Contribution ID : **23** Type : **Plenary/section talk**

STUDY OF n-n CORRELATIONS IN d+2H⟶p+p+n+n REACTION

Friday, 14 October 2016 14:35 (20)

The goal of this work is an experimental study of neutron-neutron interaction and, in particular, of mechanisms of *nn*-correlations in few-nucleon systems. According to [1] strong discrepancies of experimental data and theory observed in nd- and pd-breakup reactions [2, 3] can be explained by a significant strengthening of nn- and pp-correlations of attractive character in the third nucleon field in 3H (pnn) and 3He (ppn) systems.

In this work the d + 2H $\longrightarrow$ p + p + n +n reaction is studied at 15 MeV deuteron beam of U-120 cyclotron of Skobel'tsyn Institute of Nuclear Physics, Moscow State University. In this reaction, the correlated nn- and pp-singlet pairs can be formed dynamically in the intermediate state. Thus, the measured nn- and pp-correlations, in particular, energies of *nn* (*pp*) singlet quasi-bound states can appear different than those inherent for a free nn- and pp-systems.

For the first time, in a kinematically complete experiment the energy of quasi-bound state of 2n-system is determined. The energy of the nn 1S0 state is determined by comparing experimental time-of-flight spectrum of the neutron from the breakup of 2n-system with simulation spectra depending on this energy. The obtained value Enn = 76 $\pm$ 6 keV is significantly lower than energies (120 – 160 keV) recalculated from the experimental values of 1S0 nn-scattering length [3-5], that perhaps indicates an effective enhancement of nn-interaction in the intermediate state of studied reaction. This work was partly supported by RFBR under grant N16-32-00743.

1. Konobeevski E.S., Kukulin V.I., Zuyev S.V. et al. Bull. Russ. Acad. Sci. 78, 341 (2014).
2. Witala H. and Glöckle W. Phys. Rev. C 83, 034004 (2011).
3. Ruan X.S. et al. Phys. Rev. C 75, 057001 (2007).
4. Huhn V. et al. Phys. Rev. C 63, 014003 (2000).
5. Gonzales Trotter D. E. et al. Phys. Rev. C 73, 034001 (2006).

Primary author(s) : Dr. KONOBEEVSKI, Evgeny (Institute for Nuclear research)

Co-author(s) : Mr. KASPAROV, Alexander (Institute for Nuclear Research); Dr. SPASSKY, Andrey (Skobel'tsyn Institute of Nuclear Physics); Dr. MORDOVSKOY, Michail (Institute for Nuclear Research); Dr. ZUYEV, Sergey (Institute for Nuclear Research); Dr. LEBEDEV, Viktor (Skobel'tsyn Institute of Nuclear Physics)

Presenter(s) : Dr. KONOBEEVSKI, Evgeny (Institute for Nuclear research)

Session Classification : Nuclear physics and particle physics - parallel IX

Track Classification : Nuclear physics and particle physics