bubble would create instead, we obtain the associated value of the conversion probability $\pi(L)$ which determines the cluster (bubble) formation rate explained in Sec. 4.5. If the partons do convert into a cluster, they disappear from a phase-space cell, and instead the composite cluster appears at the same space-time point, from which it propagates on. Otherwise the partons continue in their shower development. The final decay of each formed cluster into hadrons is simulated analogously, except that it does not require the comparison of pressures, but is determined by kinematics and the available phase space. This cascade evolution is followed until all partons have converted, and all clusters have decayed into final-state hadrons.

As an illustrative example, we show in Fig. 7 the time evolution of the particle density profiles of partons (Fig. 7a) and clusters (Fig. 7b) for a jet system with invariant mass $Q = 100$ GeV. It is evident how the system evolves in position space with respect to the center-of-mass of the two inital partons as a polar wave front (the pictures are symmetric in $r_\perp = \sqrt{r_x^2 + r_y^2}$), with the partons gradually converting to clusters. It is interesting that this local excitation of the vacuum due to the injection of the highly virtual dijet system, and the subsequent evolution, resemble very much the situation of a stone plunged into water, with a well-shaped "shock front" expanding isotropically in the center-of-mass frame.

5. PHENOMENOLOGY

In this Section we study the observable implications of our approach to parton-hadron conversion, and investigate its consistency with standard particle physics phenomenology.

5.1 Determination of the potential $V(\chi, U)$

We first need to specify the parameters of our approach. Recall that this phenomenological input is contained in the effective long-range potential $V(\chi, U)$, eq. (11), which combines with the dynamical contribution $\delta V(L, \chi)$ to the L-dependent potential $\mathcal{V}(L)$, eq. (21). As L varies, $\mathcal{V}$ changes its shape, which affects the dynamical evolution of the system, and the latter in turn determines the further change of $\mathcal{V}$. Hence, the details of the dynamics are governed by the choice of parameters in V and thus $\mathcal{V}$. The crucial parameters are the bag constant B which defines the vacuum pressure $V(0)$ in the short-distance limit $L \to 0$, and χ_0, the value of the condensate of χ in the long-distance regime. As indicated