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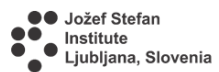
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01 Fundamental Physics / 211**#01-211 Production and Monitoring of Neutron Flux by Activation Detectors**

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At the microtron M-10 of Uzhgorod National University there are carried out experimental investigations of photonuclear reactions as well as applied studies of irradiation influence on the properties of new technological materials and electrical components. It is possible to use electron, bremsstrahlung and neutron fluxes.

The bremsstrahlung is generated by output electron beam at few millimeter thick tungsten or titan converter. Neutrons can be generated on ⁹Be target in (γ, n) reaction (with a reaction threshold 1.67 MeV). To measure neutron flux we use ⁵⁹Co as activation detectors. Cobalt detector is activated by neutrons to ⁶⁰Co ground state and to isomeric level ^{60m}Co with half-life 10.47 minutes and following isomeric transition $E_{\gamma} = 58.6$ keV to the ground state. After β -decay (half-time 5.27 years) the ground state gives well known two lines $E_{\gamma} = 1173$ keV and $E_{\gamma} = 1332$ keV.

The neutron flux was tested at the microtron for 8.6 MeV output electron beam, which was converted to bremsstrahlung by 2 mm thick tungsten plate. The cobalt detector (boxed powder $\text{CoCO}_3\text{Co}(\text{OH})_2\text{nH}_2\text{O}$, mass 31 g) was irradiated during 10 min by neutrons generated by bremsstrahlung at beryllium block of size $\varnothing 10 \times 14$ cm and weight 2 kg.

Measurements of γ -radiation from the activated cobalt were performed with a spectrometer, which includes a NaI(Tl) scintillation detector with an SBS-40 amplifier-to-digital converter board, which is connected to a computer (the spectrum is built using AkWin). The energy resolution of the spectrometer was 7% (FWHM) for line $E_{\gamma} = 1173$ keV. The flux density of thermal neutrons was $2 \cdot 10^7$ n/(cm²·s).

Due to the presence of isomer state ^{60m}Co cobalt as neutron detector is very convenient.