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Nucleon spectral function at finite density from QCD sum rules KEIUSKE OHTANI, Tokyo Institute of Technology, PHILIPP GUBLER, RIKEN, MAKOTO OKA, Tokyo Institute of Technology — The QCD sum rule method is a powerful tool for studying hadron properties directly from QCD. Recently, the Maximum Entropy Method (MEM) has been applied and is successful in the analysis of the rho meson sum rule in vacuum [1]. The advantage of this approach is that the spectral functions can be extracted without assuming a specific form. We have applied this analysis method of QCD sum rules to the spectral function of the nucleon and its negative parity excited states in vacuum and have constructed the parity projected nucleon sum rules including the first order α_s corrections [2]. Both the positive and negative parity spectral function of the nucleon are extracted after the MEM is applied to the sum rule. We find that the difference between the positive and negative parity spectral function is mainly caused by the chiral condensate. Applying this method to the analyses in nuclear matter, the mass modification of both the positive and negative parity states can be examined. By doing this, we investigate the relation between the masses and partial restoration of chiral symmetry breaking.

[1] P. Gubler and M. Oka, Prog. Theor. Phys. 124, 995 (2010).
[2] K. Ohtani, P. Gubler and M. Oka, Phys. Rev. D 87, 034027 (2013).

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