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Form Factors and Chiral Kinetic Theory

We derive form factors for massless fermions, which has an analogous structures as that of chiral kinetic theory. We further use it describe the local spin polarization in relativistic spin hydrodynamics. To achieve this, we use the metric perturbation to mimic the fluid gradient. The coupling spin and fluid gradient arise in two forms: one corresponds to the potential correction modifying the equilibrium distribution. The other can be interpreted as the side-jump term in chiral kinetic theory. By adding the two parts of spin-gradient coupling, all components of spin-gradient coupling in axial Wigner function can be given. We also show application of form factors in scattering of massless particles.

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