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INVESTIGATION OF THE 7,6H STATES IN 8He+d INTERACTION

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Investigation of the 6H and 7H isotopes, has long history going up to these days. These the most neutron rich systems with the biggest ratio of mass-over charge, which makes these systems attractive to study. The high intensity 8He secondary beam with energy 26 AMeV, produced at the recently commissioned ACCULINNA-2 fragment separator [1], was used for the population of the systems of interest in the 8He+d interaction. The detection the low-energy recoils 4He and 3He made with good energy and angular resolution allowed us to reconstruct the missing-mass spectra of 6H and 7H populated in the 2H(8He,4He)6H and 2H(8He,3He)7H reactions. The applied experimental techniques, the results of the data analysis and simulations will be presented in our report. The ground state 1/2+ at 2.2(5) MeV of 7H and (possibly) the 5/2+ -3/2+ doublet of the first excited states, located in the energy range 5.5-7.5 MeV, were populated in the proton transfer reaction from the 8He beam on deuterium cryogenic gas target [2,3]. As compared to previous works, experiment [2,3] features the reliable channel identification, better energy resolution, and additional support from the obtained angular and energy distributions. The obtained results presumably resolve the problem of search for the 7H ground state which was not successful for more than 40 years. The 6H studies were a "satellite activity"of the 7H investigation [4]. The obtained results allowed us to observe a resonant state in 6H at 6.8 MeV above the 3H+3n decay threshold and to obtain an indication on a resonant state at 4.5 MeV, which is a realistic candidate for the 6H ground state. In addition, the measured momentum distributions of the 3H fragments, represented in the 6H rest frame, provided evidence for an extremely strong "dineutron-type"correlation occurring in the decay of the 5H ground state. All together, the obtained data on the low-energy spectra of 6H and 7H systems shed light on the spectroscopy of these exotic systems and decay mechanisms of their ground and exited states.

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