Registration efficiency of a stilbene based neutron detector

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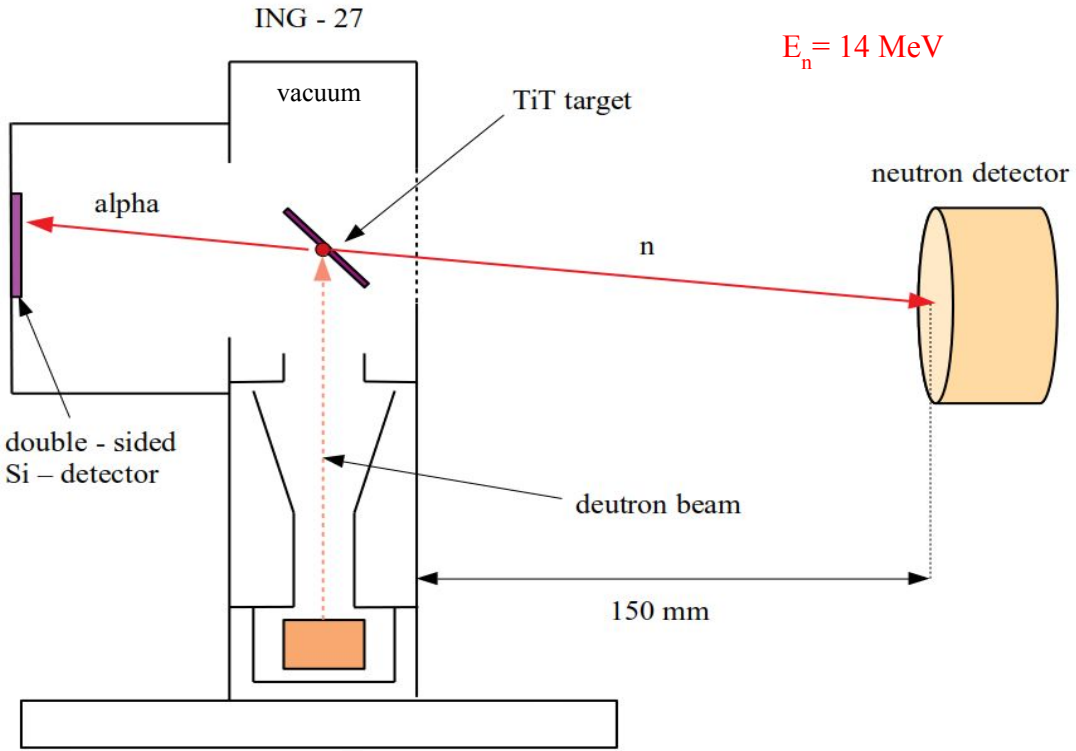
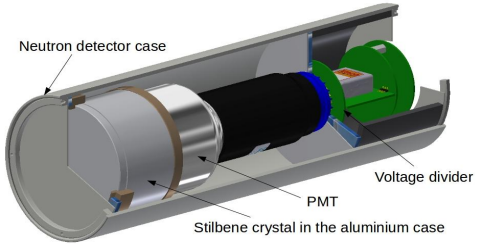
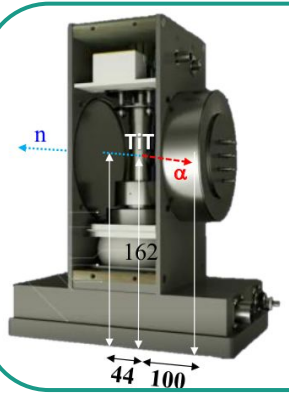
Scheme of $^{3}H(d,n)^{4}He$ reaction





