

Antisymmetrization of The Wave Functions Consisting of Spin-Isospin and Hyperspherical Parts

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In order to investigate Few-Particle Hypernuclei within the framework of the Hyperspherical Function Method, it is necessary to obtain full wave functions that are anti-symmetric under particle interchange. These wave functions must include not only hyperspherical, but also spin-isospin parts. According to the Parentage Scheme of Symmetrization, N -particle hyperspherical functions ($N=3,4,5,6,\dots$) symmetrized with respect to $(N-1)$ -particles, can be obtained from the N -particle hyperspherical functions with arbitrary quantum numbers by the use of the transformation coefficients related with the permutations of the last two particles.

This article explains how to obtain fully antisymmetrized wave functions consisting of spin-isospin and hyperspherical parts. It is demonstrated that there are sixteen possible combinations in $(3+1)$ configuration and 12 possible combinations in $(2+2)$ configuration when spin and isospin functions are represented by $[4]$, $[31]$, and $[22]$ representations of the four-particle permutation group S_4 . A complete set of the fully antisymmetrized four-particle wave functions is obtained. It is demonstrated that proposed mathematical formalism can be easily generalized to obtain fully antisymmetrized wave functions for the systems consisting of five and more particles.

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