量子物理学・ナノサイエンス第 273 回セミナー

QCD Casimir effect : Application to chiral partners of hadrons

講師　：　鈴木 渓 氏

日本原子力研究開発機構

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場所　：　本館 1 階 156 物理学系輪講室

概　要

The usual Casimir effect is a zero-point energy shift induced by two parallel plates, which is a perturbative phenomenon in quantum electrodynamics (QED) (particularly, photon fields). On the other hand, in the quantum chromodynamics (QCD) vacuum including quarks and gluons (and also hadrons), the Casimir effect should be affected by the nonperturbative properties such as the spontaneous chiral symmety breaking, color confinement, and instantons. Recently, similar phenomena in the pure Yang-Mills theory were observed from lattice simulations [1,2,3], so that the "QCD Casimir effect" would also attract much attention in the future. In this talk I will discuss our recent studies [4,5] about the Casimir effects for chiral partners in hadrons such as nucleons and D mesons.

[1] M.N. Chernodub, V.A. Goy, A.V. Molochkov, and H.H. Nguyen, Phys. Rev. Lett. **121**, 191601 (2018)
[2] M.N. Chernodub, V.A. Goy, and A.V. Molochkov, Phys. Rev. D **99**, 074021 (2019)
[3] M. Kitazawa, S. Mogliacci, I. Kolbé, and W.A. Horowitz, Phys. Rev. D **99**, 094507 (2019)
[4] T. Ishikawa, K. Nakayama, and K. Suzuki, Phys. Rev. D **99**, 054010 (2019)
[5] T. Ishikawa, K. Nakayama, D. Suenaga, and K. Suzuki, Phys. Rev. D **100**, 034016 (2019)

連絡教員　物理学系　慈道　大介（内線 2083）

量子物理学・ナノサイエンス先端研究センター 主催
東京工業大学理学院・物理学系 共催

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