

Lateral shift of light beam transmitted through photonic-magnonic crystals

Y.S. Dadoenkova,^{1,2,3} N.N. Dadoenkova,^{2,3} J.W. Klos,⁴ M. Krawczyk,⁴ and
I.L. Lyubchanskii³

¹*Ulyanovsk State University, Ulyanovsk, Russian Federation*

²*Novgorod State University, Veliky Novgorod, Russian Federation*

³*Donetsk Physical and Technical Institute of the NAS of Ukraine, Donetsk, Ukraine*

⁴*Adam Mickiewicz University in Poznań, Poznań, Poland*

The Goos-Hänchen effect (lateral shift of a reflected or transmitted light beam with respect to the geometric optics prediction) is a topic of intensive studies in different systems, including magnetic photonic crystals, and has application in the design of integrated optics devices, such as optical switchers and chemical sensors. We present a theoretical investigation of the lateral shift of the Gaussian light beam transmitted through one-dimensional bi-periodic photonic-magnonic crystals consisting of equidistant magnetic layers separated by finite size dielectric photonic crystals. We show that increase of the number of magnetic super-cells in the structure leads to the increase of lateral shift in the vicinity of the modes inside the photonic band gap.

The work is supported by Ministry of Education and Science of Russian Federation (Projects 3.7614.2017/Π220 and 14.Z50.31.0015); European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie (Grant 644348).