The Non-Perturbative Self-Consistent Model in SU(N) Gauge Field Theory

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The non-perturbative quasi-classical model in a gauge theory with the Yang-Mills (YM) field is developed. The self-consistent solutions of the Dirac equation in the $SU(N)$ gauge field, which is in the eikonal approximation, and the Yang-Mills (YM) equations containing the external fermion current are solved. It shown that the developed model has the self-consistent solutions of the Dirac and Yang-Mills equations at $N \geq 3$. In this way, the solutions take place provided that the fermion and gauge fields exist simultaneously, so that the fermion current completely compensates the current generated by the gauge field due to self-interaction of it. The applications of the obtained solutions to QCD are considered in the context of the processes in the matter generated in collisions of heavy ions of high energies. The bosonisation process is studied.

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