Contribution ID: **41** Type: **Oral report**

POPULATION OF EXCITED STATES IN 45Ti AND 197Hg NUCLEI IN CHARGE-EXCHANGE REACTIONS ON LOW-ENERGY 3He BEAMS

Saturday 17 October 2020 13:00 (25 minutes)

Studying charge-exchange reactions allows one to study the structure of a nucleus and understand the mechanism of the ongoing reaction.
In the charge-exchange reactions (p, n) and (3He, t) at low energy of bombarding particles on nuclei with even mass, isobar-analog and other excited states have been observed and identified. The reaction (3He, t) has certain advantages over the (p, n) reaction due to the possibility of measuring the energy of emitted particles (t). It was found that the cross sections for reactions (3He, t) are almost an order of magnitude lower than the cross sections for (p, n) reactions on the same target nuclei. Nevertheless, the cross sections for reactions (3He, t) on nuclei with an odd mass (45Sc and 197Au) reach relatively large values (up to 100 mb) at bombarding particle beam energy close to the reaction Coulomb barrier [1].
One of the first reactions on odd nuclei, in which excited states were studied, was the reaction 9Be (3He, t) 9B. In the 9B nucleus, only one excited state has been observed at 3He energy of 30 MeV [2]. In this work, we continued the study of the reaction (3He, t) on the odd 45Sc and 197Au target nuclei. In this work, for the (3He, t) reaction, differential cross sections for the population of excited states in 45Ti and 197Hg product nuclei were obtained at 3He energy of 30 MeV. The angular distribution of the formed tritium was also studied. The experiments showed that the maximum values of the cross sections for these reactions correspond to grazing angles. This indicates the peripheral nature of charge-exchange reactions.

1. N.K. Skobelev, Yu.E. Penionzhkevich et al. // Phys. Part. Nucl. Lett. 2013, V.10, P.410.
2. D.M. Janseitov, S.M. Lukyanov, K. Mendibayev et al. // Intern. Journ. Mod. Phys. E. 2018. V.77. 185089.

Primary authors: Dr SKOBELEV, Nikolay (JINR); Mr ISSATAYEV, T. (JINR); Prof. PENIONZNKEVICH, Yu.E. (JINR)

Presenter: Mr ISSATAYEV, T. (JINR)

Session Classification: Section 2. Experimental and theoretical studies of nuclear reactions

Track Classification: Section 2. Experimental and theoretical studies of nuclear reactions.