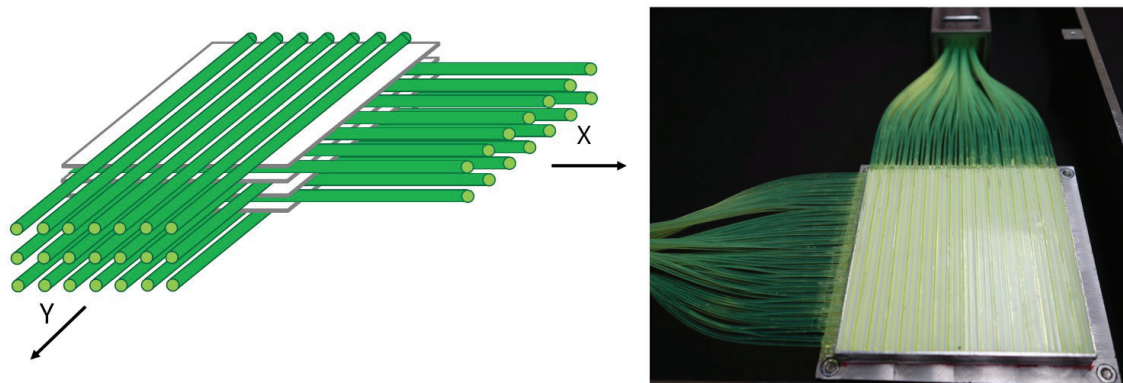


Fig. 1. Simplified layout of the scintillator and optical fibers (left), photo of the detector assembly(right).

There were used two 16-channel photomultipliers Hamamatsu - H8711-100 (photocathode 30x30 mm) for the formation of an electronic signal and its amplification. Further signals were recorded and processed using multichannel digitizers from CAEN and a personal computer. Data were obtained on an experimental bench using a ²⁵²Cf neutron source. The report will present the first results obtained, as well as methods for selecting and processing these results and their efficiencies.