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Micromagnetic Simulation for Exploring Spin-wave Filtering Effects[1] CHAO MA, XIANGYIN LI, TOBIAS STUECKLER, Fert Beijing Research Institute, School of Electronics and Information Engineering, Beihang University, Beijing, China, SHENGDA WANG, Technical University Munich, PEDRAM KHALILI, KANG L. WANG, Department of Electrical Engineering, University of California, Los Angeles, California, WEISHENG ZHAO, HAIMING YU, Fert Beijing Research Institute, School of Electronics and Information Engineering, Beihang University, Beijing, China, FERT BEIJING RESEARCH INSTITUTE TEAM, DEVICE RESEARCH LABORATORY COLLABORATION, TECHNICAL UNIVERSITY LABORATORY COLLABORATION — Spin wave propagation in periodical magnetic structures has been studied in experiments and simulations over last few years and offers potential applications in spin wave filters. We conduct simulation studies on the band gap structure of three types of structures for potential spin filter applications: first, antidot lattice based on yttrium iron garnet (YIG); second, magnonic crystal with iron dots embedded in YIG film; third, grating coupler formed by iron dots above YIG film. We found that the width and frequency position of band gap vary among these different structures. In addition, we investigate spin filter properties depend on the geometry parameters of the periodic pattern, e.g. lattice period, dot diameter. Such studies can be helpful for the realization of the spin filter device with optimized periodical structure and geometry parameters using nanotechnology.

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Fert Beijing Research Institute, School of Electronics and Information Engineering, Beihang University, Beijing

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