Structure of Light p-shell Hypernuclei in Antisymmetrized Molecular Dynamics

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Recent developments of hypernuclear spectroscopy provides us with precious information to understand the core excitation mechanism and YN interaction in more detail. For example, several core excited states in $^{12}\mathrm{C}(\pi^+, K^+)^{12}_{\Lambda}\mathrm{C}$ reaction, are found in a recent high-resolution experiment [1]. For the description of these core excited states, it may be necessary to include *strong coupling* states in addition to the *weak coupling* basis states of core and Λ. As proposed by Motoba, when the intrinsic state has reflection asymmetry, parity-changing core excitation and Λ excitation naturally couple to each other and this coupling causes the the parity-mixing intershell coupling [2].

In this work, we investigate the structure of light p-shell hypernuclei using Antisymmetrized Molecular Dynamics (AMD) [3] with double parity projection (DPP). In DPP, we can project the parities of the total system and Λ by superposing core reflected states. This procedure helps us to include *weaker* coupling states into usual AMD states, which are generally of strong coupling.

In Fig. 1, we show preliminary results on excitation spectra of $^{13}_{\Lambda}\mathrm{C}$ and $^{12}_{\Lambda}\mathrm{C}$. DPP significantly changes the spectra of hypernuclei. In the case of $^{13}_{\Lambda}\mathrm{C}$ ($^{12}_{\Lambda}\mathrm{C}$), negative (positive) parity states, to which the p_Λ state couples, get down more strongly by including core reflected states. As a result, in a present calculation, there appear low-lying positive parity states below the experimentally observed p_Λ state. In the presentation, we will show the results of GCM with AMD-DPP basis, and discuss the effects of parity-mixing intershell coupling more quantitatively.

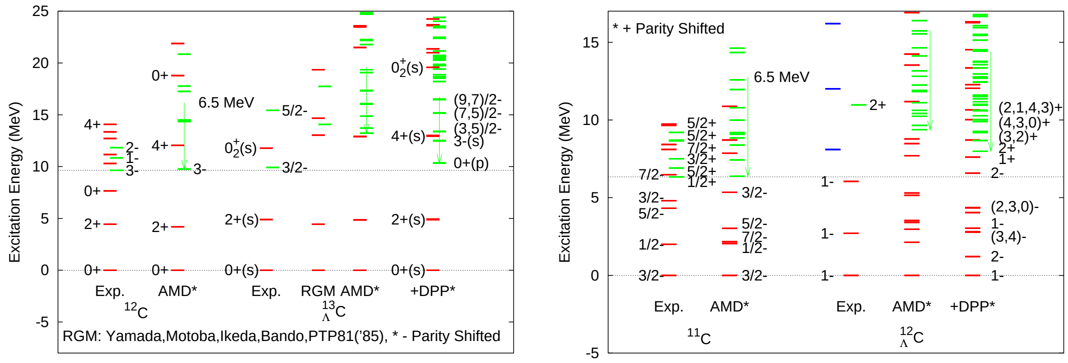

Figure 1: Calculated energy levels of $^{13}_{\Lambda}\mathrm{C}$ (Left) and $^{12}_{\Lambda}\mathrm{C}$ (Right) in comparison with data and RGM calculation [4].

References

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