Contribution ID: **211** Type: **Poster**

#01-211 Production and Monitoring of Neutron Flux by Activation Detectors

Wednesday, June 23, 2021 4:30 PM (5 minutes)

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 electronical 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 60mCo with half-life 10.47 minutes and following isomeric transition Eγ = 58.6 keV to the ground state. After β-decay (half-time 5.27 years) the ground state gives well known two lines Eγ = 1173 keV and Eγ = 1332 keV.
The neutron flax 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 CoCO3*Co(OH)2*nH2O, mass 31 g) was irradiated during 10 min by neutrons generated by bremsstrahlung at beryllium block of size Ø10x14 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 Eγ = 1173 keV. The flux density of thermal neutrons was 2·107 n/(cm2·s).
Due to the presence of isomer state 60mCo cobalt as neutron detector is very convenient.

Primary authors: HAYSAK, Ivan (Uzhgorod National University); HOLOMB, Robert; Mr MARTISHECHKIN, Vasyl (Uzhgorod National University); Mr HARAPKO, Evgen (Uzhgorod National University); Prof. KATOVSKY, Karel (Technological University of Brno)

Presenter: HOLOMB, Robert

Session Classification: 01 Fundamental Physics

Track Classification: 01 Fundamental Physics