to the zero-temperature potential is $O(T^2)$ [18]. This formal analogy will be indicative in the following. However, one must bear in mind that here we are aiming to describe the evolution of a general non-equilibrium system in real time and Minkowski space, as opposed to thermal evolution in Euclidean space. Nevertheless, we adopt the general concept of Ref. [14], and from the analogy with this previous work we can qualitatively expect that the correction δV will give a first-order "phase transition" from the parton to the hadron phase, when combined with V.

As seen in Fig. 2, there are three characteristic scales, L_χ, L_c and L_0, that mark the time evolution from the small-L to the large-L region as the scale-dependent potential $\mathcal{V}(L)$, eq. (21), changes:

(i) L_χ is the characteristic length scale below which the vacuum with $\chi \neq 0$ cannot exist. The potential $\mathcal{V}$ has a unique minimum at $\chi = 0$, i.e. we are in the perturbative vacuum of the pure parton phase.

(ii) L_c marks the point when the $\mathcal{V}$ develops two degenerate minima, one at $\chi = 0$ and the other at $\chi = \chi_c$. The pressure in the parton phase is here equal to the pressure in the hadron phase, and the probability for partons to tunnel through the barrier becomes large.

(iii) L_0 defines when $\delta V = 0$ and $\mathcal{V}$ becomes equal to V in eq. (11), and has a single absolute minimum at $\langle \chi \rangle = \chi_0$. The parton phase cannot exist any longer, and the parton-hadron conversion is completed. We are in the true (physical) vacuum characterized by the presence of a gluon and a quark condensate.

Following [14], we can relate the *vev*'s (8), χ_0 and U_0, to the gluon condensate

$$\langle 0 \,|\, \frac{\beta(\alpha_s)}{4\alpha_s} \, F_{\mu\nu} F^{\mu\nu} \,|\, 0 \,\rangle \;=\; -\, b \, \chi_0^4 \;\equiv\; G_0 \tag{23}$$

and the quark condensate

$$\langle 0 \,|\, \bar{q} q \,|\, 0 \,\rangle \;=\; c \left(\frac{\chi}{\chi_0} \right)^3 U_0 \;\equiv\; Q_0 \;, \tag{24}$$

where b and c are defined in (11). These condensates can be regarded as local order parameters associated with gluon and quark confinement, respectively, and chiral symmetry breakdown. Also, as discussed in [14], one can interpret small oscillations about the minimum of the potential $\mathcal{V} = V$ at $\langle \chi \rangle = \chi_0$, $\langle U + U^\dagger \rangle = U_0$, as physical hadronic states that