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Spin polarization、phase transition and Transportation of QGP at finite temperature in the presences of magnetic field and rotation

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We investigate the magnetized QCD matter and chiral phase transition in a (2 + 1)-flavor Nambu–Jona- Lasinio (NJL) model at finite temperature and chemical potential by comparing the contributions from the tensor spin polarization (TSP) and anomalous magnetic moment (AMM) of quarks. On the other hand, we study the properties of the shear viscosity coefficient of quark matter near the chiral phase transition at finite temperature, chemical potential and strong magnetic field. If the magnetic field is strong enough, it will interfere with significant QCD phenomena, such as the generation of dynamic quark mass, which may affect the transport properties of quark matter. On the other hand, the chiral and deconfinement phase transitions under rotation have been simultaneously investigated in the Polyakov-Nambu-Jona-Lasinio (PNJL) model. An interesting observation has been found that the chiral phase transition is catalyzed and the deconfinement phase transition is decelerated by rotation, therefore a chiral symmetric but confined quarkyonic phase is induced by rotation, which indicates that chiral dynamics and gluon dynamics can be split by rotation.

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