Contribution ID: **433** Type: **Talk**

Light Exotic Λ Hypernuclei

Wednesday 8 September 2021 13:20 (20 minutes)

Hypernuclei with proton or neutron excess are of particular interest in strangeness nuclear physics [1]. Such systems are loosely studied experimentally so far. The first attempts to get neutron-rich Λ hypernuclei [2-4] were taken using mesonic projectiles. Exotic hypernuclei can be produced also in heavy ion collisions [5], particularly, at NICA complex developed at JINR. Properties of exotic hypernuclei can shed light on the subtle features of the hyperon-nucleon and hyperon-nucleus interactions. Specifically, density dependence of the ΛN interaction, core polarization can be investigated as factors that may have a significant influence on structure of exotic hypernuclei [6]. The charge symmetry breaking ΛN interaction [1,7,8,9] is also relevant to exotic hypernuclei.

We address the structure of light Λ hypernuclei in the framework of Hartree-Fock approach with effective potentials in the Skyrme form. This phenomenological approach widely used in hypernuclear physics (e.g., [10,11]) allows us to analyze the hypernuclear properties in relation to both nucleon-nucleon and hyperon-nucleon components of the general baryonic interaction. Hyperon binding energies, as well as radii of nuclear cores are calculated using several Skyrme parametrizations. We consider isobaric chains of light Λ hypernuclei and show that the Λ binding energy depends slightly but sizably on $(N - Z)$ at fixed A.

Due to the glue-like role of the Λ hyperon, there is a chance to get bound hypernuclei with unstable cores. We test the possibility of the ^{9}C hypernucleus to be bound, and study its stability against two-proton and four-proton decays. We also examine the stability of exotic boron, nitrogen and oxygen hyperisotopes.

1. A. Gal, D.J. Millener, Phys.Lett. B 725, 445 (2013).
2. P.K. Saha et al., Phys. Rev. Lett. 94, 052502 (2005).
3. M. Agnello et al., Nucl.Phys. A 881, 269 (2012).
4. H. Sugimura et al., Phys. Lett. B 729, 39 (2014).
5. C. Rappold, J. Lopez-Fidalgo, Phys. Rev. C 94, 044616 (2016).
6. T.Yu. Tretyakova, D.E. Lanskoy, Eur. Phys. J. A 5, 391-398 (1999).
7. A. Gal., Phys. Lett. B 744, 352 (2015).
8. P. Achenbach, Few-Body Syst. 581 (2017).
9. E. Botta, T. Bressani, A. Felicielo, Nucl. Phys. A 960, 165 (2017).
10. D.E. Lanskoy, Y. Yamamoto, Phys. Rev. C 55, 5, 2330-2339 (1997).
11. H.-J. Schulze, E. Hiyama, Phys. Rev. C 90, 047301 (2014).

Primary authors: SIDOROV, Semyon (Lomonosov Moscow State University, Joint Institute for Nuclear Research); TRETYAKOVA, Tatiana; LANSKOY, Dmitriy (Lomonosov Moscow State University)

Presenter: SIDOROV, Semyon (Lomonosov Moscow State University, Joint Institute for Nuclear Research)

Session Classification: Hadrons in medium - hyperons and mesons in nuclear matter

Track Classification: Hadrons in medium - hyperons and mesons in nuclear matter