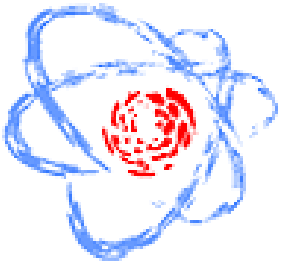

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Studies of the reference and satellite nuclear reactions in search for light neutron-rich nuclear systems.

Wednesday, 8 June 2022 12:40 (10 minutes)

Investigation of nuclear matter, located close and beyond drip-lines is a challenging experimental methodological task, due to short lifetime of the studied isotopes, low reaction cross section, complicated background conditions, etc. We have faced all of the mentioned difficulties in the recent studies of 6,7H systems, produced in interactions of 8He beam (26 MeV/nucleon) with cryogenic deuterium target. Such s investigations were available at the ACCULINNA-2 fragment-separator (http://aculina.jinr.ru/a-2.html) recently commissioned in FLNR JINR (http://flerovlab.jinr.ru/our-laboratory/). In order to verify the experimental approach, the satellite measurements with 10Be projectile have been conducted at the same detector setup. As the result of the reactions of the same mechanisms 8,9Li nuclei were produced. Data analysis of these reference reactions was in itself the calibration of all detector systems, and allowed to determine the energy resolution of the obtained missing-mass spectra. Another important applied procedure of the data analysis was the studies of the satellite reaction channels. The latter may provide the same reaction products, which would affect the obtained missing-mass spectra as a background events. We have studied such possible reaction as 8He(d,3H)7He, 8He(d,5H)5He, 8He(d,4H)6He and the 8He+d quasi-free scattering as well. The possible contribution of all background channels to the low energy spectrum of the 6H was studied. The mentioned techniques have been a key and advantage of the conducted experiments and allowed to obtained new significant results in solving the problems of the extreme heavy hydrogen isotopes, described in [I. A. Muzalevskii, et al., "Resonant states in 7H: Experimental studies of the 2H(8He,3He) reaction", Phys. Rev. C 103, 044313 (2021)], [E. Y. Nikolskii, et al., submitted to Phys. Rev. C https://arxiv.org/abs/2105.04435]. These works briefly shows the reference reaction studies, but the full description will be a part of the Ph.D, thesis and presented in a conference talk.

Summary

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Session Classification: Sectional talks