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Chiral vortical effect for free fermions on anti-de Sitter space

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According to the axial vortical effect, an axial current J^μ_A is produced in a fluid undergoing a macroscopic vortical motion, which is equal to the local kinematic vorticity ω^μ multiplied by the axial vortical conductivity σ^ω_A. We probe the curvature corrections to σ^ω_A by computing the thermal expectation value of J^μ_A with respect to a rigidly-rotating quantum state at finite temperature. The calculation is computed in the real time formalism using a novel KMS relation which includes the effect of rotation, being based on an exact expression for the fermion vacuum two-point function (the analysis is restricted to subcritical rotations when no speed of light surface forms, such that the rotating and stationary vacua are identical). Our results confirm the Minkowski expression for σ^ω_A, revealing a novel contribution proportional to the Ricci scalar. At vanishing mass, the conservation of J^μ_A implies a non-vanishing flux through the adS boundary, while at non-vanishing mass, the flux of J^μ_A is completely converted into a volumetric density of pseudoscalar condensate $-i\bar{\psi}\gamma^5\psi$.

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