emerge after symmetry breaking. They include in principle: (a) glueballs and hybrids as quantum fluctuations in the gluon condensate χ_0, (b) pseudoscalar mesons as excitations of the quark condensate U_0, (c) the pseudoscalar flavor singlet meson ϕ_0, and (d) baryons as topological solitons. We will return below to the issue of hadron formation.

3. EQUATIONS OF MOTION AND KINETIC EVOLUTION

In this Section we outline how to obtain a fully dynamical description of the parton-hadron conversion in real time and complete phase space, starting from the defining generating functional (19) of our effective field theory. A comprehensive derivation can be found in Ref. [19], to which we refer for details. The method is based on the Green function technique [20, 21], here applied to derive transport equations for the field operators A^μ, ψ, χ, and U. The form of the transport equations results directly from the Dyson-Schwinger equations [22]. The self-energy operators that enter the connected part of the equations can then be evaluated in a perturbative expansion. This leads to corresponding equations of motion for the distribution functions of particles, namely gluons and quarks as colored fluctuations, and scalar and pseudoscalar hadronic excitations. The solution for the time development of these particle distribution functions in phase space will then allow us to calculate macroscopic observable quantities within the framework of relativistic kinetic theory.

3.1 Equations of motion

We start from the field equations of motion that follow from the variation of the generating functional (19) with (20):

$$
\begin{aligned}
&\left[\left(i\gamma_\mu \partial^\mu \,-\, \mu_L(\chi)\right) \delta_{ij} \,-\, g_s \gamma_\mu A_a^\mu T_a^{ij}\right] \,\psi_j \;=\; 0 \\
&\partial_\mu F_a^{\mu\nu} \,+\, g_s\, f_{abc}\, A_{\mu,b} F_c^{\mu\nu} \,-\, \left(\partial_\mu \ln \kappa_L(\chi)\right)\, F_a^{\mu\nu} \,-\, \left(1 + \frac{\mu_L(\chi)}{\mu_0}\right) g_s\, \overline{\psi}_i\, \gamma^\nu T_a^{ij}\, \psi_j \,+\, \xi_a^\nu(A) \;=\; 0 \\
&\partial_\mu \partial^\mu \chi \,+\, \frac{\partial V(\chi,U)}{\partial \chi} \,+\, \frac{1}{4}\frac{\partial \kappa_L(\chi)}{\partial \chi}\, F_{\mu\nu,a} F_a^{\mu\nu} \,+\, \frac{\partial \mu_L(\chi)}{\partial \chi}\, \overline{\psi}_i \psi_i \;=\; 0 \\
&\partial_\mu \partial^\mu U \,+\, \frac{\partial V(\chi,U)}{\partial U} \,+\, \partial_\mu \frac{\partial V(\chi,U)}{\partial(\partial_\mu U)} \;=\; 0\,.
\end{aligned}
\tag{25}
$$

where $\partial^\mu \equiv \partial/\partial x^\mu$, and we set $U \equiv (U + U^\dagger)/2$. In the second equation, the function

$$
\xi_a^\nu(A) \;:=\; \partial_\mu \left(\kappa_L\, \frac{\partial \xi_a(A)}{\partial(\partial_\mu A_a^\nu)}\right) \tag{26}
$$