

Contribution ID: 52

Type: Parallel-Few-Body Physics

Constraints on the Λ -neutron interaction from charge symmetry breaking of A = 4 hypernuclei

Charge symmetry breaking (CSB) of the Λ -nucleon interaction has been well established by the experimentally known difference of the Λ separation energies of the mirror hypernuclei ${}^{4}_{\Lambda}$ He and ${}^{4}_{\Lambda}$ H[1]. At the same time, accurate predictions for these quantities are possible based on solutions of Faddeev-Yakubovsky equations[2].

In this contribution, we employ chiral hyperon-nucleon interactions including the leading CSB contributions to constrain the Λ -neutron interaction. To this aim, we determine the strength of the two arising CSB contact terms by a fit to the differences of the separation energies of these hypernuclei in the 0⁺ and 1⁺ states, respectively, and then predict Λ n scattering lengths[3]. Based on two version of the hyperon-nucleon interaction at next-to-leading order and using different momentum cutoffs, we also estimate uncertainties of these predictions. The impact of the possible changes of the experimental input is discussed in view of recently improved experimental results for the separation energies of ${}^{\Lambda}_{\Lambda}$ He and ${}^{\Lambda}_{\Lambda}$ H.

References

[1] A. Nogga, H. Kamada and W. Glöckle, Phys. Rev. Lett. 88 (2002), 172501 [arXiv:nucl-th/0112060 [nucl-th]].

[2] A. Gal, E.V. Hungerford and D.J. Millener,
Rev. Mod. Phys. 88 (2016), 035004 [arXiv:1605.00557 [nucl-th]].

[3] J. Haidenbauer, U.-G. Meißner and A. Nogga, Few Body Syst. 62 (2021), 105
[arXiv:2107.01134 [nucl-th]].

Primary author: Dr NOGGA, Andreas (Forschungszentrum Juelich GmbH)

Co-authors: Dr HAIDENBAUER, Johann (Forschungszentrum Juelich GmbH); Prof. MEISSNER, Ulf-G. (Universitaet Bonn and Forschungszentrum Juelich)

Presenter: Dr NOGGA, Andreas (Forschungszentrum Juelich GmbH)