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Nuclear structure of the exotic nucleus ^{84}Ge

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Nuclear structure of exotic nuclei near ^{78}Ni , with $Z = 28$ and $N = 50$, is fundamental to understand the doubly magic nature of this neutron-rich nucleus. Currently, many experimental and theoretical efforts are dedicated to investigating this region of the nuclear chart [1-5], aiming to comprehend the robustness of nuclear shells far from stability and the emergence of collective effects as nucleons are added. The interaction among valence nucleons may be capable of attenuating the magic nature of a nucleus very close to shell closures [6]. From this perspective, isotopes of Ge, with $Z = 32$, could be of significant interest to understand the evolution of the $N = 50$ gap.

This work focuses on the experimental and theoretical study of ^{84}Ge , with $Z = 32$ and $N = 52$. Although its excited structure has been previously attempted to be studied, it is not well established [2, 3, 7]. This study takes advantage of the good production and high purity of exotic nuclei $^{85,84}\text{Ga}$ at the ISOLDE facility at CERN to populate the structure of ^{84}Ge through β^-n and β^- decay [8]. High-resolution gamma spectroscopy is employed to investigate the excited structure, based on the gamma-gamma coincidences technique. In addition, two theoretical studies are proposed. One of them is based on the Interacting Shell Model [9, 10], aiming to observe the nucleus structure and the filling of single-particle levels, and compare with the experimental results. The other theoretical study complements the former; it is a beyond-mean-field study using the Projected Generator Coordinate Method to evaluate low-energy collective effects [11, 12].

References

- [1] M. Lettmann, V. Werner, N. Pietralla, et al., Physical Review C 96 (2017) 011301.
- [2] M. Lebois, D. Verney, F. Ibrahim, et al., Physical Review C 80 (2009) 044308.
- [3] R. Yokoyama, R. Grzywacz, B. C. Rasco, et al., Physical Review C 108 (2023) 064307.
- [4] K. Sieja, T. R. Rodríguez, K. Kolos, and D. Verney, Physical Review C 88 (2013) 034327.
- [5] C. Delafosse, D. Verney, P. Marević, et al., Physical Review Letters 121 (2018) 192502.
- [6] A. Huck, G. Klotz, A. Knipper, et al., Physical Review C 31 (1985) 2226.
- [7] A. Korgul, K. P. Rykaczewski, R. Grzywacz, et al., Physical Review C 88 (2013) 044330.
- [8] A. Illana, B. Olaizola, L. M. Fraile, et al., CERN-INTC-2016-034 / INTC-P-471, 2016.
- [9] E. Caurier and F. Nowacki, Acta Physica Polonica B 30 (1999) 705.
- [10] E. Caurier, G. Martínez-Pinedo, F. Nowacki, et al., Reviews of Modern Physics 77 (2005) 427–488.
- [11] B. Bally, A. Sánchez-Fernández, and T. R. Rodríguez, The European Physical Journal A 57 (2021) 69.
- [12] B. Bally and T. R. Rodríguez, The European Physical Journal A 60 (2024) 62.

Abstract

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