Name of scientific school: Physics and Technology of Magnetoelectric Phenomena

Scientific advisor: Radio Equipment Design and Technology Department Chair, Dr. Sci. in Physics and Mathematics, Professor, Honored Science Worker of the Russian Federation, Honorary Figure of the Higher School of the Russian Federation, Honored Scientist of the Lodz University of Technology (Poland) Mirza Bichurin

Year of foundation of the scientific school: 1974

The staff of the scientific team: total number of members - 20, including doctors of sciences - 4, masters of sciences - 8

The main results of the team's work over the 2013 to 2016 period:

− Using single-crystal components in the form of spheres, films and plates as the magnetostrictive phase of the composite was proposed for the first time; it allowed observing the shift of ferromagnetic-resonance lines in an external electric field and creating the first models of magnetoelectric microwave devices;

− Theoretical models of magnetoelectric properties of magnetostriction-piezoelectric composites and structures with various connections were developed;

− Frequency dependences of the parameters of composites based on nickel, permendur, metallic glass, nickel zinc ferrite, lead zirconate titanate and sodium titanate niobate are obtained;

− Theoretical models of magnetoelectric properties of layered structures consisting of gradient magnetostrictive and piezoelectric materials are created;

− Frequency dependences of the parameters of layered structures based on gradient nickel zinc ferrite and lead zirconate titanate are investigated;

− Models for the characteristics of magnetostriction-piezoelectric structures consisting of single-crystal nanofilms are developed;

− Models of magnetoelectric low-frequency devices (sensors, transformers, power sources) and microwave devices (attenuators, filters, phase-shifters, detectors) of a magnetic type with electrical tuning of the working frequency are created.

The most significant publications of the team over the 2013 to 2016 period:

− Bichurin, M.I. Magnetoelectric effect at thickness shear mode in ferrite-piezoelectric bilayer [Текст] / M.I. Bichurin, R.V. Petrov, and V.M. Petrov // Appl. Phys. Lett. - 103, 092902 (2013).

− Bichurin, M.I. Modeling of magnetoelectric effect in composites [Текст]: монография / M.I. Bichurin, V.M. Petrov - Springer Series in Materials Science, 201, 2014. – 108p.

− Petrov, R.V. Magnetic Field Tunable Electromechanical Resonance Properties of Magnetoelectric Bilayer [Текст] / R.V. Petrov, V.M. Petrov, D.V. Kovalenko, G.A. Semenov, M.I. Bichurin // Solid State Phenomena, - Jul. 2015. - Vols. 233-234. – pp.349-352.

− Petrov, V.M. Enhanced Magnetoelectric Coupling in Layered Structure of Piezoelectric Bimorph and Metallic Alloy [Текст] / Petrov, V.M., Bichurin, M.I., Lavrentyeva, K.V., Leontiev V.S. // Journal of Electronic Materials. - August 2016. - Vol. 45, Issue 8. – pp.4197-4201.

− Bichurin, M.I. High Sensitivity Magnetometers, Smart Sensors, Measurement and Instrumentation. Chapter № 5. [Текст]: монография / M.I. Bichurin, V.M. Petrov, R.V. Petrov, A.S. Tatarenko. - Springer International Publishing, Switzerland, 2016.