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Quantum kinetic theory, spin polarization and form factors

The experimental observations of spin polarization in heavy ion collisions have provide a unique opportunity to study spin transports in QCD matter. Much progress has been made in formulating a quantum kinetic theory (QKT) that incorporates dynamics of spin degree of freedom. Qualitative understanding of the spin polarization phenomena has been reached. While QKT works perfectly in weakly coupled regime, where quasi-particles exists, its applicability in heavy ion collisions remains to be verified. We reformuate the spin transport problem in terms of form factors in the medium without assuming a quasi-particle picture. We illustrate the application of form factors with example of spin-vorticity coupling, which gives a radiative correction to the known results.

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