

Three-wave nonlinear scattering in finite layered structures  
as a way to terahertz wave generation

O.V. Shramkova

School of Electronics, Electrical Engineering & Computer Science, Queen's University  
Belfast, Queen's Road, Queen's Island, BT3 9DT, Belfast, U.K.

e-mail: O.Shramkova@qub.ac.uk, tel: +4428 90971763, fax: +4428 90971702.

An overview of the most relevant to the paper title properties of electromagnetic crystals is presented considering 1D, 2D and 3D structures. The emphasis is on nonlinear properties of the second order. The harmonic and combinatorial frequency generation due to the wave scattering by layered structures composed of stacked anisotropic layers of nonlinear materials is discussed. The three-wave process is analyzed to characterise the nonlinear interactions. The properties of the waves of combinatorial frequency are examined in dependence of the structure parameters and frequencies and angles of incidence of pump waves. The enhancement of the nonlinear scattering products at Wolf-Bragg resonances has been demonstrated.