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QCD sum rule approach to nuclear structure problems

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Microscopic approach based on quantum chromodymanics (QCD) is the most challenging ab initio theory for nuclear structure physics. In this respect, QCD sum rule gives a powerful tool, but numerically not highly demanding, to cross a bridge the QCD and hadron spectroscopy such as meson and baryon masses in terms of chiral symmetry breaking due to quark condensation. In nuclear medium, a partial restoration of the chiral symmetry breaking is found in the pionic atom experiments.
In my talk, I will present the QCD sum rule approach to the anomaly in the mass difference of mirror nuclei, known as Okamoto-Nolen-Schiffer (ONS) anomaly, which is not yet solved by fully microscopic theory. Our approach is intimately related with the partial restoration of the chiral symmetry breaking in nuclear medium and provides a quantitative solution of the ONS anomaly in the mass difference between protons and neutrons in nuclear medium. I will also mention the charge symmetry breaking effect in hyper nuclei which is observed recently.

session

I. Nuclear Structure and Reactions

Primary author: SAGAWA, Hiroyuki (RIKEN/University of Aizu)

Presenter: SAGAWA, Hiroyuki (RIKEN/University of Aizu)

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