Contribution ID: **388** Type: **Talk**

Hypernuclear spectroscopy with extended shell-model configurations

Wednesday 8 September 2021 13:00 (20 minutes)

Hypernuclear studies have played an important role to understand hyperon-nucleon fundamental interaction properties and also to disclose characteristic structures of many-nucleon systems with strange particles which are free from the nucleon Pauli principle. In various theoretical approaches in hypernuclear spectroscopy, different types of production cross sections are often compared in order to elucidate properties of many-body structures. Thus we focus our attention on the understanding of the new results of high-resolution $(e, e'K^+)$ experiments done at the Jefferson Laboratory (JLab) and then we will also discuss possibility of high-resolution (π^+, K^+) and (K^-, π^-) reactions being planned in the upgrade proposal of the J-PARC beamlines.

Recent $(e, e'K^+)$ reaction experiments done at JLab have provided us with remarkably high-resolution data showing p-shell hypernuclear structure details. These experiments have confirmed the major peaks and subpeaks predicted by the DWIA calculations based on the normal-parity nuclear core wave functions coupled with a Λ-hyperon in s- and p-orbits. At the same time, the data also show some extra subpeaks which seem difficult to be explained within the p-shell nuclear normal parity configurations employed so far. In order to describe the extra subpeaks, we have extended the model space by introducing the new configuration which includes non-normal parity nuclear core-excited states. By this extension we emphasize that the Λ-hyperon plays an interesting role to induce intershell mixing of the nuclear core-excited states having different parities.

For the ${}^{10,11}_{\Lambda}$Be and ${}^{10,11}_{\Lambda}$B hypernuclei, we will show the energy levels and the DWIA cross sections of (K^-, π^-), (π^+, K^+), and (γ, K^+) reactions that are calculated within the extended model space. Also, we will discuss the E1 and M1 transtions of these hypernuclei.

Primary author: Dr UMEYA, Atsushi (Nippon Institute of Technology)

Co-authors: Prof. MOTOBA, Toshio (RCNP, Osaka Univ. / Osaka E-C Univ.); Prof. ITONAGA, Kazunori (Miyazaki Univ. / Gifu Univ.)

Presenter: Dr UMEYA, Atsushi (Nippon Institute of Technology)

Session Classification: Hadrons in medium - hyperons and mesons in nuclear matter

Track Classification: Hadrons in medium - hyperons and mesons in nuclear matter