COMPARISON BETWEEN 9LI AND 10BE NUCLEI FROM VIEW POINT OF NUCLEAR STRUCTURE AND REACTION

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Recently, we proposed the microscopic structure and reaction models. The model firstly constructs the nuclear structure by the stochastic multi-configuration mixing (SMCM) method based on the Brink model. Next, the cross section is obtained by the microscopic coupled-channel (MCC) calculation based on the folding model with the complex G-matrix interaction.

In this work, we compare the ^{9}Li nucleus with the ^{10}Be nucleus from the view point of the nuclear structure and reaction. The ^{9}Li and ^{10}Be nuclei are described as an ^{4}He + t (^{4}He) + n
+ n four-body system based on the cluster model. The elastic and inelastic scattering cross sections for the ^{9}Li + ^{12}C and ^{10}Be + ^{12}C systems are obtained by the MCC calculation with the MPa interaction which is the latest version of the complex G-matrix interaction derived from the ESC NN interaction model.

The excitation energies of the low-lying states for the ^{9}Li and ^{10}Be nuclei give the consistent result. The sum of transition strengths of the low-lying states for the ^{9}Li nucleus is apparently larger than that for the ^{10}Be nucleus. However, the channel-coupling effect for the ^{10}Be nucleus is clearly larger than that for the ^{9}Li nucleus. In addition, the coherent sum of inelastic cross section for the ^{10}Be nucleus is also larger than that for the ^{9}Li nucleus. Lastly, we verify that the cause of this dissimilarity is obtained by the angular momentum algebra by the difference of the spin between the ^{9}Li and ^{10}Be nuclei.