

ANNIHILATION MECHANISM OF DILEPTON EMISSION FROM FINITE FIREBALL

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S u m m a r y

Medium-induced modifications of the $\pi^+\pi^-$ and $q\bar{q}$ annihilation mechanisms of dilepton production during relativistic heavy ion collisions are considered. Due to the dense hadron environment, the pions produced during a collision are effectively confined in a finite volume, in which they live for a finite time which is scaled as the lifetime of a fireball. Keeping the vacuum mass and width of the ρ -meson formfactor, we compare two approaches to the description of the ρ -meson behavior. In the first approach, a ρ -meson has a zero mean free path due to the dense hadron environment. But, in the second approach, it propagates as in vacuum. Our results indicate that, due to the space-time finiteness of the pion system which generates the corresponding quantum randomization, the dilepton rates are finite in the invariant low-mass region $M \leq 2m_\pi$. It is found that the spatial finiteness of quark wave functions and the finiteness of the lifetime of excited states result in the same effect for the $q\bar{q}$ annihilation to dileptons. The breaking of the detailed energy-momentum conservation due to the broken translation invariance in a medium is discussed.