

Magnetic field in relativistic heavy-ion collisions: how good is the classical approximation?

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In relativistic non-central heavy-ion collisions an intense magnetic field is produced. Classical fields can be used to describe quantum fields when the occupation of each field mode is sufficiently high. In this work, we test the classical magnetic field approximation in heavy-ion collisions. First, we use a classical field to study the forward pion production by the magnetic excitation of nucleons through the Δ , in the process $N \rightarrow \Delta \rightarrow N + \pi$. We suggest that the pions produced in this process can be detected by the ZDC's, and this detection would be a measure of the magnetic field intensity. Then, we replace this field with a flux of photons and use the photoproduction of pions as the analogous process of magnetic excitation. In the end, we compare the two calculations and present our conclusions.

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