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Stability of Light Exotic Λ-hypernuclei with Unstable Cores

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In strangeness nuclear physics, exotic hypernuclei with a proton or neutron excess are of particular interest now [1]. Such systems loosely studied experimentally so far can be produced in heavy ion collisions [2] at NICA complex developed at JINR. Properties of exotic hypernuclei can bring new knowledge on subtle features of the hyperon-nucleon and hyperon-nucleus interactions. Specifically, density dependence of the ΛN interaction, ability of the hyperon to distort the nuclear core, charge symmetry breaking ΛN interaction can be investigated [3].

Due to the glue-like role of the Λ hyperon, there is a chance to stabilize systems with unstable nuclear cores. Particularly, we test the possibility of the 9ΛC hypernucleus to be bound. We use the Skyrme-Hartree-Fock approach, which has been widely and successfully applied to Λ hypernuclei including the light ones (e.g., [4,5]) and carefully examine various Skyrme potentials known from the literature. We predict that ^{9}C with extreme Z/N=3 (impossible in nonstrange nuclei) is bound. We study also the stability of exotic boron, nitrogen and oxygen hyperisotopes.

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