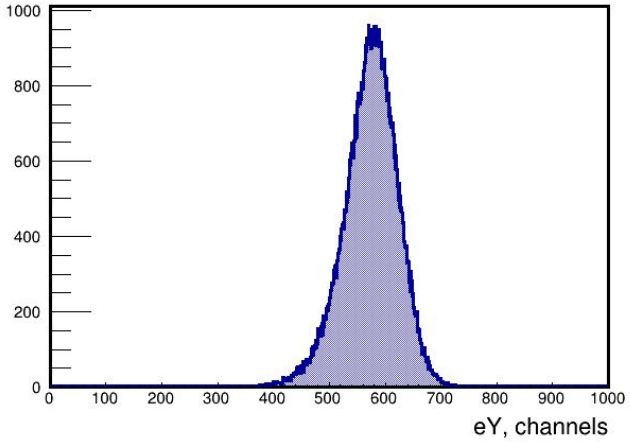
Neutron module in sectional view

- diameter 8 cm, height 5 cm
- molecular formula C_4H_{10}
- time resolution of 400 ps
- threshold of n-γ discrimination of 200 KeV

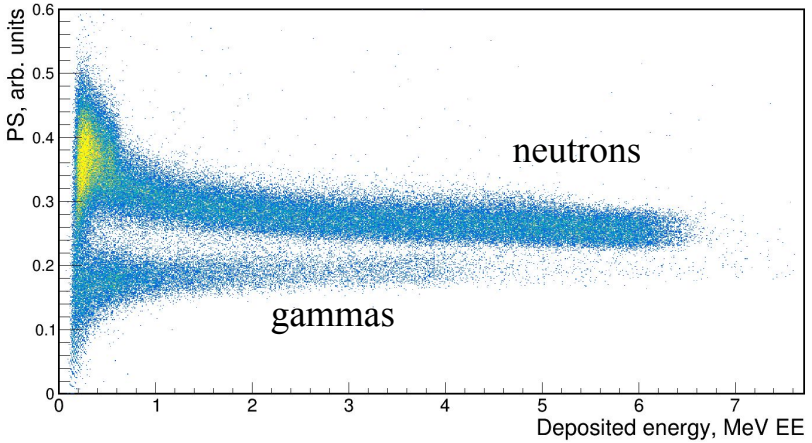


ING-27 dimensions (mm) and the direction of irradiation of $^{3}H(d,n)^{4}He$ reaction fragments

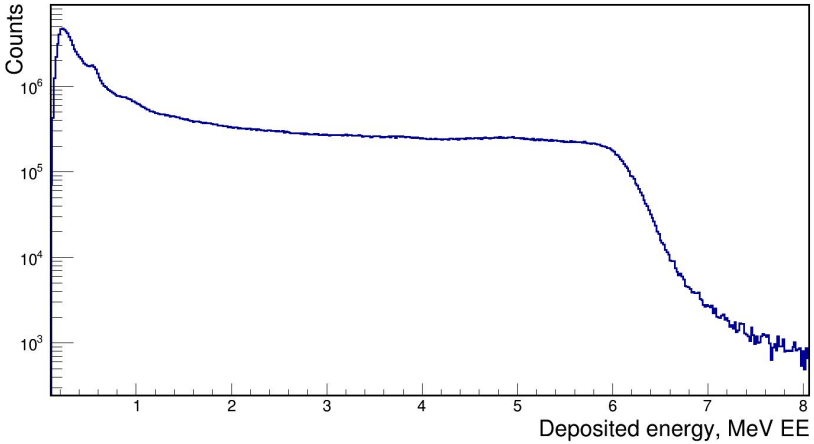
What did we measure ?



Energy spectra of α - particles measured by a silicon detector. Energy deposited in the one of Y-side strips is shown.

