

Peer Review

Review of: "Distinguishing Features of Longitudinal Magnetoconductivity for a Rarita-Schwinger-Weyl Node"

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In this work, Dr. Mandal investigates the longitudinal magnetotransport in systems hosting Rarita-Schwinger-Weyl (RSW) fermions by performing an explicit evaluation of the collision integral, moving beyond the commonly used constant relaxation time approximation. The detailed algebraic treatment and formalism presented in the manuscript are technically sound and merit publication. However, I have a few minor comments that I would like the author to address in a revised version of the manuscript.

The author does not specify the value or scale of the impurity concentration ρ_{imp} used in the numerical calculations. Since the scattering rates (and consequently the conductivity) are proportional to ρ_{imp} , it is important to clarify how this parameter is treated—whether it is set to unity for normalization or tied to any physical estimate. Additionally, some discussion on the scale of ρ_{imp} relative to typical experimental values would help contextualize the results.

In Eq. (28), the author introduces an ansatz for the angular dependence of the vectorial mean-free path as a truncated expansion in powers of $\cos\theta$. However, the rationale behind choosing this specific functional form is not discussed. Given the complexity of the scattering processes—especially in the presence of both intraband and interband contributions—it would be helpful if the author could justify the validity and sufficiency of this ansatz for the system under consideration. A brief explanation, possibly grounded in symmetry arguments or convergence checks, would strengthen the reliability of the proposed solution.

In Figure 3, the author presents conductivity plots for different combinations of the scattering strength parameters β_{inter} or β_{intra} . However, the manuscript does not explain the rationale or guiding principles behind the specific choice of these parameter values.

With scientific clarification and revision on the above points, the preprint could be considered suitable for publication.

Declarations

Potential competing interests: No potential competing interests to declare.