"Free" Constituent Quarks and Dilepton Production in Heavy Ion Collisions

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Abstract

An approach is suggested, invoking vitally the notion of constituent massive quarks (valons) which can survive and propagate rather than hadrons (except of pions) within the hot and dense matter formed below the chiral transition temperature in course of the heavy ion collisions at high energies. This approach is shown to be quite good for description of the observed excess in dilepton yield at masses 250 MeV$\leq M_{ee} \leq$700 MeV over the prompt resonance decay mechanism (CERES cocktail) predictions. In some aspects, it looks to be even more successful, than the conventional approaches: it seems to match the data somewhat better at dilepton masses before the two-pion threshold and before the ρ-meson peak as well as at higher dilepton masses (beyond the ϕ-meson one). The approach does not imply any specific assumptions on the equation of state or about the peculiarities of the phase transitions in the expanding matter.

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