Abstract:
Geometry and Spin Transport in Skyrmion Magnets

We investigate the emergent electrodynamic fields that arise from gauge potentials when a free electron travels through a skyrmion magnetic texture. In the adiabatic limit we project these potentials onto the spin axis, allowing us to investigate the nature of the emergent fields. We find that when the magnetic texture is time-independent the emergent magnetic field is quantised in the direction transverse to the basal plane of the skyrmion. We also consider when the texture has a time-dependence from the dissipationless Landau-Lifshitz-Gilbert equation, and find that there is an emergent electric field in the radial direction from the skyrmion core independent of the skyrmion winding number. Hence a temporally and/or spatially inhomogeneous skyrmion texture gives rise to an emergent spin motive force.