

Procedure for measuring photon and vector meson circular polarization variation with respect to the reaction plane in relativistic heavy-ion collisions

The electromagnetic field pattern created by spectators in relativistic heavy-ion collisions plants a seed of positive (negative) magnetic helicity in the hemisphere above (below) the reaction plane. Owing to the chiral anomaly, the magnetic helicity interacts with the fermionic helicity of the collision system and causes photons emitted in upper and lower hemispheres to have different preferences in the circular polarization. Similar helicity separation for massive particles, owing to the global vorticity, is also possible. In this talk, we lay out a procedure to measure the variation of the circular polarization with respect to the reaction plane in relativistic heavy-ion collisions for massless photons, as well as similar polarization patterns for vector mesons decaying into two daughters. We propose to study the yield differentially and compare the yield between upper and lower hemispheres to identify and quantify such effects. This procedure will facilitate the investigation of novel phenomena related to chirality, magnetic field and vorticity in the Quark Gluon Plasma.

Preferred Track

Correlations and Fluctuations

Collaboration

Not applicable

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