Contribution ID: **20** Type: **Poster**

Influence of pure isoscalar neutron-proton pairing on nuclear statistical quantities.

Abstract
Pairing correlations are an essential feature in the understanding of nuclear structure. Recently, renewed interest in the study of these correlations occurred [1-2] due to the development of the radioactive beam facilities that made the experimental study of medium mass nuclei such as N≈ Z possible.
In the isospin formalism, the pairing effect can exist in the isovector case (T=1) which corresponds both the pairing between like-particles and the neutron-proton pairing, and the isoscalar case (T=0) which corresponds to only neutron-proton pairing. T being the isospin quantum number.
It's shown from both theoretical and experimental studies that, besides the isovector pairing, isoscalar one may also be of importance in N≈Z nuclei [3-4]
On the other hand, the study of the temperature effect on pairing correlations at finite temperature have been the subject of many efforts since the sixties and is still a relevant subject [5- 7].
In the present work, expressions of the various statistical quantities, i. e. , the energy, the entropy and the heat capacity are deduced using a path integral approach in the pure isoscalar pairing (T=0). A numerical study is then performed using the schematic one level model.
It's shown that the behavior of the various statistical quantities as a function of the temperature is similar to that obtained using the conventional FTBCS theory in the pairing between like-particles case. An increase in the energy value is noted compared with other types of pairing.

References:
1. E. Perlinska, S. G. Rohozinski, J. Dobaczewski and W. Nazarewicz, Phys. Rev. C 69 (2004) 014316.
2. A. L. Goodman, Phys. Rev. C 63 (2001) 044325.
3. F. Pan, Y. He, Y. Wu, Y. Wang, K. D. Launey and J. P. Draayer, Phys. Rev. C 102, 044306 (2020).
4. B. Le Crom et al. , Phys. Rev. Lett. B 829 (2022) 137057.
5. M. Sano and S. Yamazaki, Prog. Theor. Phys. 29 (1963) 397.
6. D. Mokhtari, N. H. Allal and M. Fellah, Int. J. Mod. Phys. E 27 (2018) 1850054.
7. D. Mokhtari, N. H. Allal and M. Fellah, accepted for publication in Rom. J. Phys.

Author: Dr MOKHTARI, Djamila (USTHB)

Co-authors: Prof. ALLAL, Hosni Nassima (USTHB); Prof. FELLAH, Mohamed (USTHB)

Presenter: Dr MOKHTARI, Djamila (USTHB)

Session Classification: Poster session

Track Classification: Nuclear Structure, Spectroscopy and Dynamics