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Peer Review

# Review of: "Classical Characters of Spinor Fields in Torsion Gravity"

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I appreciate the derivation of the MPD equation composed of hydrodynamic variables, starting from Dirac's relativistic wave equation ($\hbar = 1$) and also its reduction to the standard form under the plane-wave approximation, which at the end becomes trivial. However, this does not mean that quantum mechanics is visualized classically.

In the early last century, there were severe attempts to interpret quantum mechanics classically. For example, under Wick rotation, the Schrödinger equation becomes identical to the heat equation, which admits wave solutions. Sometimes, a spinning top is addressed to interpret spin angular momentum. But such classical analogy leads to misconceptions and paradoxical situations. Quantum mechanics exhibits the uncertainty principle, wave-particle dualism, and also superposition, which are absent in the classical domain. Quantum mechanics may only be visualized as the sum over all paths – the path integral method, while the Schrödinger equation considers perturbations around the classical definite trajectory. In this context, let me mention that a recent study (Science Advances, doi: 10.1126/SCIADV.ADR2007) suggests that the two seemingly separate concepts, such as the uncertainty principle and wave-particle dualism, are fundamentally linked.

Following comments may be undertaken by the author. Firstly, since torsion also attributes to gravity, the statement 'The problem will be answered on a general manifold with torsion and gravity' should better be 'torsion and curvature'. Some minor issues are that the torsion term is usually denoted by T, while Q denotes non-metricity, and the contortion tensor is usually denoted by K. A general affine connection is given by, $\Gamma^{\alpha}{}_{\mu\nu} = \{^{\alpha}_{\mu\nu}\} + K^{\alpha}{}_{\mu\nu} + L^{\alpha}{}_{\mu\nu}$, where the first term on the right-hand side is the Levi-Civita connection, the second is the contortion tensor, while the third is the disformation tensor. In the absence of the last term, it is the expression given in (18). Why a factor of ½ appears with $Q^{\alpha}{}_{\mu\nu}$ is not clear.

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## Declarations

**Potential competing interests:** No potential competing interests to declare.