

Structure of light hypernuclei in the framework of Fermionic Molecular Dynamics

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We report the first variational calculations of the s-shell hypernuclei ${}^4_{\Lambda}\text{H}$, ${}^4_{\Lambda}\text{He}$, ${}^5_{\Lambda}\text{He}$ and the p-shell hypernucleus ${}^7_{\Lambda}\text{Li}$, using our very recently developed Fermionic Molecular Dynamics (FMD) code [1]. Attention is paid mainly to the effect of the presence of Λ on the nuclear structure. Using several NN and ΛN interactions, we illustrate the model dependence of our calculations. We found rather weak dependence of the Λ separation energies on the applied NN potential in ${}^4_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{He}$, which becomes significantly stronger in ${}^5_{\Lambda}\text{He}$. We observed a substantial difference between the Λ separation energy spectra calculated using various ΛN potentials. The proper choice of the ΛN potential as well as Fermi momentum, which enters the YNG ΛN [2] potentials as a parameter, is thus crucial. Comparing the calculated ${}^4_{\Lambda}\text{H}$ and ${}^4_{\Lambda}\text{He}$ spectra (with Coulomb interaction involved) we discuss the charge symmetry breaking in these mirror hypernuclei [3,4]. The nuclear core modifications due to the presence of Λ in s-shell hypernuclei are negligible. However in ${}^7_{\Lambda}\text{Li}$, the Λ particle pulls the alpha and deuteron clusters in the ${}^6\text{Li}$ nuclear core closer together, which confirms the glue-like role of the Λ hyperon [5].

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