

Quantum constitutive equations for finite temperature Dirac fermions under rotation

The experimental confirmation of the polarization of the Lambda hyperons observed in relativistic heavy ion collisions experiments [1] has renewed the interest in anomalous transport of fermions due to the spin-orbit coupling (e.g., through the chiral vortical effect [2]). Using a non-perturbative technique [3], exact expressions are derived for the thermal expectation values of the stress-energy tensor, charge current and (anomalous) axial current for the case of massless rigidly-rotating fermions at finite chemical potential [4]. Compared to the relativistic kinetic theory analogue, the quantum corrections are expressed as constitutive equations in terms of local kinematic quantities, such as the vorticity and acceleration.

References:

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- [3] V. E. Ambrus, E. Winstanley, Phys. Lett. B 734 (2014) 296.
- [4] V. E. Ambrus, E. Winstanley, arXiv:1908.10244 [hep-th].

Primary author: AMBRUS, Victor Eugen (West University of Timisoara)

Presenter: AMBRUS, Victor Eugen (West University of Timisoara)

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