独立行政法人理化学研究所　仁科加速器研究センター
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Shell-model study on Lambda-Sigma coupling effect in neutron-rich lithium hypernuclei

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One of the most important subjects in strangeness nuclear physics is a study of neutron-rich Λ-hypernuclei. It is expected that a Λ hyperon plays a glue-like role in neutron-rich nuclei, together with a strong ΛN-ΣN coupling, which might induce a Σ-mixing in nuclei. Such a Σ admixture is required in a DWIA calculation to explain the (Π^-, K^+) spectrum of ${}^{10}_{\Lambda}$Li on a ^{10}B target at 1.2 GeV/c. The purpose of our study is to theoretically clarify the structure of the neutron-rich Λ-hypernuclei by a nuclear shell model.

We systematically investigate the structures of ${}^{A}_{\Lambda}$Li hypernuclei with A=7-10, by focusing on the Σ mixing probabilities and the energy shifts, in shell-model calculations considering the ΛN-ΣN coupling in the first-order perturbation method. We find that the energy shift by the ΛN-ΣN coupling is the order of 10^{-1} MeV for each isotope and increases with neutron number due to the appearance of multi-configuration Σ excited states that can be strongly coupled with the Λ ground state in ${}^{A}_{\Lambda}$Li. We discuss that the ΛN-ΣN coupling strengths are enhanced in the neutron-rich hypernuclei and are related to the β-transition properties of the nuclear core state.

A. Umeya and T. Harada, Phys. Rev. C 79 (2009) 024315.
T. Harada, A. Umeya, and Y. Hirabayashi, Phys. Rev. C 79 (2009) 014603.

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The seminar will be given in English.

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