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Anisotropic Electrical Conductivity in Rotating Hadron Gas

In non-central heavy-ion collisions, substantial orbital angular momentum (OAM) is produced and transferred to the QGP and hadronic matter, leading to effects like spin polarization and the chiral vortical effect. Previous studies have explored the impact of OAM on electrical conductivity under a non-relativistic, globally rotating QGP. In this work, we have developed a relativistic framework, relaxing earlier assumptions, to study the electrical conductivity of rotating hadronic matter. We have used the Boltzmann transport equation, integrating the Coriolis force that arises due to rotation in the hadron resonance gas (HRG) model. We have observed that similar to the Lorentz force, the Coriolis force induces anisotropy in the medium, which can be classified into three components: Hall ($\sigma^{\times}$), perpendicular ($\sigma^{\perp}$), and parallel ($\sigma^{||}$). In a rapidly rotating HRG, the Hall component (σ×) becomes dominant up to T ≈ 0.20 GeV, reflecting significant anisotropy in the medium.

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