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Probing the effect of the nonextensivity on the transport properties of hot QCD medium at finite magnetic field and chemical potential

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We have probed the effect of the nonextensivity on the transport properties related to the charge and heat in hot QCD medium at finite magnetic field and chemical potential. The coefficients associated with the charge and heat transport, such as the electrical conductivity, Hall conductivity, thermal conductivity and Hall-type thermal conductivity are determined using the nonextensive Tsallis framework within the relaxation time approximation of kinetic theory. The Tsallis distribution function encodes the effect of the nonextensivity, where the deviation of parameter q from unity signifies the extent of the nonextensivity. The matter produced in heavy ion collisions may not be exactly in the locally equilibrated state, and for understanding the properties of such matter to a greater degree, the nonextensive Tsallis framework is a relevant approach to follow. Our observation shows that the electrical and thermal conductivities as well as their Hall components increase with the nonextensivity and this implies an increased deviation of both charge and heat transports from their counterparts at $q = 1$. It is observed that the deviations of the abovementioned transport coefficients from their respective equilibrated values get further increased at finite magnetic field, whereas these deviations become decreased at finite chemical potential. Furthermore, the effects of the nonextensivity on the flow characteristics through the Knudsen number, specific heat and elliptic flow have been explored.

Category

Theory

Collaboration (if applicable)

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