EFFECTIVE VERTEXES IN MAGNETIZED QUARK-GLUON PLASMA

V. V. Skalozub

Oles Honchar Dnipro National University, Dnipro, Ukraine

In quark-gluon plasma (QGP), at high temperatures T the spontaneous generation of color magnetic fields, $b^3(T)$, $b^8(T) \neq 0$ (3, 8 are color indexes), and usual magnetic field $b(T) \neq 0$ happens. Also, the Polyakov loop and related to it the $A_0(T)$ condensate, which is solution to Yang-Mills imaginary time equations, create.

Recently [1], with the new type two-loop effective potential, which generalizes the known integral representation for the Bernoulli polynomials and takes into consideration the magnetic background, these effects were derived. The corresponding effective potential $W(T, b^3, b^8, b, A_0)$ was calculated either in $SU(2)$ gluodynamics or full quantum chromodynamics (QCD). The values of magnetic field strengths at different temperatures were calculated and the mechanism for stabilizing the background due to $A_0(T)$ was also discovered [2].

In present talk, we concentrate on the one-loop quark contributions [2]. In particular, we derive the effective vertexes, which couple magnetic fields and A_0. The vertexes result in new specific effects signalling the creation of QGP in heavy ion collision experiments.

Key words: spontaneous magnetization, high temperature, asymptotic freedom, effective potential, A_0 condensate, effective vertexes.

1. M. Bordag, V. Skalozub. Eur. Phys. J. C. 82(5) (2022) 390.
2. V. Skalozub. Effective vertexes in magnetized quark-gluon plasma 2026. arXiv:2603.05248 [hep-ph]