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Wave Equation of Three-Dimensional Skyrmion Line JUNICHI IWASAKI, Dept. of Applied Physics, Univ. of Tokyo, CHRISTOPH SCHÜTTE, Institut für Theoretische Physik, Universität zu Köln, NAOTO NAGAOSA, RIKEN Center for Emergent Matter Science and Dept. of Applied Physics, Univ. of Tokyo
— Magnetic skyrmion is a particle in magnets, which is now regarded as one of the most promising candidate for information career in future memory devices. In the bulk of chiral magnets, skyrmions form lines along the applied magnetic field. Previous studies report that the emergent magnetic monopoles are assocoated with the creation and annihilation of these lines. Here, we raise more fundamental question: how does the wave propagates in these one-dimensional "strings"? Surprisingly, the numerical simulation reveals that the waves propagating in positive and negative directions are different. This asymmetric feature is described by magnon contribution, which has, in general, k-linear term in its dispersion relation under the Dzyaloshinskii-Moriya interaction. Starting from the action of the spin system in chiral magnets, we derive the wave equation of the skyrmion line.

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