

Propagating spin waves in 1D quasiperiodic magnonic crystals

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In this work we report on fabrication and spin waves (SWs) dynamics in one-dimensional quasiperiodic magnonic crystals consisted of $Ni_{80}Fe_{20}$ nanowires arranged using Fibonacci inflation rule. Magnetic dynamic properties were investigated using ferromagnetic resonance with vector network analyzer and scanning x-ray microscopy with x-ray circular dichroism contrast with which propagating SWs were imaged for quasiperiodic and reference periodic structure. Gradual variation of the phase along the propagation direction is visible which indicates propagating character of the SWs in the structure. Significant jumps of the phase value between wide and narrow nanowires are also observed, which means that the oscillations in both type of nanowires are out-of-phase. It may suggest that the optical modes were excited. The outcomes of numerical calculations were used for the interpretation of the experimental results.

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