

The Utilization of Magneto-Hydrodynamics Framework in Expansion of Magnetized Conformal Flow

Authors : Majid Karimabadi, Ahmad Farzaneh Kore, Behnam Azadegan

Abstract : The evolution of magnetized quark gluon plasma (QGP) in the framework of magneto- hydrodynamics is the focus of our study. We are investigating the temporal and spatial evolution of QGP using a second order viscous hydrodynamic framework. The fluid is considered to be magnetized and subjected to the influence of a magnetic field that is generated during the early stages of relativistic heavy ion collisions. We assume boost invariance along the beam line, which is represented by the z coordinate, and fluid expansion in the x direction. Additionally, we assume that the magnetic field is perpendicular to the reaction plane, which corresponds to the y direction. The fluid is considered to have infinite electrical conductivity. To analyze this system, we solve the coupled Maxwell and conservation equations. By doing so, we are able to determine the time and space dependence of the energy density, velocity, and magnetic field in the transverse plane of the viscous magnetized hot plasma. Furthermore, we obtain the spectrum of hadrons and compare it with experimental data.

Keywords : QGP, magnetohydrodynamics, hadrons, conversation

Conference Title : ICHP 2024 : International Conference on Hadron Physics

Conference Location : Ottawa, Canada

Conference Dates : July 11-12, 2024