fm), characterized by an explosive production of partons and consequently transverse momentum; (ii) a longer *shower stage* ($\approx 0.02 - 0.3\ fm$) that essentially just causes diffusion in phase space with little additional entropy and transverse momentum production; (iii) a *conversion stage* ($\approx 0.3 - 5\ fm$) which sets in when the partons start locally to form clusters; (iv) a *hadronization stage* ($\gtrsim 5\ fm$) when the clusters start fragmenting into physical hadron states via cluster decay and resonances.

It is interesting to inspect the distribution of the cluster sizes and the invariant-mass spectrum of clusters, since these measures are essentially the only microscopic information (aside from the momentum spectrum) which is carried over from the partonic to the hadronic phase, and therefore determines directly the final-state hadron distributions. In Figs. 10 and 11 we show these distributions, for the two values of L_c and the two jet energies Q considered before.

From Fig. 10a it is obvious that the typical cluster radius is strongly peaked at a value slightly above L_c, with a very small width of about $10^{-1}\ fm$. Specifically, the average cluster size is $\langle R_{cl} \rangle = 0.62\ (0.83)\ fm$ for $L_c = 0.6\ (0.8)\ fm$. The narrow width of the cluster size distribution is a consequence of the smallness of the surface tension σ_c (83), which implies a very small surface energy to be overcome, and results in a jump in the tunnelling probability (58) around $L = L_c$. One also sees that there are a few clusters with radius smaller than L_c, a feature which arises from the fact that cluster formation sets in already at L_χ (c.f. Table 1), when there is a non-zero transition probability for partons to yield clusters by tunnelling through the potential barrier that begins to develop when $L > L_\chi$ (c.f. Fig. 2). A striking feature of the cluster mass spectrum shown in Fig. 10b is that it is insensitive to the choice of L_c. The spectrum is characterized by a strongly-damped exponential form at low mass ($M_{cl} \lesssim 3$ GeV), with a high-mass tail that extends substantially beyond 5 GeV. For both choices of L_c, the value for the average cluster mass is $\langle M_{cl} \rangle \simeq 1.2$ GeV, which is in qualitative agreement with the characteristic mass scale m_χ obtained in (86) as an estimate.

Figs. 11a and 11b display the corresponding size and mass distribution for the case when we impose the constraint mentioned in Sec. 4.3, that two partons cannot form a cluster if their invariant mass is above a maximum cluster mass M_{crit}, even if their mutual separation increases beyond L_c, where we chose $M_{crit} = 4$ GeV. In this case the two partons propagate