THE NEUTRON MULTIPLICITY STUDY AT SPONTANEOUS FISSION OF SHORT-LIVED ISOTOPES ($Z > 100$) USING VASSILISSA RECOIL SEPARATOR

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Recoil in – flight separator VASSILISSA [1] is widely used for the synthesis and study of decay properties of heavy and superheavy nuclei. For the registration of heavy ER in the focal plane of the separator, a new system with a 16-strip detector assembly, 60x60 mm^2 in size, and surrounded by backward detectors was developed. For the purpose of the study of spontaneous fission of short-lived SF isotopes in more detail a neutron detector consisting of 54 ^{3}He filled counters was mounted around the focal plane detector chamber of VASSILISSA separator. Neutron detectors with ^{3}He filled counters placed in a moderator are typically used for experimental studies of prompt spontaneous fission neutrons because of their constant high efficiency in a broad range of neutron energy (in thick detectors).

In the last ten years we carried out several experiments aimed to investigate properties of short-lived SF isotopes. The neutron-deficient isotope ^{246}Fm, produced in the complete fusion reaction ^{40}Ar + ^{208}Pb, was investigated in the year 2008 [2]. In the year 2010 we carried out an experiment aimed at investigating the properties of spontaneous fission of neutron deficient isotopes of ^{252}No and ^{244}Fm produced in the reaction with ^{48}Ca, ^{40}Ar-beam and ^{206}Pb-target. The main goal of the experiment was to determine the neutron multiplicity at spontaneous fission of these isotopes. From the experimental data for the first time the average number of neutrons per spontaneous fission of ^{244,246}Fm, formed in reactions ^{40}Ar(^{206,208}Pb, 2n), was determined (= 3.3 ± 0.3 and = 3.6 ± 0.5 respectively). The average number of neutrons from spontaneous fission of ^{252}No, formed in the reaction ^{48}Ca(^{206}Pb,2n) was equal to 4.06± 0.09. This value is in good agreement with that from literature (4.15± 0.30).

The new focal plane detector based on double-sided multistrip (48 x 48 strips) Si plate (DSSD) is described and future experiments are discussed.

1. A.V.Yeremin *et al.* // Phys. At. Nucl. 2003. V.66. P.1042.
2. A.I.Svirikhin *et al.* // Eur.Phys. J. A. 2010. V.44. P.393.