EXAMINATION OF BETA-DELAYED NEUTRON EMISSION PHENOMENA IN VERY NEUTRON RICH ISOTOPES

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Nowadays availability of neutron-rich beams has arisen interest to the phenomena of beta-delayed (multi-neutron) neutron emission. The interest is triggered by importance of nuclear data for astrophysical r-process calculations [1]. Beta-delayed neutron emission represents an additional source of neutrons which favours neutron captures shifting thus abundance peaks towards heavier masses. In many cases when the experimental data is not available these parameters are obtained using different theoretical approaches. This model looks simple only from the first sight. In practice the information on neutron emitter states and their configuration is very scarce. Thus, for a long time a competition between neutron and gamma emission from such states was neglected – the assumption which is known not to be correct. The most recent experimental confirmation of gamma/neutron competition in beta-decay of neutron-rich nuclei was proposed in *A.Gottardo PRL 116, 182501 (2016)* by observation of high-energy gamma-rays. From another side, contribution of forbidden decays is expected to be stronger crossing the major neutron shells which influences beta-decay properties. In contrast, it was shown that in nuclei located at $N+1$, $N+2$, $N+3$ probability of beta delayed neutron emission oscillates as a function of the neutron number. Finally, the multi-neutron emission process after beta decay is even less understood. In the region of medium and heavy nuclei it was observed only for a few nuclei. As the energy available in beta-decay increases together with a drop in neutron separation energy, it may lead to an enhancement of multi-neutron emission – the fact which has not (yet) confirmed. Therefore, to answer the questions above, neutron-rich nuclei in the vicinity of $N = 50$ and 82 were produced and studied at ALTO ISOL facility. The beta-decay station equipped with a powerful long neutron-counter TETRA [3] allowed to detect beta, gamma and neutron activity following beta decay of In. It will be presented the experimental details and the preliminary results.

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