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Effects of Λ(1405) on the Structure of Multi-Antikaonic Nuclei TAKUMI MUTO, Department of Physics, Chiba Institute of Technology, TOSHIKI MARUYAMA, Advanced Science Research Center, Japan Atomic Energy Agency, TOSHITAKA TATSUMI, Department of Physics, Kyoto University
— Multi-strangeness system in hadronic matter has received much attention toward understanding high-density QCD.Recently deeply bound antikaonic nuclear states have been studied extensively. We have investigated multi-antikaonic nuclei (MKN), where several K^- mesons are bound in the nucleus. In this paper, we extend our framework to take into account the Λ(1405) (Λ^*) and consider its effects on the structure of the MKN. We base our study on the relativistic mean-field theory (RMF), coupled with $\bar{K}$-nucleon (N) and $\bar{K}-\bar{K}$ interactions which respect chiral symmetry. The Λ^* is introduced as a pole contribution to the energy together with the range effects as the second-order perturbation with respect to the relevant axial-vector current. The density profiles of the nucleons and K^- for the MKN are obtained. It is shown that the I=0 $\bar{K}N$ attraction is enhanced as a result of avoiding the Λ^* pole. Therefore both protons and K^- mesons become denser around the center of the MKN as compared with the previous result without the range terms and Λ^*. We also discuss behavior of the binding energy of the MKN by systematically changing the number of the embedded K^-, $|S|$.

Takumi Muto
Department of Physics, Chiba Institute of Technology

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