

T=0 pairing along the N=Z line in the g9/2 region

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Enhanced neutron-proton (np) pairing correlations can arise when both particle types occupy the same orbitals. In addition to the $T = 1$ np pairing phase, the opportunity for isoscalar ($T = 0$) correlations is also present, especially on the $N=Z$ line. Competition between these np-pairing mechanisms is of much interest. Recent work on ^{92}Pd [1] has indicated the possibility for the existence of a new type of spin-aligned isoscalar np pair. The observation of the β -decaying 16^+ isomer in ^{96}Cd has also revealed evidence for the importance of the $T = 0$ np interaction at higher spins [2]. Very recently, the gamma rays in the ground state sequence of ^{96}Cd have been observed [3], following decay of the spin-trap isomer, although the ordering of the transitions could not be confirmed. Calculations suggest that spin-aligned pair approximation should contribute significantly to the structure of the states in the sequence, but varying with spins, and may reduce significantly for the 8^+ state [e.g. 4].

To gain further insight into the np-pairing effects, we propose here to use the knockout methodology to populate states in the $N=Z$ systems ^{96}Cd and ^{92}Pd up to 8^+ through (probably 1-neutron) knockout. The aim will be to firmly establish the ordering of the transitions in both nuclei and also to investigate the extent to which the knockout cross-sections might be affected by changes in the underlying structure along the yrast line.

[1] B. Cederwall, F. G. Moradi, T. Bäck, A. Johnson, J. Blomqvist, E. Clement, G. de France, R. Wadsworth, K. Andgren, K. Lagergren et al., *Nature* 469, 68 (2011).

[2] P. J. Davies, H. Grawe, K. Moschner, A. Blazhev, R. Wadsworth, P. Boutachkov, F. Ameil, A. Yagi, H. Baba, T. Bäck et al., *Phys. Lett. B* 767, 474 (2017).

[3] P. J. Davies et al. *Phys. Rev C* 99, 021302(R) (2019)

[4] G. J. Fu, J. J. Shen, Y. M. Zhao and A. Arima. *Phys. Rev C* 87, 044312 (2013)

[5] Z. X. Xu, C. Qi, J. Blomqvist, R. J. Liotta and R. Wyss. *Nucl. Phys. A* 877 (2012) 51

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