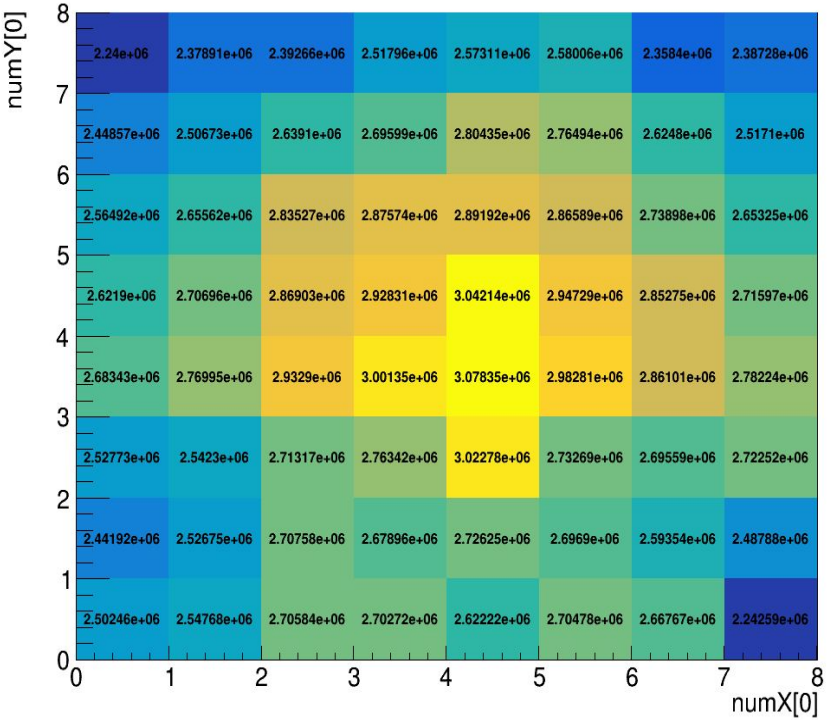


Pulse - shape neutron - gamma discrimination: events which correspond to neutron hits and gamma hits

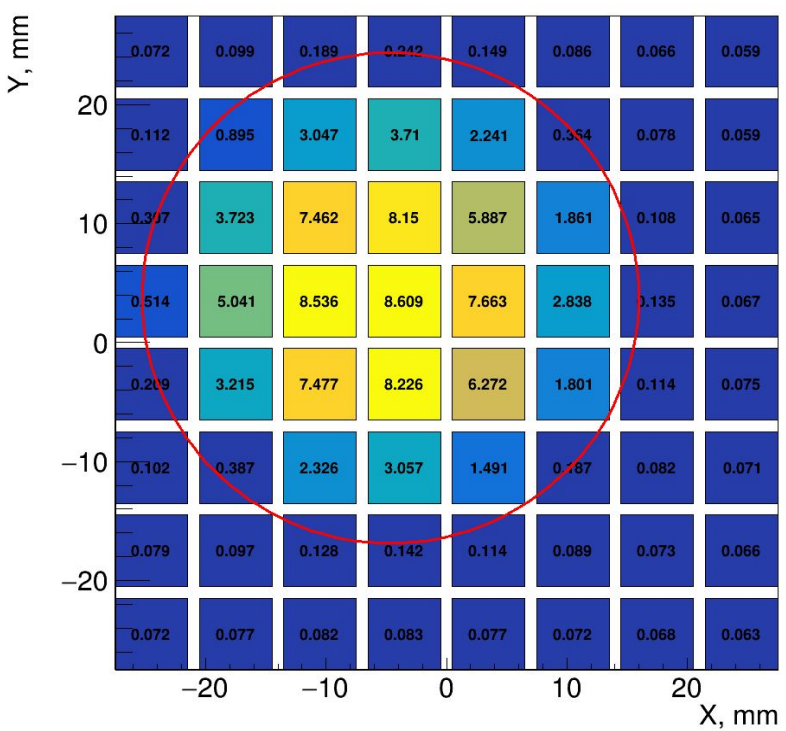


The experimental spectra of signal amplitudes from the neutron detector for E_n = 14 MeV

