to the one without, as a function of the invariant mass q. In Fig. 14a we show the resulting enhancement $b_{L_c}(q)$ for our two previously-used values of L_c, confronted with the corresponding distribution obtained by the OPAL collaboration [43] at $Q = 91$ GeV. It is remarkable how well this comparison with the experimental data allows us to separate the two choices of L_c in our calculations. Clearly the value $L_c = 0.8\ fm$ appears to be strongly favored. In fact, the average source size in this case turns out $\sigma_\rho = 0.84\ fm$, which is almost identical to the average cluster size determined from Figs. 10 and 11. On the other hand, this value is well in the range of the pion source radius determined by OPAL, $\sigma_\rho^{exp} = 0.93 \pm 0.17\ fm$ with $\lambda_\rho^{exp} = 0.87 \pm 0.14$.

We may thus conclude that our presumed identification of $L_c \simeq \sigma_\rho$ indeed has physical relevance that provides a unique relation between the parameter L_c and the experimentally-observed pion emission source radius. With this important insight, it would be interesting to investigate this issue in more detail, because it provides a promising method to extract properties of the partons' space-time evolution and cluster formation from the measured particle distributions. Since the structure of the perturbative parton cascade development is projected locally onto the cluster distribution, which itself maps on the hadron spectra, the characteristic shape of the Bose enhancement $b(q)$ will depend only on the local environment, which may in turn depend on the physical situation (vacuum, as considered here, or medium, as, e.g., in deep-inelastic lepton-nucleus scattering or nucleus-nucleus collisions). Thus, by comparing, for instance, the Bose-Einstein correlations measured in $e^+e^- \to hadrons$ to high-energy heavy-ion collisions, one might extract specific features of perturbative QCD in a finite-density and -temperature medium, which are absent in vacuum [24, 50].

As an illustrative example of such a comparison, we show in Fig. 14b the ratio $b_{0.6\,fm}(q)/b_{0.8\,fm}(q)$ of the curves in Fig. 14a. Although the individual curves in Fig. 14a are very similar to each other, their ratio is a very sensitive quantity that filters out clearly their subtle difference. It is evident that a smaller L_c gives rise to a significantly stronger enhancement at low masses $k \lesssim 300$ MeV, peaked at about 1.5 times the pion mass. Fig. 14b also shows that the results for $Q = 34$ GeV and $Q = 91$ GeV are identical, even for this sensitive ratio, which implies that the specifics of the Bose-Einstein effect and Bose enhancement are independent of the energy, in agreement with what is observed