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Proton-neutron pairing and quartetting in odd-odd $N = Z$ nuclei

Isoscalar ($T = 0$) and isovector ($T = 1$) proton-neutron pairing is playing a major role in understanding the spectroscopic properties of odd-odd nuclei with $N=Z$. The majority of these properties are described rather well by shell model (SM) calculations, but from the complex structure of SM states is difficult to extract unambiguously the role played by pairing correlations. As an alternative, we shall present a calculation scheme based on quartet condensation model (QCM), proposed for treating the isovector-isoscalar pairing interaction [1-2], which we have extended recently to odd-odd $N = Z$ nuclei [3]. In this model the ground state and the lowest excited state of odd-odd nuclei are described as a condensate of quartets to which it is appended a collective isovector or isoscalar pair, according to the isospin of the state. This model is applied for the odd-odd $N = Z$ nuclei with the valence nucleons moving above the closed cores ^{16}O , ^{40}Ca and ^{100}Sn . It is shown that in the lowest $T = 1$ and $T = 0$ states the isoscalar and isovector pairing correlations coexist for all the nuclei we have investigated.

- [1] N. Sandulescu, D. Negrea and D. Gambacurta, Phys. Lett. B 751 (2015) 348.
[2] M. Sambataro, N. Sandulescu, Phys. Rev. C93, 054320 (2016). [3] D. Negrea, N. Sandulescu and D. Gambacurta, in preparation.

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