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Virtual photon polarization and dilepton anisotropy in relativistic heavy-ion collisions

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We present a general framework for studying the angular anisotropy of dileptons produced from polarized virtual photons in relativistic heavy-ion collisions. The spin-anisotropy coefficients characterizing the angular distribution of the dilepton final state are introduced and their dependence on the medium evolution via flow velocity and temperature profiles is obtained. We illustrate these effects in dilepton production from quark-antiquark annihilation in the QGP phase and $\pi^+\pi^-$ annihilation in the hadronic phase for a static uniform medium and for a longitudinally expanding system. It is shown that the anisotropy coefficients are in general non-zero in a thermalized medium, and depend on the flow of the medium as well as on the transverse momentum and invariant mass of the virtual photon. The present framework can be easily implemented in a realistic hydrodynamic simulation of relativistic heavy-ion collisions in order to study the effect of non-trivial medium properties on dilepton anisotropy.

Content type

Theory

Collaboration

Centralised submission by Collaboration

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