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S-shell Λ and $\Lambda\Lambda$ hypernuclei based on chiral EFT

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The scarcity of hyperon-nucleon (YN) and hyperon-hyperon (YY) scattering data presents an enormous challenge for nuclear physicists in an attempt to derive baryon-baryon (BB) interactions from a microscopic level. Therefore $S = -1$ and $S = -2$ hypernuclei are important laboratories for testing BB interaction models and provide essential information for constructing realistic potentials. In this contribution, we employ the Jacobi no-core shell model (J-NCSM) approach to study the predictions of the two chiral next-to-leading order (NLO) YN interactions, NLO13 and NLO19, for Λ hypernuclei up to the p-shell. We also investigate possible implications of an increased Λ-separation energy of ${}^{3}_{\Lambda}\mathrm{H}$ on the separation energies of $A = 4 - 7$ hypernuclei. Finally, we report our first results for $\Lambda\Lambda$ s-shell hypernuclei based on chiral YY potentials at LO and NLO. The NLO results for ${}^{6}_{\Lambda\Lambda}\mathrm{He}$ are consistent with experiment. Both interactions also yield a bound state for ${}^{5}_{\Lambda\Lambda}\mathrm{He}$. The ${}^{4}_{\Lambda\Lambda}\mathrm{H}$ system is predicted to be unbound.

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