Registration efficiency of the stilbene based neutron detector



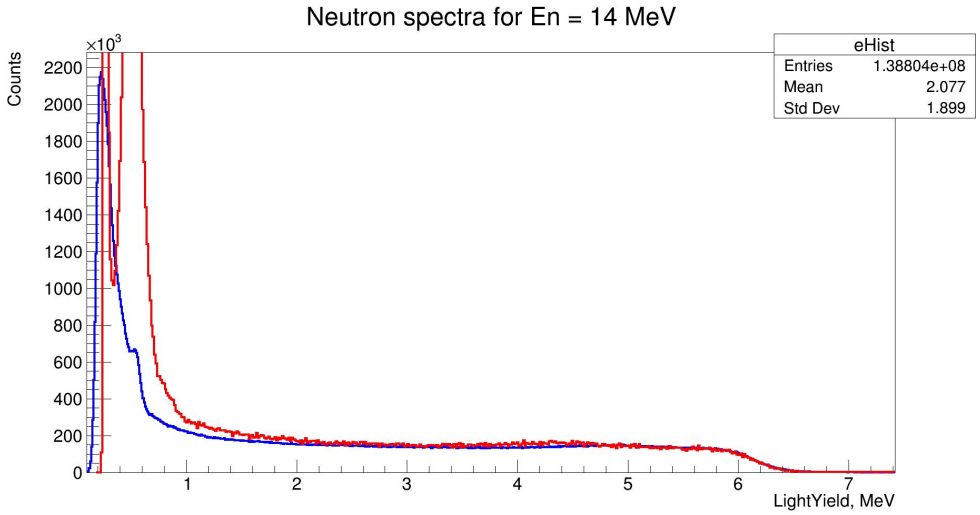
A two dimensional plot shows the number of alpha-particles detected by the double - sided silicon detector



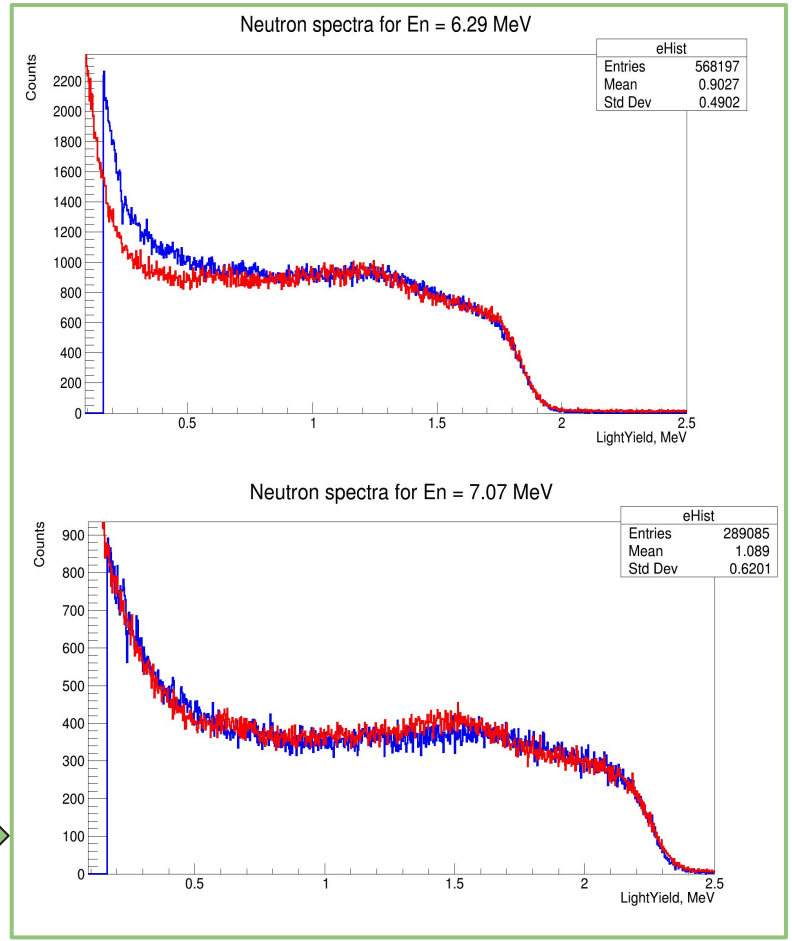
Projection of the neutron detector (red line) onto the coordinate axis of the silicon detector. The picture shows the registration efficiency of the neutron detector (in %) depending on the XY strips of the silicon detector.

Monte Carlo simulation of the neutron spectra in a GEANT4 framework (physics list QBBC)

The experimental (blue histogram) and simulated (red histogram) spectra of signal amplitudes of the neutron detector



Neutron spectra for E_n = 6.29 MeV and E_n = 7.07 MeV from the experiment of the excitation function measurement for $^{13}C(^4He,n)^{16}O$ reaction.
Nur - Sultan, Kazakhstan 2018



Thank you for attention!

Monte Carlo simulation of the neutron spectra in a GEANT4 framework (physics list QBBC)

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