

THE INVESTIGATION OF STILBENE SCINTILLATOR DETECTOR AT ACCULINNA-2

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Neutron detector array has been employed and developed in the investigation of light neutron rich nuclei at Acculina -2 separator, in the Flerov Laboratory of Nuclear Reactions (FLNR, JINR). Stilbene exposes its excellent Pulse Shape Discrimination (PSD) properties for neutron-gamma separation compared to liquid or plastic scintillators, which is the key factor to eliminate the unwanted gamma-rays background in fast neutron measurements. Consequently, a prototype of fast neutron detector based on stilbene crystal coupled with a 3" PMT has been devised in our work. Utilising several standard gamma-ray sources to determine the light yield response of stilbene detector by means of Compton Edge technique. Accordingly, the neutron-gamma discrimination capabilities will be exposed at different range of energies. Moreover, the timing resolution of stilbene detector will be investigated as well.

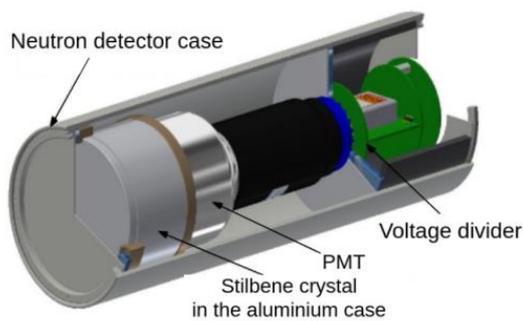


Fig.1. The 3D prototype of stilbene crystal.



Fig.2. Stilbene modules attached with 3" PMT.

Goals: after the training, you will be able to grasp the principle on fast neutron detection, more precisely, how a stilbene scintillator detector works. Next is to have some practical experience in evaluating its stilbene performance in terms of light output response, timing resolution and neutron-gamma separation abilities.

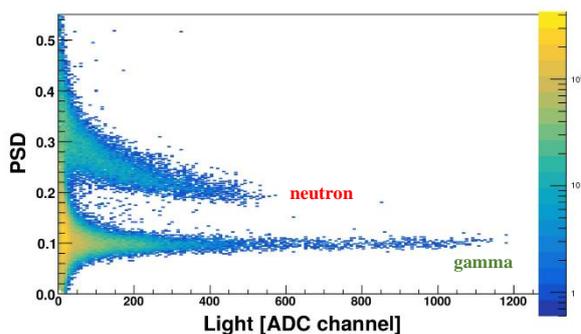


Fig.3. Neutron-gamma separation for stilbene detector at different energies.



Fig.4. The experimental stilbene detectors being implemented at ACCULINNA-2.