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Momentum distributions for correlated nucleons in spin-singlet channels

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Study of short-range correlations (SRC) of nucleons is very relevant in nuclear physics. One of the main problems within it is an isospin dependence of SRC showing an essential domination of np over pp or nn correlated pairs. At the same time, a quantitative description of high-momentum components of the distributions for spin-singlet pairs is complicated due to the absence of bound states in the corresponding $^1S_0$ channels. We suggest a formalism for a quantitative treatment of SRC for such NN configurations based on the momentum distributions for the virtual states which expected to be quite suitable for calculations in nuclei within the contact formalisms. A procedure for the practical calculation of the above virtual-state distributions from the low-energy scattering wave functions is developed which is based on the relation of Fäldt and Wilkin [1].
As numerical applications, we test found distributions by using the contact formalism [2] to approximate two-nucleon momentum distributions in several light nuclei for different realistic models of the NN interaction. Special attention is paid to the differences caused by employment of the dibaryon model [3,4] which accounts effectively for non-nucleonic degrees of freedom. The results obtained might be useful for researchers working on the SRC problem.

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