Contribution ID: **91** Type: **not specified**

Effect of momentum anisotropy on quark matter in the NJL model

The chiral phase structure, mesonic properties and transport properties in a momentum anisotropic quark matter induced by the preferential expansion of medium are phenomenologically investigated based on the two flavor Nambu-Jona-Lasinio model.
The calculations of various transport coefficients have been performed using the kinetic theory in the relaxation time approximation, where the momentum anisotropy is embeded in the estimation of both distribution function and the relaxation time.
Our results indicate that an increase in anisotropy parameter ξ can considerably lead to a catalysis of chiral symmetry breaking.
The critical endpoint (CEP) is shifted to smaller temperatures and larger quark chemical potentials as ξ increases, and the influence of momentum anisotropy on temperature of CEP is almost the same as that on the quark chemical potential of CEP.
The meson masses and the associated decay widths also significantly are affect by the variation of ξ.
The temperature behavior of scaled shear viscosity η/T^3 and scaled electrical conductivity σ_{el}/T exhibit a similar dip struture, however, their qualitative behaviors with ξ are different.
Nevertheless, the minima of both η/T^3 and σ_{el}/T shift toward higher temperatures with an increase of ξ.
Furthermore, in this work the Seebeck coefficient S exhibits a decreasing function of temperature and its sign is positive, indicating the dominant carriers of converting the temperature gradient to the electric field are up quarks.
With a rise in ξ the value of S has a significant enhancement for the temperature below the critical temperature.

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