Contribution ID: **14** Type: **not specified**

Quasi-deuteron clusters in the ^{12}C and short-range NN correlations in the reaction ^{12}C+p$\longrightarrow^{10}$A+ pp+N

Friday, 3 March 2023 12:20 (30 minutes)

Short-range correlated (SRC) NN pairs play an important role in structure of atomic nuclei and are studied using mainly electron beams [1]. A new step was done at BM@N in JINR [2] where the reaction 12C+p⟶10A+pp+N is studied using the ^{12}C beam at energy of 4 GeV/nucleon in inverse kinematics providing interaction with the hydrogen target to probe the SRC pairs in the ^{12}C. In theoretical analysis [3] of the SRC effects in this reaction is used a properly modified approach developed earlier (see Ref. [4] and references therein) to describe the quasi-elastic knock-out of fast deuterons from the light nuclei ^{12}C and ^{7,6}Li by protons in the reactions (p,pd) and (p,nd) [5]. Elementary sub-processes in the (p,Nd) were the backward quasi-elastic scattering of the proton on the two-nucleon clusters p{pn}⟶pd and p{nn}⟶nd at the proton beam energy 670 MeV. As in Ref. [4], the spectroscopic amplitudes for NN-pairs in the ground state of the 12C nucleus are calculated here within the translation-invariant shell model (TISM) with mixing configurations. Factorization of the two-nucleon momentum distribution over the internal n_{rel} (q_{rel}) and the c.m.s. ncm ($k_{c.m.}$) momenta is assumed and for nrel (q_{rel}) the squared deuteron (or singlet deuteron) wave function the CD Bonn NN-interaction potential is used. Relativistic effects in the sub-process p+{NN}⊠p+N+N of quasi-elastic knockout of nucleon from the SRC pair are taken into account in the light-front dynamics. We found that the c.m. distribution of the deuteron clusters obtained within the TISM and used in [4], [5] to describe the (p,Nd) data [4] has to be modified considerably [6] to describe the kc.m. distribution of the SCR NN pairs measured in the electron data [6]. The ratio of the spin-singlet to spin-triplet pairs $\{pp\}_s/\{pn\}_t$ is calculated [7] and found to be in agreement with existing data. Here the initial and final state interaction effects are estimated within the eikonal approximation using the Glauber model for the N^{10}A scattering [8]. The one-loop approximation with elastic N^{10}A rescatterings is applied and the effect is found to be moderate.
This work was supported in part by the RFBR grant № 18-02-40046.

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