

Structure of Be hyper isotopes

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In this talk, we will discuss the low-lying structure of Be hyper isotopes based on the Antisymmetrized Molecular Dynamics (AMD) calculation. One of the unique and interesting aspects of hypernuclei is the structure change caused by a hyperon. Through the interaction with surrounding nucleons, a hyperon in the atomic nucleus can affect and modify nuclear clustering and deformation. Especially the structure changes of Be hyper isotopes are of interest, since the Be isotopes have characteristic cluster structure with the 2α clustering.

In the ground states of Be isotopes, it is well known that an α - α clustering is affected by extra neutrons and the clustering and deformation are changed depending on the number of neutron. Indeed, such exotic structure appears as an abnormal parity of the ground state in ^{11}Be [1]. The observed spin parity of the ground state is $1/2^+$, while ^{11}Be with the seven neutrons should have a $1/2^-$ state as the ground state. By adding a Λ hyperon to them, the drastic structure changes are expected because a Λ hyperon can affect the clustering and deformation of the nuclei. In the other Be isotopes, the different kinds of structure changes are also expected by a Λ hyperon. For example, it was predicted by the four-body cluster model calculation that the virtual state $1/2^+$ of ^9Be will be bound by a Λ hyperon [2].

To study such phenomena, we have applied an extended version of the AMD for hypernuclei (HyperAMD [3]) to Be hyper isotopes. By using the ΛN effective interactions such as YNG, we have investigated the low-lying states of Be hyper isotopes systematically without any assumption on the clustering. It is found that the abnormal parity of the ^{11}Be ground state is reverted by a Λ hyperon and $^{12}_{\Lambda}\text{Be}$ has the normal shell order as shown in Figure 1. In this talk, we will discuss the changes of the clustering by a Λ hyperon and its effects to the excitation spectra for several Be hyper isotopes as well as $^{12}_{\Lambda}\text{Be}$.

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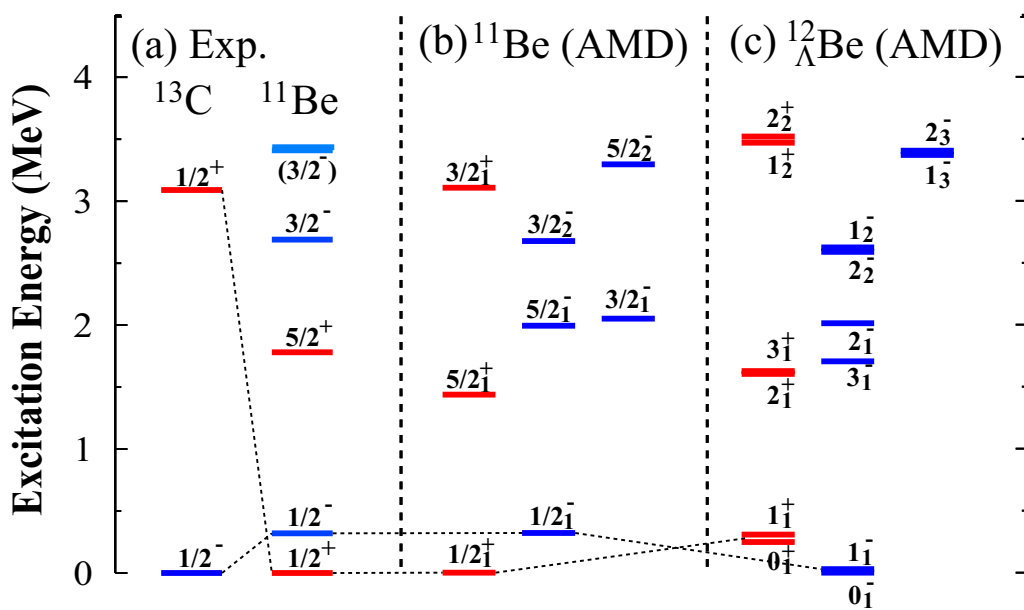


Figure 1: Calculated excitation spectra of ^{11}Be and $^{12}_{\Lambda}\text{Be}$.