Contribution ID: **377** Type: **Poster**

MODERNIZATION OF CORSET SETUP TO MEASURE CHARGE DISTRIBUTIONS OF FISSION FRAGMENTS USING BRAGG IONIZATION CHAMBER

Wednesday, 13 July 2022 11:10 (20 minutes)

Because fission is the result of competition between electrostatic and nuclear forces, information about the distribution of charge is critical to understanding the dynamics of a fissioning nucleus, as well as refining the parameters of fission process models needed for their developing. In this regard, the measurement of the charges of fission fragments is a crucially important task, therefore, various methods have been developed for measuring charges based on the Bethe-Bloch theory [1], which relates the specific energy loss to the charge number Z. One of these methods is the determination of the charge by the Brag peak [2], which is widely used both in nuclear physics experiments and applied research [3–7].
A system for measuring the charge distributions of fission fragments using an axial Bragg ionization chamber (BIC) has been developed. The design of the chamber makes it possible to change the distance between the cathode and the anode, which, in turn, along with a change in the pressure of the working gas, makes it possible to register a wider range of charge distributions depending on the task. The development of a technique for extracting information about the charge number from the signals of the BIC will significantly expand the range of tasks of the CORSET time-of-flight spectrometer [8]. In addition to measuring the mass-energy distributions, the charge distributions of fission fragments will be measured. The upgraded setup has the ability to smoothly change the angles of the Bragg ionization chamber, which allows one to measure the charge distributions of fragments emitted at different angles relative to the beam. This work presents test measurements.

1. H. Bethe und J. Ashkin in "Experimental Nuclear Physics, New York, 1953, p. 253
2. C.R. Gruhn, et al., Bragg curve spectroscopy, Nucl. Instrum. Meth. 196 (1982) 33-40
3. J.M. Asselineau, et al., Performance of a bragg curve detector for heavy ion identification, Nucl. Instrum. Methods 204 (1982) 109–115.
4. A. Oed, P. Geltenbort, F. Gönnenwein, A new method to identify nuclear charges of fission fragments, Nucl. Instrum. Methods 205 (1983) 451–453.
5. W. Neubert, Bragg curve spectroscopy of fission fragments by using parallel plate avalanche counters, Nucl. Instrum. Methods A 237 (1985) 535–542.
6. Kamanin, D.V., et al., Proc. Int. Symp. on Exotic Nuclei. EXON2004 (Peterhof, Russia, 2004), Singapore: World Sci., 2005, p. 588.
7. E. Pellereau, et al., Accurate isotopic fission yields of electromagnetically-induced fission of 238U measured in inverse kinematics at relativistic energies, Phys. Rev. C 95 (2017) 054603
8. Kozulin, E.M., et al., Instrum. Exp. Tech., 2008, vol. 51, p. 44.

The speaker is a student or young scientist

No

Section

1. Experimental and theoretical studies of nuclear reactions

Primary author: Dr KIRAKOSYAN, Vahan (Joint Institute for Nuclear Research)

Co-authors: Dr KOZULIN, Edward (Joint Institute for Nuclear Research); Dr MUKHAMEJANOV, Yerzhan (Joint Institute for Nuclear Research); Mr OSTROUKHOV, Artem (Joint Institute for Nuclear Research); Mr

TIKHOMIROV, Roman (Joint Institute for Nuclear Research); Dr NOVIKOV, Kirill (Joint Institute for Nuclear Research); Mr VOROBIEV, Igor (Joint Institute for Nuclear Research)

Presenters: Dr KIRAKOSYAN, Vahan (Joint Institute for Nuclear Research); Dr MUKHAMEJANOV, Yerzhan (Joint Institute for Nuclear Research); Mr OSTROUKHOV, Artem (Joint Institute for Nuclear Research)

Session Classification: Poster session