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Measuring pressure anisotropy of the quark-gluon plasma through photon polarization

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Photons are radiated throughout heavy-ion collisions, including from the hot and dense quark-gluon plasma (QGP). In this talk, we consider the polarization of QGP photons. The polarization gives detailed information about how the pressure anisotropy of the QGP medium evolves and thus how the medium isotropizes during the initial stages of collisions. We calculate for the first time the emission of polarized photons through quark-antiquark pair annihilation and bremsstrahlung in an anisotropic QGP medium. Our calculation includes the Landau-Pomeranchuk-Migdal effect fully. We show that the polarization goes directly as the anisotropy of the soft gluon cloud radiated by quarks and gluons and thus measures pressure anisotropy. Finally, we discuss the size of these effects in heavy-ion collisions and the feasibility of measuring the photon polarization.

Experiment/Theory

Theory/Phenomenology

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