国立研究開発法人理化学研究所　仁科加速器科学研究センター
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The 288th RIBF Nuclear Physics Seminar

Structural evolution of neutron-rich calcium isotopes

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The calcium isotopes, which have 20 protons (Z=20), are one of the most interesting isotopic chains to study nuclear structure. Due to the closed proton shell, the structural evolution is governed by the neutrons. Using the intense radioactive beams at RIBF, the first experimental evidence of the N=34 sub-shell closure was found in 54Ca [1]. More recent in-beam gamma-ray spectroscopic studies aimed at a detailed study on the nature of the N=34 sub-shell closure of 54Ca and the nuclear structures in its vicinity.

More specifically, the N=34 sub-shell closure of 54Ca was investigated by quasifree one-neutron knockout reactions. Using the in-beam γ-ray technique tagging on the final states of 53Ca, the exclusive cross sections and momentum distributions were measured. A significantly larger cross section to the p3/2 state compared to the f5/2 state in 53Ca corroborated the arising of the N=34 sub-shell closure in calcium isotopes [2]. Furthermore, spectroscopic information for calcium isotopes beyond the N=34 sub-shell closure was obtained for the first time by measuring the de-excitation γ rays of 56,58Ca following one-proton knockout reactions. The observations were confronted with several state-of-the-art theoretical calculations, allowing for a prediction of the structure of 60Ca.

In this seminar, the study on the N=34 sub-shell closure of 54Ca, as well as the structural information on 56,58Ca will be discussed in detail.

[1] D. Steppenbeck et al., Nature, 502, 207-210, (2013). [2] S. Chen et al., Phys. Rev. Lett. 123, 142501 (2019).

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~~RIBF Hall, RIBF bldg., RIKEN~~

POSTPONED

＊ The talk will be given in English language.

Contact: Nuclear Physics Seminar Organizing Committee
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