Stuttgarter Physikalisches Kolloquium

Max-Planck-Institut für Intelligente Systeme
Max-Planck-Institut für Festkörperforschung
Fachbereich Physik, Universität Stuttgart

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Artificial magnonic crystals from periodic and quasicrystalline lattices of nanostructured magnets

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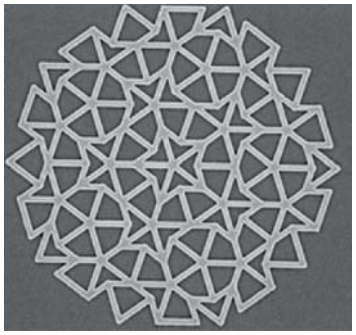
Abstract

Both periodically modulated magnetic thin films and noncollinear spin structures – such as skyrmion lattices – give rise to the realization of magnonic crystals which represent the magnetic counterpart of photonic crystals. Exploiting spin waves (magnons) instead of photons one can control the relevant band structures in operation via different magnetic states. We prepare and explore periodic and aperiodic spin structures (Figure) aiming at the control of magnons approaching soft x-ray wavelengths. They might form reconfigurable microwave devices which operate on the nanoscale.



Interconnected permalloy nanobars (bright) with two different lengths of 500 and 800 nm forming an artificial two-dimensional quasicrystal on a nonmagnetic substrate (dark). (V. Bhat et al., unpublished)