THREE-BODY CORRELATIONS IN ^{6}Be POPULATED IN (p,n) REACTION

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The nuclear driplines are defined by instability with respect to particle emission, and therefore the entire spectra of the systems beyond the driplines are continuous. The first emission threshold in the light even systems is often the threshold for two-neutron or two-proton emission, and therefore one has to deal with three-body continuum. Such continuum provides rich information about nuclear structure of ground state and continuum excitations, which is, however, often tightly intertwined with contributions of reaction mechanism.

The 47 *A*·MeV ^{6}Li beam was produced by the cyclotron U-400M and injected into ACCULINNA facility [1]. The ^{6}Be continuum states were populated in the charge-exchange reaction ^{1}H(^{6}Li,^{6}Be)n collecting very high statistics data (~$5\cdot10^{6}$ events) on the three-body α+p+p coincidences. The first results of the experiment studying the α+p+p correlations were published in Ref. [2]. The paper was focused on the proof that the observed ^{6}Be excitation spectrum above ~3 MeV is dominated by the novel phenomenon – isovector breed of the soft dipole model. The correlations in the decay of ^{6}Be states with excitation energy below ~3 MeV, where the data are dominated by the contributions of the known and well-understood 0^{+} and 2^{+} states of ^{6}Be, are presented.

A general quantum-mechanical formal issue and important practical task of data interpretation is the extraction of the most complete quantum-mechanical information from the accessible observables. For the majority of classes of experimental data, extraction of complete quantum-mechanical information is not possible. For certain classes of reactions the most complete quantum-mechanical information which can be extracted is contained in the density matrix.

We demonstrate that basing on the known level scheme it is possible to extract the maximal possible quantum mechanical information about reaction mechanism from the three-body correlations. It is demonstrated how the high-statistics few-body correlation data can be used to extract detailed information on the reaction mechanism. The suggested method of analysis allows for identification of fine effects and it may be regarded as a general tool for different tasks on radioactive beams.

1. A.M.Rodin *et al.* // NIM Phys. Res. A. 1997. V.391. P.228.
2. A.Fomichev *et al.* // Physics Letters B. 2012. P.708. V.6.