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Search for 7H at ACCULINNA-2

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The 7H isotope is the Golden Fleece to be searched by the RIB holders. Until the present moment only upper limits of its lifetime and ground state energy were estimated. Such unbound complicated five-body nuclear system, which has extremely large mass-to-charge ratio, lies far beyond the drip-line and has not been detected yet.

An experimental search for the 7H resonance was performed with the $2\text{H}(8\text{He}, 3\text{He})7\text{H}$ reaction. Beam of the 8He with energy of $\sim 26\text{A MeV}$ provided by ACCULINNA-2 fragment separator interacted with the gaseous cryogenic deuterium target (6 mm thick at 27K and at 1 atm). The detector system was consisted of Si and CsI telescope detectors intended for detection of the recoil 3He and 3H emitted from 7H decay. Compared with the previous works dedicated to 7H the main advantage and novelty of the used setup was the possibility to measure the angle and energy of the emitted tritium.

Events with a coincidence of detected 3He and 3H was considered as candidates for 7H event. The number of coincidences of the decay products allowed us to estimate the reaction cross-section. Measuring the spectra of 3He under the small angles allows to reconstruct the 7H missing-mass spectrum. The obtained angles and energies of 3He and 3H in coincidence gave a lot of informative angular correlations.

In the report we will present preliminary 7H missing-mass spectrum together with estimation of detection efficiency of the 7H and various angular correlations of reaction products (e.g. missing-mass spectrum with the angle of the emitted tritons). Simulations needed for data analysis has been performed within the ExpertRoot framework [1].

[1] <http://er.jinr.ru/>

Author: Mr MUZALEVSKII, Ivan (JINR)

Co-authors: OVCHARENKO, Egor (Justus-Liebig-Universität Gießen); Mr SERIKOV, Adilzhan (Joint Institute for Nuclear Research); Mrs SWIERCZ, Aleksandra (Joint Institute for Nuclear Research); Dr GORSHKOV, Alexander (Joint Institute for Nuclear Research); Mr BEZBAKH, Andrey (Joint Institute for Nuclear Research); Dr FOMICHEV, Andrey (Joint Institute for Nuclear Research); Mrs QUYNH, Anh (Joint Institute for Nuclear Research); Mr ZALEWSKI, Bogumil (Joint Institute for Nuclear Research); Mrs KOSTYLEVA, Daria (GSI Helmholtzzentrum Darmstadt, Germany); Mr BIARE, David (Joint Institute for Nuclear Research); Mrs GAZEeva, Elvira (Joint Institute for Nuclear Research); Dr NIKOLSKII, Evgeni (Joint Institute for Nuclear Research); KAMINSKI, Grzegorz (Flerov Laboratory of Nuclear Reactions, Joint Institute for Nuclear Research, 141 980 Dubna, Moscow region, Russia); Prof. TER-AKOPIAN, Gurgen (Joint Institute for Nuclear Research); Prof. GRIGORENKO, Leonid (Joint Institute for Nuclear Research); KOZLOV, Michail (The Laboratory of Information Technologies JINR); Prof. GOLOVKOV, Mikhail (Joint Institute for Nuclear Research); Mr SZUMKIEWICZ, Patryk (Joint Institute for Nuclear Research); Mr SHAROV, Pavel (Joint Institute for Nuclear Research); Mr PLUCINSKI, Piotr (Joint Institute for Nuclear Research); Mr SLEPNEV, Roman (Joint Institute for Nuclear Research); Dr WOLSKI, Roman (Joint Institute for Nuclear Research); Dr STEPANTSOV, Sergei (Joint Institute for Nuclear Research); Dr BELOGUROV, Sergey (Joint Institute for Nuclear Research); Mr KRUPKO, Sergey (Joint Institute for Nuclear Research); Dr SIDORCHUK, Sergey (Joint Institute for Nuclear Research); SCHETININ, Vitaliy (The Laboratory of Information

Technologies JINR); Dr CHUDoba, Vratislav (Joint Institute for Nuclear Research); Dr PARFENOVA, Yulia (Joint Institute for Nuclear Research)

Presenter: Mr MUZALEVSKII, Ivan (JINR)

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