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A Systematic Study of Nuclei in the A=60 -70 Mass Region

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One of the most reliable models to describe the nucleus is the Large Scale Shell Model, which has demonstrated to reproduce with very good accuracy detailed nuclear properties (see ref. [1] for a review). In the A=50-80 mass region, many studies have been published attempting to explain the role of the 0g9/2 orbital in the high spin states, especially in the neutron-rich nuclei like, for example, 59-66Fe [2], 65,67Cu [3], 70,80Ge [4,5] and the odd-mass isotopes of As, Ge and Ga [6]. Two different studies have investigated the role of the 0g9/2 orbital in neutron-rich odd-mass Ga isotopes. In ref. [7] band-like structures, where a proton is excited to the 0g9/2 shell are studied. In ref. [8] the importance of this orbital in describing the change in structure along the Ga isotopic chain is shown. More recently, the role of the 1d5/2 orbital has been discussed by Lenzi et al. [9].

Not that far for stability, the role of both 0g9/2 and 1d5/2 orbitals has still to be investigate. In particular, this is put in evidence in the odd and odd-odd-mass nuclei. Recently, the high spin excited states of odd-odd 64,66,68,70Ga have been studied with in-beam gamma-ray spectroscopy experiments performed at University of São Paulo using the SACI-PERERE [10] spectrometer and at Florida State University using the Clover Array System [11]. In this work, we investigate the role of the 0g9/2 and 1d5/2 orbitals in these Ga isotopes by means of Large Scale Shell Model calculations using the Antoine code [12] and three different residual interactions: FPG [13], JUN45 [14] and LNPS [9]. This has been done in the framework of a systematic study of odd-mass Zn, Ga and Ge nuclei in the mass A= 60-70 region.

[1] E. Caurier et al., Rev. of Mod. Phys. 77, 427 (2005).
[2] S. Lunardi. et al., Phys. Rev. C 76, 034303 (2007).
[3] C. J. Chiara et al., Phys. Rev. C 85, 024309 (2012).
[4] M. Sugawara et al., Phys. Rev. C 81, 024309 (2010).
[5] H. Iwasaki.et al., Phys. Rev. C 78, 021304(R) (2008).
[6] N. Yoshinaga et al. Phys. Rev. C 78, 044320 (2008).
[7] I. Stefanescu et al., Phys. Rev. C 79, 064302 (2009).
[8] B. Cheal et al. Phys. Rev. Lett. 104, 252502 (2010).
[9] S. M. Lenzi et al., Phys. Rev. C 82, 054301 (2010).
[10] J.A. Alcántara-Núñez, Nucl. Instr. and Meth. A 497, 429 (2003).
[11] Web site: http://www.physics.fsu.edu/nuclear/foxlab/nuclear-foxlab.html (2012).
[12] E. Caurier and F. Nowacki, Acta Phys. Polonica B 30, 705 (1999).
[13] O. Sorlin et al., Phys. Rev. Lett. 88, 092501 (2002).
[14] M. Honma et al., Phys. Rev. C 80, 064323 (2009).

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