

# Reflection and transmission by a bi-anisotropic omega structures under normal incidence of plane waves

I.V. Semchenko and S.A. Khakhomov

Department of General Physics

Gomel State University

Sovyetskaya Str. 104, 246019, Gomel Belarus

Fax: + 375-232-576557

E-mail: khakh@gsu.unibel.by

In this paper plane wave reflection and transmission phenomena in slabs of artificial bi-anisotropic media are theoretically considered. The

artificial structure is a so-called *omega* composite which is formed by embedding small  $\Omega$ -shaped particles in an isotropic host-medium. Normal incidence is assumed. The boundary-value problem for artificial omega structure was solved taking into account multiple reflections of electromagnetic waves from the sample's boundaries.

### Acknowledgement

Sergei Khakhomov thankfully acknowledges support from the Belarusian Foundation for Fundamental Research in form of a young scientist grant (grant number F99M-055).

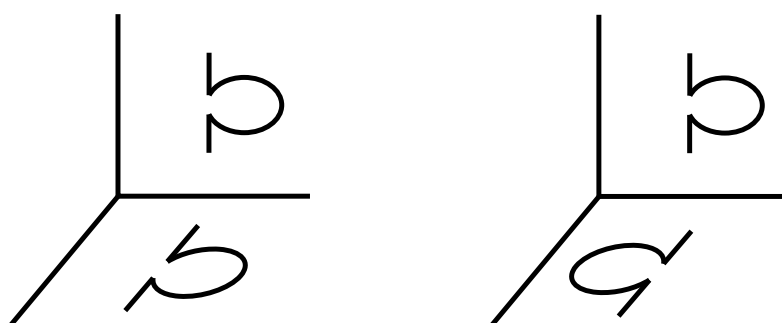


Figure 1. Geometry of the omega structure

## References

- [1] A. Serdyukov, I. Semchenko, S. Tretyakov and A.Sihvola, Electromagnetics of bi-anisotropic materials: theory and applications, Gordon and Breach Science Publishers, 2001.
- [2] M.M.I. Saadoun and N. Engheta, A reciprocal phase shifter using novel pseudo-chiral or  $\Omega$  medium, *Microw. and Optical Technology Lett.*, 5 (1992): 184–188.
- [3] A.A. Sochava, C.R. Simovski, and S.A. Tretyakov, Chiral effects and eigenwaves in bi-anisotropic omega structures, in *Advances in Complex Electromagnetic Materials* (Kluwer Academic Publishers, NATO ASI Series 3), Vol 28 (1997): 85–102.
- [4] I.V. Lindell, S. A. Tretyakov, and A. J. Viitanen, Plane-wave propagation in a uniaxial chiro-omega medium, *Microw. and Optical Technology Lett.*, 6 (1993): 517–520.

- [5] S.A. Tretyakov and A.A. Sochava, Proposed composite material for nonreflecting shields and antenna radomes, *Electron. Lett.*, 29 (1993): 1048–1049.
- [6] S.A. Tretyakov and A. A. Sochava, Novel uniaxial bianisotropic materials: reflection and transmission in planar structures, *Progress in Electromagnetics Research (PIER9)* (Cambridge, MA:EMW Publishing), (1994): 157–179.
- [7] Fedorov F.I., 1976, Theory of gyrotropy, Nauka i tekhnika, Minsk.
- [8] Bokut B.V., Serdyukov A.N., To phenomenological theory of natural optical activity, *Zhurnal Eksperiment. i Teor. Fiziki*, vol. 61, (1971), No.5, pp.1808 - 1813 .