TRANSFORMATION OF THE POLARITONIC SPECTRUM OF A ONE-DIMENSIONAL MAGNETIC PHOTONIC CRYSTAL IN EXTERNAL CROSSED DC ELECTRIC AND MAGNETIC FIELDS

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The conditions are determined for a one-dimensional magnetic photonic crystal (MPC), under which square-low magnetooptical interaction leads to a number of specific features upon propagation and localization of magnetic TE and TM polaritons in external crossed dc electric E and magnetic H fields. Superlattice of easy-axis antiferromagnet nonmagnetic dielectric type choose as a basis for MPC. Easy magnetization axis of antiferromagnet l, external electric E and magnetic H fields are mutually perpendicular (H⊥E⊥l).

In particular it is shown: i) The spectrum of normal and surface magnetic polaritons is nonreciprocal (ω(k) ≠ ω(−k)). ii) Dispersion properties and character of localization of polaritonic excitations being dependent essentially on the ratio of electric and magnetic fields E/H, and relative orientation of vectors E, H and n (n is unit vector of a normal line to surface of a superlattice). iii) Varying size of magnetic and electrical fields it is possible effectively and in a wide range to change character of refraction of bulk electromagnetic wave which falling from without on a surface of MPC.

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