

Dilepton production as a measure of QGP thermalization time

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We calculate leading-order dilepton production resulting from the annihilation process $q\bar{q} \rightarrow l^+l^-$ from a quark-gluon plasma which has a time-dependent anisotropy in the momentum space. A phenomenological model for the hard momentum scale, $p_{\text{hard}}(\tau)$ and the plasma anisotropy parameter, $\xi(\tau)$, is constructed. The model interpolates between free streaming behavior at early times and ideal hydrodynamical behavior at late times. Using this model, we show that for LHC energies, the medium dilepton production increases in the kinematic range $3 < p_T < 8$ GeV. As a result this observable is sensitive to the isotropization time of the system, τ_{iso} . Therefore high-energy dilepton production can be used to probe the degree of momentum-space isotropy of a quark-gluon plasma produced in relativistic heavy ion collisions and the time of onset of hydrodynamic expansion of the QGP.

References

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