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Spin polarization impact on QCD critical point

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Spin polarization, as a novel method for detecting the rotational properties of QGP which are produced in relativistic heavy-ion collisions, has attractd great interest. We study the impact of parton spin polarization on the effective transport and thermodynamic coefficients and the QCD critical point in non central light-and heavy-ion collisions. By employing the novel kinetic theory method, we found that the transport and thermodynamic coefficients, i.g, speed of sound squared c_s^2 , specific shear viscosity η/s , specific bulk viscosity ζ/s , and mean of free path λ , are significantly affected by spin polarization. The spin polarization impact on η/s and λ show that monotonic dependent on collision energy in terms of both the radius and temperature. While the spin polarization impact on c_s^2 and ζ/s exhibit that non-monotonic dependent on collision energy in terms of both the radius and temperature. The non-monotonic behavior suggests that spin polarization can serve as an effective probe for the critical point of the QCD phase transition.

References

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