Test of the Neutron Detector Prototype

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In June 1996 two protytype modules of the neutron detector for the COSY - 11 installation were build in Cracow. The first operation tests were performed during the measurements in July and September 1996. Two modules as well as a veto detector were installed as shown in figure 1. The module indicated as 'n1' consists of five scinitillation plates interspersed by plates of lead, each with dimensions of 500 mm x 90 mm x 5 mm. The scintillators are connected to photomultipliers on both sides, via twisted strip light quides. The second module depicted as 'n2' is drawn schematically in figure 2. It is built of eleven plates of scintillator material with dimensions 240 mm x 90 mm x 4 mm and eleven plates of lead with dimensions 236 mm x 90 mm x 4 mm. This module is read out only on one side. The light guide is made of one solid block of plexiglass, which changes smoothly its shape from rectangular to cylindrical, in order to collect the scintillation light on a circular photocatode of a photomultiplier.

The ADC and TDC spectra observed during the measurement in September are shown in figure 3. The two peaks in the TDC spectrum result from two different triggers used simultaneously in the experiment. The peak observed in the ADC spectrum may be caused by charged pions or protons originating from the target. However, in order to check the detector response on the neutrons, a detailed analysis is necessary and is in progress.

Further twelve modules of the 'n2' kind will be produced in Cracow during the next five months.

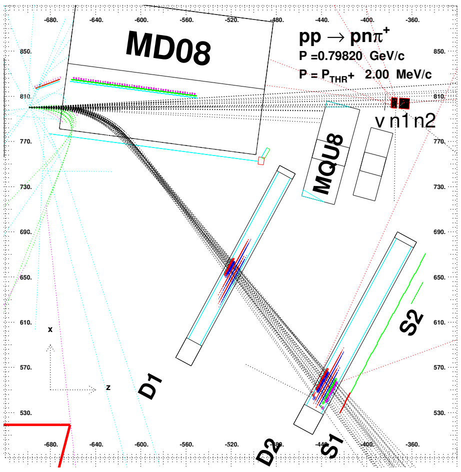

Figure 1: Part of the COSY-11 detection system together with the neutron detector prototype.

Figure 2: Scheme of the neutron detector prototype

Figure 3: Raw ADC (upper) and TDC (lower) spectra obtained during on July measurements.