Contribution ID: **77** Type: **talk**

Single- and double-strangeness hypernuclei up to A=7 within chiral EFT

Wednesday, 29 June 2022 08:55 (25 minutes)

We investigate $S = -1$ and -2 hypernuclei with $A = 4 - 7$ employing the Jacobi-NCSM approach [1] and in combination with baryon-baryon (BB) interactions derived within the frame work of chiral effective field theory. The employed BB interactions are softened using the so-called similarity renormalization group (SRG) [2] in order to speed up the convergence. Such a SRG evolution is only approximately unitary when the SRG induced higher-body forces are omitted. Impact of the SRG evolution and of the two almost phase-equivalent YN NLO13 [3] and NLO19 [4] potentials on the Λ separation energies of $A = 4 - 7$ hypernuclei is thoroughly studied [5]. Finally, we report our first results for $\Lambda\Lambda(\Xi)$ hypernuclei based on chiral YY potentials at LO [6] and NLO [7]. The NLO result for ${}^{\ \ 6}_{\Lambda\Lambda}$He is consistent with experiment. Both interactions also yield a bound state for ${}^{\ \ 5}_{\Lambda\Lambda}$He whereas the ${}^{\ \ 4}_{\Lambda\Lambda}$H system is predicted to be unbound [8]. Using the ΞN NLO potential we found three shallow bound states for the NNNΞ system while the ${}^{\ \ 5}_{\Xi}$H and ${}^{\ \ 7}_{\Xi}$H are more tightly bound [9].

[1] P. Navratil, G. P. Kamuntavicius, and B.R. Barrett, Phys. Rev. C61, 044001 (2000).
[2] S. K. Bogner, R. J. Furnstahl, and R. J. Perry, Phys. Rev. C 75, 061001 (2007).
[3] J. Haidenbauer and others Nucl. Phys. A 915, 24 (2013).
[4] J. Haidenbauer, U.-G. Meißner, and A. Nogga, Eur. Phys. J. A 56, 91 (2020).
[5] H. Le, J. Haidenbauer, U.-G. Meißner, and A. Nogga, Eur. Phys. J. A 56, 301 (2020).
[6] H. Polinder, J. Haidenbauer, and U.-G. Meißner, Phys. Lett. B653, 29 (2007).
[7] J. Haidenbauer and U.-G. Meißner, Eur. Phys. J. A 55, 23 (2019).
[8] H. Le, J. Haidenbauer, U.-G. Meißner, and A. Nogga, Eur. Phys. J. A 57, 217 (2021).
[9] H. Le, J. Haidenbauer, U.-G. Meißner, and A. Nogga, Eur. Phys. J. A 57, 339 (2021).

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Session Classification: 3; Wed-I