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The investigation of properties of short-lived SF isotopes ($Z > 100$) at the focal plane of VASSILISSA separator.

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Abstract :

Recoil in – flight separator VASSILISSA 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, $60 \times 60 \text{ mm}^2$ 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 ^3He filled counters was mounted around the focal plane detector chamber of VASSILISSA separator. Neutron detectors with ^3He 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 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 $^{40}\text{Ar} + ^{208}\text{Pb}$, was investigated in the year 2008. 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 $^{244,246}\text{Fm}$ was determined ($\nu = 3.3 \pm 0.3$ and $\nu = 3.6 \pm 0.5$ respectively). The average number of neutrons from spontaneous fission of ^{252}No was equal to 4.1 ± 0.1 . This value is in good agreement with that from literature (4.15 ± 0.30).

Award :

No

Paper :

Yes

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