



New Trends in Nuclear Physics Detectors

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FIRST EXPERIMENTS WITH RADIOACTIVE BEAMS AT ACCULINNA-2 SETUP

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Investigations of the 6H and 7H hydrogen isotopes were carried out as a flag ship experiments of the recently commissioned ACCULINNA-2 fragment separator [1]. The 8He secondary beam with intensity 105 1/s and energy 26 AMeV was used for the population of the systems of interest in the $8\text{He}+\text{d}$ interaction. The detection of low-energy recoils 4He or 3He allowed us to reconstruct the missing-mass spectra of 6H and 7H populated in the $2\text{H}(8\text{He},4\text{He})6\text{H}$ and $2\text{H}(8\text{He},3\text{He})7\text{H}$ reactions, respectively. The reference reactions $2\text{H}(10\text{Be},4\text{He})8\text{Li}$ and $2\text{H}(10\text{Be},3\text{He})9\text{Li}$ with 44 AMeV 10Be radioactive beam were studied as well. The key issues of the measurements were i) clear $3,4\text{He}$ identification at low energies ($\sim 8\text{--}20\text{ MeV}$), ii) good energy and angular resolution of the experimental setup and iii) high efficiency of coincidences between decay products.

The applied experimental techniques including the cryogenic deuterium gas target and unique detector systems provided the new results on the low-energy spectra of 6H and 7H systems [2-5]. In particular, the obtained data shed light on the spectra of these exotic systems and decay mechanisms of their ground and excited states. Analysis of the other runs on 7He , 9He , 10Li isotopes populated in the (d,p) reaction and 27S with OTPC has been progressing. The next step of experimental program is under discussion.

[1] A.S. Fomichev, L.V. Grigorenko, S.A. Krupko, S.V. Stepanov, G. M. Ter-Akopian, *The EPJ A* 54 (2018) 97.

[2] A.A. Bezbakh et al., *Phys. Rev. Lett.* 124 (2020) 022502.

[3] I.A. Muzalevskii et al., *Phys. Rev. C* 103 (2021) 044313.

[4] I.A. Muzalevskii et al., *Bulletin of the Russian Academy of Sciences: Physics*, 84 (2020) 500.

[5] E.Yu. Nikolskii et al., submitted to *Phys. Rev. C* (2021) [arXiv:submit/3877004].

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