

XXV International Baldin Seminar on High Energy Physics Problems "Relativistic Nuclear Physics and Quantum Chromodynamics"



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Fast proton interaction with a short-range NN correlation in ^{12}C

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Recently the BM@N Collaboration [1] measured the missing momentum and residual nucleus momentum distributions in proton knock-out reactions $^{12}\text{C}(p, 2pn_s)^{10}\text{B}$ and $^{12}\text{C}(p, 2pp_s)^{10}\text{Be}$ in the inverse kinematics with incident ^{12}C beam at 48 GeV/c on proton target. Here, "s" stands for an unobserved spectator (or recoil) nucleon. The missing momentum is defined as the momentum of a struck proton in the ^{12}C rest frame before knock-out. The observed back-to-back correlation of the missing momentum and the spectator neutron momentum for $p_{\text{miss}} \geq 350$ MeV/c indicates that the proton interacted with a short-range pn -correlation. We perform the theoretical analysis of this experiment by applying the approach based on the translationally-invariant shell model (TISM) [2] which allows to calculate the spectroscopic amplitude of the state of " NN -pair + residual nucleus" in the wave function of the initial nucleus. Our calculations include absorptive initial- and final state interactions and charge exchange processes. In contrast to other approaches, we do not use a phenomenological c.m. momentum distribution of the NN -correlation, but calculate it from the TISM. A good overall agreement with the BM@N data is reached.

[1] M. Patsyuk et al., Nature Phys. **{bf 17}**, 693 (2021).

[2] Yu. Uzikov and A. Uvarov, Phys. Part. Nucl. **{bf 53}**, 426 (2022).

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