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Evaluate the magnetic field in heavy-ion collisions by virtual photon polarization and dilepton anisotropy

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In weak magnetic field approximation, quark distribution functions are modified linearly by electromagnetic tensor $F_{\mu\nu}$ in Quark Gluon Plasma(QGP). Quarks and anti-quarks tend to move perpendicular to the magnetic field. Hence, in the $q\bar{q} \to l\bar{l}$ process, momentum and angular momentum conservation will induce the dilepton anisotropy and the virtual photon polarization. Virtual photon polarization is characterized by coefficients λ_θ and λ_ϕ, which are sensitive to the magnetic field and hydrodynamic behaviors. In the Bjorken flow case and random fluid cell, we find that virtual photon polarization phenomena can obviously reflect the strength of the magnetic field.

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