

# Spin waves in planar quasicrystal of Penrose tiling

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We investigated two-dimensional magnonic structures which are the counterparts of photonic quasicrystals forming Penrose tiling. We considered the slab composed of Ni (or Py) disks embedded in Fe (or Co) matrix. The disks were arranged in quasiperiodic Penrose-like structure. The infinite quasicrystal was approximated by its rectangular section with periodic boundary conditions applied. This approach allowed us to use the plane wave method to find the frequency spectrum of eigenmodes for spin waves and their spatial profiles. The calculated integrated density of states shows more distinctive magnonic gaps for the structure composed of materials of high magnetic contrast (Ni and Fe) and relatively high filling fraction. This proves the impact of quasiperiodic long-range order on the spectrum of spin waves. We also investigated the localization of SW eigenmodes resulting from the quasiperiodicity of the structure.

## References:

[1] J. Rychły, S. Mieszczak, J.W. Kłos, <https://arxiv.org/abs/1701.09125>

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