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Investigating neutron-proton pairing in sd-shell nuclei via (p,3He) and (3He,p) transfer reactions

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Pairing correlations, influencing almost every feature of ground and low-lying states in nuclei, lie at the heart of nuclear physics. Understanding the mechanism of neutron-proton (np) pairing in N=Z nuclei has been a long-sought goal in nuclear structure since the early sixties. Despite large efforts in both theoretical and experimental studies, the fundamental nature and the interplay between T=0 and T=1 pairs are still the subject of debate. Cross section measurement of np-pair transfer is considered as a sensitive probe for the insight into T=0 and T=1 np pairing collectivity and its mechanism [1-3].

We therefore carried out systematic np-transfer measurements spanning N=Z sd-shell nuclei using (p,3He) and (3He,p) reactions at RCNP Osaka University. In particular, we study the cross-section ratio of the lowest 0+ and 1+ states as an observable to quantify the interplay between T=0 (isoscalar) and T=1 (isovector) pairing strengths. The experimental results are compared to second-order distorted-wave Born approximation calculations with proton-neutron amplitudes obtained in the shell-model formalism using the universal sd-shell interaction B. Our results suggest underestimation of the nonneglible isoscalar pairing strength in the shell-model descriptions at the expense of the isovector channel. In this talk, we will present this work [4].

References:
[1] R. A. Broglia, O. Hansen and C. Riedel, Adv. Nucl. Phys. Vol 6, 287 (1973).
[2] D.R. Bes et al., Phys. Rep. Vol 34C, 1 (1977).
[3] P. Van Isacker et al., Phys. Rev. Lett. 94, 162502 (2005).
[4] Y. Ayyad, J. Lee et al., Phys. Rev. C 96, 021303(R) (2017).

Summary

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