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Shear and bulk viscous coefficients of a rotating QGP medium

We have explored the effect of angular velocity on the shear and bulk viscous coefficients of a rotating QGP medium. In the noncentral heavy ion collisions, the produced medium possesses a finite angular momentum with a finite range of angular velocity. The rotation of the QGP medium can notably alter its various properties, including viscous properties. Using a novel relaxation time approximation in the relativistic Boltzmann transport equation at finite angular velocity, we have calculated the shear and bulk viscous coefficients. Additionally, we have compared these viscous coefficients with their counterparts in the standard relaxation time approximation within the kinetic theory approach. We have found that the introduction of rotation increases both shear and bulk viscosities, suggesting an enhanced momentum transfer within the medium and greater fluctuations in local pressure. This rotational effect on the shear and bulk viscosities is more conspicuous at low temperatures than at high temperatures. It is also observed that the use of the novel relaxation time approximation decreases the shear viscosity and increases the bulk viscosity as compared to the standard relaxation time approximation for the entire temperature range. Further, the rotation leaves a significant impact on some observables associated with the flow characteristic, fluid behavior and conformal symmetry of the medium.

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